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LEVERAGING THE PARTICIPATION OF SMALL AND MEDIUM-SIZED ENTERPRISES IN GLOBAL VALUE CHAINS OF THE AUTOMOTIVE INDUSTRY: INSIGHTS FROM MARUTI SUZUKI INDIA LIMITED

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Abstract

The existing potential of SMEs remains untapped in most developing countries, including India. In India, most SMEs have a lower share of foreign goods and services to produce exports than larger firms. Moreover, dependent SMEs also have greater integration in terms of imports than independent SMEs and are better equipped to overcome import trade barriers. Therefore, robust policies are essential to address the export and import constraints faced by SMEs. SMEs also face certain risks in global value chain (GVC) participation due to weaker bargaining power vis-à-vis larger firms, which calls for the creation of a level playing field. Against the above backdrop, the present study intends to analyze the role of SMEs engaged in the automotive sector in GVCs using a qualitative case study of Maruti Suzuki India Limited (MSIL) as a lead firm and how this role could be enhanced by government support. The study reveals that GVC participation benefits SMEs modestly; however, restructuring production through subcontracting can facilitate economic, industrial, functional, human, and technical upgrading. Government should extend necessary support to SMEs for the development of new alliances and comprehensive networks of upstream and downstream partners through information flow, access to the latest technology, learning opportunities, and acquisition of knowledge for high value added.

Keywords: automotive industry, global value chains, small and medium enterprises, India

JEL Classification: L62, F15, L29

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1. INTRODUCTION

Small and medium enterprises (SMEs) are heterogeneous in terms of size and sector diversity and are defined using different criteria (e.g., employment, sales, and turnover) across countries. Generally, SMEs are defined in terms of a threshold of between 100 and 500 employees (Ayyagari, Beck, and Demirgüç-Kunt 2007). In developing countries, SMEs contribute significantly to gross domestic product (GDP) and employment generation. The SME sector has emerged as a highly vibrant and dynamic sector of the Indian economy and has contributed significantly to economic development by complementing large industries as ancillary units, promoting entrepreneurship, and generating huge employment opportunities through various schemes focusing on finance, technology, infrastructure, skills and training, competitiveness, and market assistance.

Intermediary SMEs participating in global value chains (GVCs) of the automotive industry are considered key actors in domestic production and exports, which bring value and opportunities via learning, innovation, and technological upgrading through access to advanced technology and business processes of lead firms. Local SMEs can also achieve significant success by combining domestic and foreign intermediate inputs through specialization and improved opportunities in terms of manufacturing abilities and efficiency in GVCs of the automotive industry. SME participation in GVCs involves a certain degree of direct or indirect trade. The sample SMEs analyzed in this study do not directly export their products but export indirectly by supplying components to the lead firm that exports.

GVCs enable SMEs to specialize in specific manufacturing segments and integrate into global production chains and contribute to economic development via higher productivity and increased exports (Kowalski et al. 2015) through exports and upstream supplies to larger firms as well as access to cheaper inputs and capital goods including foreign technologies, products, and know-how. Furthermore, foreign direct investments (FDIs) help SMEs to access international markets and integrate in GVCs as upstream suppliers to exporters (OECD-World Bank 2015). However, the existing potential of SMEs remains untapped in most developing countries, including India.

In India, most SMEs have a lower share of foreign goods and services to produce exports than larger firms. Moreover, dependent SMEs also have greater integration in terms of imports than independent SMEs and are better equipped to overcome import trade barriers. Therefore, robust policies are essential to address the export and import constraints faced by SMEs. The gains from GVC participation in global production networks will be more for firms in the center with greater access to foreign inputs and technologies than small firms at the periphery. SMEs also face certain risks in GVC participation due to weaker bargaining power vis-à-vis larger firms, which calls for the creation of a level playing field. Against the above backdrop, the present study intends to analyze the role of SMEs engaged in the automotive sector in GVCs using a case study of Maruti Suzuki India Limited (MSIL) and how this role could be enhanced by government support.

2. REVIEW OF LITERATURE

A value chain (VC) implies a “set of activities which are required to bring a product or service from conception, through the different phases of production, delivery to final consumers, and final disposal after use” (Kaplinsky and Morris 2001, 4). The global

network of various organizations and firms in the VC leads to the emergence of a GVC (Gereffi and Korzeniewicz 1994). A GVC is defined as "the full range of activities that firms and workers perform to bring a product from its conception to end use and beyond" (Gereffi and Fernandez-Stark 2011, 4). GVCs are coordinated by large multinational enterprises (MNEs) called "lead firms" (Kano 2018). Lead firms perform core activities in the VC (Navas-Alemán 2011). Upgrading involves innovation to generate higher value added by improving processes, products, and functions in the VC and creates interorganizational capacity to meet buyers' demands (Pietrobelli and Rabellotti 2011). MNEs control high-value-added functions, and therefore capture higher value added than supplier s (Buckley and Strange 2015).

GVC players perform better than non-GVC players (Abe 2015). SMEs experience greater stability due to better business diffusion and upgrading prospects (Navas-Alemán 2011) and gain from GVC participation through upgrading (Abe 2015) and may develop their own brand to become a lead firm (Gereffi 1999). Innovative firms gain more from upgrading in GVCs by increasing productivity, employment growth, and sustainable business (Minniti and Venturini 2017), which depends on institutions and government policy. However, upgrading occurs less often in firms focused on low-value manufacturing in developing countries (Navas-Alemán 2011), due to high barriers to functional upgrading (Buckley and Strange 2015).

SMEs have less knowledge-based capital and accumulated technology to enable them to adopt emerging technologies than large MNEs (OECD-WB 2015) and weaker managerial skills, which act as a barrier to their effective participation in GVCs (OECD 2017). The geographic location of SMEs determines their prospects of joining GVCs (Kowalski et al. 2015). The quality of physical infrastructure and their operational efficiency along with types of preferential access to major industrialized markets also influence SMEs' participation in GVCs (OECD-WB 2015). Trade and investment liberalization facilitates technological advances (Buckley and Strange 2015) and maximizes the efficiency of lead firms (Kano 2018).

Globally, industrial policies are focused on GVC integration and upgrading (UNCTAD 2018). Automotive component manufacturers rarely design and brand their own exports even in GVCs, which makes them more vulnerable than lead firms (Navas-Alemán 2011). Moving up into GVCs requires fitting into existing corporate strategies and establishing close links with lead firms (Gereffi 1999). Policy makers need to know how to upgrade SMEs' position in GVCs (Kaplinsky and Farooki 2010). In brief, coordinated actions of government, businesses, and international organizations are required to support public and private investments to gain from SMEs' participation in GVCs.

3. OBJECTIVES AND METHODOLOGY

The selected case study has focused on the highly competitive automotive sector in India, using structured interviews with the senior management of Maruti Suzuki India Limited (MSIL) and 20 SMEs engaged in manufacturing auto components (ACs) to capture information on the awareness and understanding of GVCs, linkages to GVCs, the relationship between lead and supplier, government support, and efforts to upgrade activities. The summary and detailed characteristics of interviewed SMEs are given in Table 1 and Annexure I, respectively. In this study, a firm is defined as a foreign firm or foreign affiliate if more than 10% of the equity is owned by a foreign firm; if less than 10% of the equity is owned by foreign firms (or more than 90% of the equity is owned by domestic firms), then the firm is classified as a domestic firm; and if 100% of the equity

is owned by foreign (domestic) firms, then the firm is a wholly owned foreign (domestic) firm. The sample size of selected SMEs has been restricted to 20 by selecting an equal proportion of small and medium enterprises, of which 17 were foreign firms (JVs: 65% and wholly owned: 20%), and the rest were domestic firms (JVs: 10% and wholly owned: 5%).

The impact of GVCs on SMEs in developing countries has not been thoroughly researched. Therefore, the present study intends to understand the process of SME participation in GVCs in the context of the automotive component industry (ACI) using a case study approach focusing on MSIL, as a lead firm, and to draw policy options to better integrate SMEs into global markets. The findings of the selected case study are automotive industry-specific based on procurement strategies of the lead firm and helpful in identifying the key policies for leveraging SMEs' role in GVCs.

Table 1: Summary Characteristics of Selected SMEs

Characteristics	**SMEs** (Number)	**SMEs** (%)
Size of SMEs		
a. Small (< INR 200 million)	10	50
b. Medium (> INR 200 million)	10	50
Total	20	100
Duration of SMEs		
a. Old firm (before year 2000)	12	60
b. New firm (after year 2000)	8	40
Total	20	100
Foreign firms		
a. JVs	13	65
b. Wholly owned	4	20
Domestic firms		
a. JVs	2	10
b. Wholly owned	1	5
Total	20	100

Source: Compiled by author.

4. SMES IN INDIA

Micro-, small, and medium-sized enterprises (MSMEs) are major drivers of economic development, innovation, and employment. In India, SMEs are classified as a part of MSMEs. Generally, MSMEs are defined in terms of investment in plant, machinery, and/or equipment, the number of people employed, and the annual turnover. In India, MSMEs are collectively known as small-scale industries (SSIs) in terms of the number of employees under the Industrial Development and Regulation Act 1951; however, due to a lack of reliable data on number of employees, investment in plant and machinery/equipment was considered as a proxy. The MSME Development Act 2006 had removed ambiguity in the criteria for classifying MSMEs by providing a comprehensive definition of an MSME based on separate investment ceilings for manufacturing and service enterprises: a microenterprise with investment of less than INR2.5 million and INR1 million, a small enterprise with investment of INR50 million and INR20 million, and a medium enterprise with investment of INR100 million and INR50 million, respectively, in plant and machinery in the manufacturing sector and in equipment in the service sector.

In 2018, Section 7 of the MSME Development Act 2006 was amended to define a microenterprise as having an annual turnover not exceeding INR50 million, a small enterprise as having an annual turnover of more than INR50 million rupees but not exceeding INR750 million, and a medium enterprise as having an annual turnover of more than INR750 million but not exceeding INR2.5 billion (GoI 2018). MSMEs can be distinguished from other firms, which enables the country to use targeted policy interventions to address their special needs. In India, small firms employ less than 100 workers, while medium firms employ 100–499 workers, medium-large firms employ 500–999 workers, and large firms employ 1,000 or more workers (GoI 2014).

Table 2 reveals that MSMEs surged rapidly during the period 2000–2001 to 2010–2011, declined sharply from 2010–2011 to 2018–2019, but remained robust at 11.2% during the period 2000–2001 to 2018–2019, and contributed significantly to economic growth owing to their contribution to output, exports, and employment. The MSME sector's exports remained lower than its share in total exports; however, it surged significantly despite sluggish global demand and stiff international competition. After the MSME Development Act 2005, the MSME sector surged robustly, which is reflected in Table 3. MSMEs are engaged in both formal and informal sectors of the Indian economy. There was a rapid increase in the number of registered MSMEs from 0.21 million in 2010 to 0.43 million in 2015 (GoI 2016) and further to 3.7 million in 2018, of which micro-, small, and medium enterprises stood at 89.6%, 10%, and 0.4%, respectively (GoI 2019), due to changes in policy toward registered SMEs, such as the introduction of preferential treatment for registered firms after 2015.

Table 2: Selected Parameters of MSMEs in India (%)

	Compound Annual Growth Rate (CAGR)					Average Share of	
Year	MSMEs	Fixed Investment	MSME Output	Exports of MSME Production	MSME Employment	MSME Exports in Total Exports	MSMEs in Total GDP
2000–2001 to 2010–2011	15.5	22.2	20.7	13.9	15.0	31.43	24.29
2010–2011 to 2018–2019	5.9	7.6	10.1	67.7	2.4	39.66	33.44
2000–2001 to 2018–2019	11.2	17.2	17.1	33.6	9.2	35.75	30.72

Note: The data for the period 2000–2001 to 2005–2006 are related to SSIs. CAGRs are computed from the nominal INR value for all items except MSMEs and employment, which are measured in terms of the number of MSMEs and employees, respectively. The CAGR of fixed investment and gross output for 2010–2011 to 2018–2019 refers to 2010–2011 to 2015–2016, and the CAGR of exports for 2010–2011 to 2018–2019 refers to 2010–2011 to 2017–2018.

Source: Author's creation based on data provided in GoI (2013, 2016, 2017, and 2019) and data extracted from the Central Statistical Office, Ministry of Statistics and Program Implementation, New Delhi: Government of India.

Table 3: Growth of MSMEs in India (million)

	Number of Firms			Employment		
Parameter	MSMEs	Manufacturing	Services	Total	Manufacturing	Services
Fourth All India Census of MSMEs (2006–2007)	36.2	11.5	24.7	80.6	32.1	48.5
NSS 73rd Round (2015–2016)	63.4	19.7	43.7	110.9	36.0	74.9
CAGR (%)	6.43	6.14	6.56	3.63	1.33	4.95

Source: Author's creation based on data provided in NSS 73rd Round (2015–2016) and Fourth All India Census of MSMEs (2006–2007).

Table 4 reveals that microenterprises provided significantly more employment than small and medium enterprises. The robust performance of MSMEs after the MSME Development Act 2005 has been attributed to several policy initiatives, including institutional and credit support, aimed at increasing the competitiveness of SMEs and integrating them into economic development strategies and plans. In India, SMEs have huge potential to tap the latent entrepreneurial talent and provide an opportunity for inclusive growth by addressing barriers such as the high cost of maintaining high-quality standards, access to information, finance, technical and managerial skills, FDI, technology, inadequate infrastructure and knowledge transfer to local suppliers to enter higher-value activities, promote technology and business linkages, attract high-quality FDI, and export promotion.

Table 4: Status of MSMEs and Employment in India (2015–2016)

	Number of MSMEs				Employment	
Type of Enterprise	**Total** (million)	**Share** (%)	**Registered** (million)	**Share** (%)	**Employment** (million)	**Employment** (%)
Micro	63.052	99	3.489	89.55	107.62	97
Small	0.331	0.52	0.392	10.06	3.19	2.87
Medium	0.005	0.48	0.015	0.39	0.17	0.13
Total	63.388	100	3.896	100	110.98	100

Source: Author's creation based on data provided in NSS 73rd Round (2015–2016).

5. INDIAN AUTOMOBILE INDUSTRY: HISTORY AND RECENT PERFORMANCE

In the late 1920s, General Motors established assembly plants in Mumbai, which was followed by assembly operations by Ford in early 1930s in Chennai, Mumbai, and Kolkata. In the early 1940s, India saw the establishment of two automobile companies, Hindustan Motors Limited in 1942 and Premier Automobiles Limited in 1944, with foreign technical collaboration. In India, the automotive sector was heavily regulated, protected, and indigenized from the late 1940s to the early 1970s. The Indian automotive industry (IAI) had experienced slow growth and limited competition followed by some relaxation of technology acquisition in the 1980s, which led to the entry of Japanese firms.

In 1982, the Government of India (GoI) and SMC of Japan entered a JV and established Maruti Udyog Limited (MUL), later renamed MSIL, which led to diverse changes in the IAI due to the introduction of Japanese standards and technologies and also incentivized domestic auto component suppliers (ACSs) to improve their competences. By the mid-1990s, several foreign automotive firms had entered JVs with Indian firms. Import restrictions were removed and customs duties were reduced by 2002; however, domestic protection still existed with a high import duty of 125% on imported used cars (SIAM 2017). In 2002, the GoI had introduced its Auto Policy (GoI 2002) followed by the Automotive Mission Plan (AMP), 2006–2016 (GoI 2006). These initiatives had led to technology development and increased production of small cars, which created supply chains (SCs) in India to serve local assembly operations, and resulted in making India an Asian hub for ACs. Over the period, the IAI had seen significant transformation in terms of growth and profitability.

Despite less integration of the Indian manufacturing sector in GVCs (Athukorala 2019), the IAI has significantly integrated into GVCs in more than the past two decades.

Upgrading in automotive GVCs occurs through investment policy, particularly FDI policy as part of industrial policy (UNCTAD 2018), which has been used to serve local markets by emphasizing local content requirements to boost assembly and local component supply. Table 5 shows that the CAGR of production of passenger and commercial vehicles has declined, while domestic sales of passenger vehicles have increased and those of commercial vehicles declined, whereas exports of passenger and commercial vehicles declined sharply during the period 2000–2001 to 2010–2011 and 2010–2011 to 2019–2020. The production of passenger and commercial vehicles is planned to reach 10 million and 2.35 million units in 2020–2021 from 4.26 million and 1.11 million, respectively, in 2018–2019 (SIAM 2019). This will lead India to become a leading manufacturer and exporter of vehicles and it is likely that the IAI will become the third largest globally in 2020.

Table 5: Production, Domestic Sale, and Export of Passenger and Commercial Vehicles (%)

	CAGR					
	Passenger Vehicles			Commercial Vehicles		
Year	Production	Domestic Sale	Export	Production	Domestic Sale	Export
2000–2001 to 2010–2011	16.8	15.3	32.2	17.6	16.3	18.1
2010–2011 to 2019–2020	15	17.2	5.1	14.8	15.8	3.4
2000–2001 to 2019–2020	16	16.2	18.6	16.3	16.1	10.9

Note: CAGRs are computed from the number of vehicles.

Source: Author's creation based on data provided in SIAM (2015, 2016, 2017, and 2019) and data extracted from the Centre for Monitoring Indian Economy (CMIE) and SIAM.

Table 6 reveals that the CAGR of aggregate turnover, exports, and imports in the auto component sector surged rapidly during the period 2000–2001 to 2010–2011 compared to the period 2010–2011 to 2019–2020, while the CAGR of investment remained negative over the last two decades. In the recent past, investment in AC sector has experienced a declining trend despite a surge in vehicle sales due to improved domestic and export market conditions. Imports and exports of the ACI reveal an increasing trend from US$0.58 billion and US$0.26 billion in 2000–2001 to US$15.17 billion and US$17.6 billion, respectively, in 2018–2019. However, ACI imports have remained higher than exports since 2007–2008 (ACMA 2019). ACSs are projected to reach a turnover of US$130 billion and US$200 billion, respectively, by 2021 and 2026, which is attributed to the expectation of high growth in domestic passenger and commercial vehicles (SIAM 2019).

Table 6: Auto Component Industry in India (%)

	CAGR			
Year	Investment	Aggregate Turnover	Exports	Imports
2000–2001 to 2010–2011	0.0	26.4	26.6	45.7
2010–2011 to 2019–2020	–3.9	2.6	8.5	8.7
2000–2001 to 2019–2020	–1.7	14.5	17.7	25.9

Note: CAGRs are computed from the nominal US dollar value. CAGR of investment for 2000–2001 to 2019–2020 refers to 2001–2002 to 2017–2018, and CAGR of import for 2000–2001 to 2019–2020 refers to 2001–2002 to 2019–2020.

Source: Author's creation based on data provided in ACMA (2016 and 2019), GoI (2006), and IBEF (2019), and data extracted from CMIE and ACMA.

In India, AC players stood significantly higher at 10,000 in the unorganized sector compared to just 700 in the organized sector in 2017. However, the turnover of organized AC players stood at 85%. In 2016, 302 auto component firms (ACFs) (41.7%) had formal R&D activities compared to only two firms in 1991 (ACMA 2016), reflecting a significant increase in the number of automotive companies engaged in formal R&D activities and more so in domestic and foreign joint firms than wholly owned domestic firms or otherwise to maximize the benefit from each other's strengths. The National Automotive Testing and R&D Infrastructure Project had developed seven testing facilities by 2011 to develop a state-of-the-art testing, validation, and R&D infrastructure with an investment of US$388.5 million to implement global standards. Many global suppliers, such as Bosch Chassis Systems, Tenneco, and Faurecia, have developed R&D facilities to adopt global designs and develop new products in India. Increasing investments in automotive R&D also helps auto players to set up laboratories and new facilities to conduct analysis, simulation, and engineering animations. For example, Magneti Marelli entered into a JV with MSIL to install a new plant for the production of robotized gearboxes for automobiles.

Recently, the government has aimed to invest US$4.5 billion in upgrading products and meeting new industry regulations in ACSs under the Make in India initiative. Exports and imports of ACs are projected to reach US$80 billion and US$23–28 billion by 2026 (ACMA 2019). ACSs are well equipped to address the challenges of a downturn due to existing strong fundamentals and the adaptation of robust risk mitigation measures through diversification to new vehicle segments and new regions, for instance using the ASEAN free trade agreement to boost exports and strengthen the AC aftermarket. Several foreign firms have also made substantial investments in ACSs in recent years. Moreover, a low-cost manufacturing base, additional cost advantages in terms of steel production, and supportive policies have been used effectively.

Recent automobile manufacturing policy is based on the AMP 2016–2026. The AMP 2016–2026 aims to generate an annual revenue of US$300 billion in the IAI by 2026 by contributing more than 12% to GDP and generating 65 million jobs and it is likely to become the world's third-largest passenger vehicle market by 2021 (SIAM 2015). Other initiatives include the National Mission on Electric Mobility in 2011; the National Electric Mobility Mission Plan 2020 introduced in 2013; Faster Adoption and Manufacturing of Hybrid and Electric Vehicles in 2015; the New Green Urban Transport Scheme in 2017; and the Draft National Automotive Policy 2018. These initiatives have aimed to remove problems pertaining to auto manufacturers. However, none of these initiatives are specifically GVC oriented as per the framework given by Gereffi and Sturgeon (2013).

6. MARUTI SUZUKI INDIA LIMITED (MSIL)

SMC is an automobile and motorcycle manufacturer in Japan. MUL was incorporated in 1981 and SMC began its operation as a JV with the Indian government in 1982 by investing in MUL and started manufacturing in 1983. In the late 1990s, differences occurred over planned factory expansion, locations, and funding sources as well as the suitability of the executive nominated by the Indian government to head the JV in 1997, which led to litigation by SMC against the Government of India. In 1998, the two parties settled the dispute, however it caused interruption to the production of new car models. In 2002, SMC increased its stake in MUL to 54.2%, followed by selling off some government shares on the stock exchange in 2003. In July 2007, MUL was renamed MSIL and the government sold all of its remaining shares. The domestic OEM Tata

Motors launched the small car Tata Nano in July 2009, which led to price competition, followed by the entry of Toyota and Honda, thereby requiring MSIL to gear up against the top-tier competitors.

6.1 Recent Performance

Table 7 reveals that the CAGR of revenue, net profit, and R&D investment of MSIL declined significantly during the period 2010–2011 to 2018–2019 compared to the period 2000–2001 to 2010–2011. Overall, the financial performance of MSIL improved steadily, except for years with production disruptions due to labor strikes.

Table 7: Financial Performance of MSIL (%)

	CAGR					
Year	**Revenue**	**Net Profit**	**Assets**	**Regular Employees**	**Liabilities**	**R&D**
2000–2001 to 2010–2011	15.7	41.9	11.5	2.2	7.2	25
2010–2011 to 2018–2019	5.4	9.8	13.9	9.9	11.4	1.3
2000–2001 to 2018–2019	11.0	25.7	12.6	5.5	9.03	13.8

Note: CAGRs are computed from the nominal US dollar value for all items except regular employees, which are measured in terms of the number of employees. The CAGR of net profit for 2000–2001 to 2010–2011 refers to 2001–2002 to 2010–2011.

Source: Author's creation based on data provided in MSIL annual report (various years).

Table 8 reveals that the CAGR of production, domestic sales, and exports of MSIL remained robust from 2000–2001 to 2010–2011. MSIL's production steadily increased until 2010, but declined in 2011–2012 due to a major strike in 2010–2011. Domestic sales and exports of MSIL also increased significantly, except in some years. In mid-2019, MSIL became the first carmaker to introduce BSVI-compliant cars in India (IBEF 2019). MSIL is a market leader in the passenger car segment and held about 50% of the market share in 2019–2020, selling 1,862,449 units in domestic and export markets (MSIL 2019).

Table 8: Production and Sales of MSIL (%)

	CAGR		
Year	**Production**	**Domestic Sales**	**Exports**
2000–2001 to 2010–2011	13.8	12.9	24.6
2010–2011 to 2018–2019	2.6	5.6	–2.96
2000–2001 to 2018–2019	8.7	9.6	11.5

Note: CAGRs are computed from the number of units.

Source: Author's creation based on data provided in MSIL annual report (various years).

MSIL has enhanced flexibility in product lines to enable production of multiple models in a single line and introduced platform sharing in product parts such as common chassis and core components. Currently, MSIL has two manufacturing facilities located in Gurugram and Manesar in Haryana with a combined production capacity of 1.58 million units per annum using highly efficient lean manufacturing processes. In 2017, Suzuki Motor Gujarat Private Limited (SMG), a subsidiary of SMC, was set up in Hansalpur,

Gujarat to meet the increasing demand for the company's products. SMG has an additional production capacity of 0.5 million units per annum. Therefore, the combined production capacity of SMC and SMG stood at 2.08 million units. SMG is expected to increase its production capacity to 0.75 million units by 2020 (MSIL 2019). Several companies were set up as suppliers to MSIL, including Jai Bharat Maruti, Minda Industries, Sona Koyo Steering Systems Ltd, etc. A few of these companies use a proprietary technology developed by Suzuki's Japanese supplier, which held an equity stake in the Indian company.

6.2 Subcontracting System

The IAI has a vertically integrated pyramid style, wherein assemblers are positioned at the top, tier 1 and tier 2 ACSs in the middle, and unorganized small and tiny suppliers in the lower ranks of the VC, which is connected through subcontracting practices. In India, the integration of ACSs through SCs and subcontracting started with the entry of MSIL. In the initial phase, MSIL started the production of passenger cars from complete knockdown of imported components. With the rapid increase in production, it had followed a phased manufacturing program by increasing the amount of local contents from suppliers, for which SMC brought its Japanese subcontractors to India through JVs. Furthermore, existing Indian and foreign AC manufacturers also became suppliers to MSIL, who also procured parts and components from other subcontractors, known as tier 2 suppliers. MSIL used its monopolistic power in the passenger car segment to develop its suppliers through subcontractors to develop its SCs by providing technical and financial assistance.

Large production, high quality, and reduced costs and delivery time are necessary conditions for subcontracting to develop. Following economic reforms in 1991, more domestic and foreign automobile firms entered the manufacturing of passenger vehicles and AC sector in India. With the expansion in the domestic market and increased competition, subcontractors of MSIL started to supply their products to other assemblers, which led MSIL to change its procurement strategy by reducing the number of subcontractors from 400 in the 1980s to 220 in the 2000s. In 2013–2014, the supplier base of MSIL stood at 326 suppliers, including 18 JV companies, and this increased to 444 local suppliers in 2015–2016, which provide raw materials, ACs, and consumables, and the number of plants of tier 1 suppliers stood at 564 in 2018–2019 (MSIL 2019).

Numerous ACFs supply parts and components to MSIL, who work directly with tier 1 suppliers, which in turn are supplied by many tier 2 or tier 3 suppliers. For instance, Denso is a tier 1 supplier of electronic control units, fuel pumps, and injectors that imports critical parts from Japan and primarily engages in assembly in India. Low-cost manufacturing leads to collaboration between MSIL and Denso to increase its procurement from local tier 2 suppliers to meet standards of end products and enables greater cost competitiveness for its products. The upstream segment of MSIL's VC comprises a multi-tiered SC network.

6.3 Suppliers' Upgrading Program

The main upgrading activities carried out by MSIL are listed below. MSIL helps in process upgrading through various channels, including the use of new production machinery and the development of new models, which led to increased demand for SMEs engaged in AC manufacturing, workers' training, a reduction in delivery times, an improvement in quality, new management techniques, an improved production process, and increased use of ICTs. These initiatives have led to new learning and

demonstration effects on MSIL subsidiaries and associated component firms. Since its inception, MSIL has systematically trained workers in multi-skills, strongly used information technology systems, and increased automation. MSIL considers financial strength, production flexibility, and demand sensitivity of ACSs to be an essential condition for its financial performance and production sustainability. As such, MSIL collaborates with its suppliers to ensure the quality and timeliness of supplies along with minimizing its environmental and social footprint, and uses the Comprehensive Excellence (CE) program to upgrade the performance of tier 1 suppliers in terms of quality, safety, financial capability, human resources, and risk management. In 2018–2019, 50% of supplier plants met the performance standards of the CE program. The Maruti Suzuki Suppliers Welfare Association conducted suppliers' awareness activities on the best practices to meet the company's expectations and awarded high-performing suppliers. MSIL helped tier 1 suppliers to identify fire risks, suggested mitigation measures, and carried out fire risk assessment of plants. In 2018–2019, 90% of supplier plants implemented fire safety measures (MSIL 2019). MSIL conducted a program to improve the human safety of its tier 1 suppliers, and encouraged them to adopt a safety management system and periodic reporting on it. MSIL also identified supplier plants facing acute waterlogging in the rainy season, which caused supply disruption, and helped them improve the drainage system.

MSIL's Green Procurement Guidelines help tier 2 suppliers to use the Environmental Management System. In 2018–2019, 75% of supplier plants had OHSAS 18001 certification and 485 suppliers had ISO 14001 certification. MSIL has adopted local sourcing of components and 88% of suppliers are located within a 100 km radius of its manufacturing facilities, and it facilitates the upgradation of tier 2 suppliers through the involvement of tier 1 suppliers. Tier 2 suppliers have been developed for surface and heat treatment of ACs. The Maruti Center for Excellence has provided training support to suppliers to maintain different quality standards. The Maruti Suzuki Training Academy has conducted need-based training of tier 1 suppliers in preventive maintenance and plant safety. MSIL has started up "Dojo" ("place" or "way" in Japanese) training centers to maintain top-quality ACSs, which have been useful for other SMEs engaged as tier 1 and 2 suppliers. The number of Dojo centers is planned to increase to 400 in 2020 (MSIL 2019). With improved production processes and greater automation, a significant reduction in delivery times has been achieved.

MSIL has resorted to significant upgrading of ACs' technological capabilities by replacing older components with more advanced parts to meet consumer demands and to compete with global suppliers, which has led to a rapid surge in AC manufacturing. This has also been done through total quality improvements in production processes. Improving operational efficiency has been one of the key aspects of the new organizational and management techniques. With increased competition, MSIL decided to ensure quality for growth and survival, for which formal quality improvement programs have been implemented. New quality upgrading programs, such as just-in-time, total quality management, and total productivity management, have been adopted. MSIL subsidiaries and linked SMEs in AC manufacturing have also attempted to follow such upgrading activities. The product upgrading activities of MSIL include improved product quality, the use of improved materials to enhance the product range, and reduced reworking rates. MSIL has also used functional upgrading in design, but has left marketing and attempts to improve product quality by meeting regulatory norms and consumer demands and to innovate and improvise on the existing product portfolio. MSIL's product quality improvements include upgraded features, design facelifts, and new and improved engines.

7. RESULTS OF THE STUDY

The case study is qualitative and highlights how the lead firm, i.e, MSIL, enabled the integration of Indian SMEs into the GVC by initially providing them with the ability and technological know-how to leverage their participation in the GVC of the IAI. Several SMEs were set up as suppliers to MSIL. Most SMEs in the IAI have experienced growing competition along with MSIL in seeking new suppliers that could meet more stringent technology, investment, and quality standards.

7.1 Awareness and Understanding of GVCs

All the SMEs that participated in the interview have a high level of awareness of other firms and the overall structure of the IAI. Table 9 reveals that 45% of smaller firms at lower tiers are less aware of the benefits of GVC participation, while 85% of all firms are aware of key elements for successful participation in GVCs, including quality, flexibility, adaptability, and ability in production, including cost-efficiency and timeliness, human capital, and technology to meet international standards, and low rejection rates, which gives a competitive edge to suppliers in meeting future demand. About 80% of firms understand the value of quality, cost, and timeliness, while 90% of firms consider the significance of skills and technology to reap the benefits from GVC participation, whereas 85% of firms understand their strengths in maintaining flexibility, adaptability, and ability in production, and also value the huge financial capacity and stronger technology base of MSIL.

The senior management of MSIL has a clear understanding of GVCs in the IAI and associated concepts and processes and acknowledges the growing competition in the automotive sector and also revealed that declining import tariffs have a significant impact on the productivity and cost competitiveness of its suppliers. MSIL faces intense domestic competition with other OEMs and international OEMs in terms of the cost and quality of supply in export markets and must be highly competitive not only in relation to local OEMs, but also with other OEMs globally. MSIL's global strategy has been to expand its export markets and restructure domestic plants with new models. In recent years, MSIL has implemented major strategic changes and remained the largest car producer in India due to significant trade protection and its network of suppliers.

Table 9: Level of Awareness of GVCs Shown by Interviewed SMEs

Level of Awareness	**SMEs** (No.)	**SMEs** (%)
Awareness of other firms	20	100
Awareness of overall structure of IAI	20	100
Benefits of GVC participation	9	45
Elements of successful GVC participation	17	85
Value of quality, cost, and timeliness	16	80
Skills and technology	18	90
Flexibility, adaptability, and ability	17	85
Financial capacity and technology of MSIL	20	100
High awareness of GVC concepts	11	55
Less awareness of GVC concepts	9	45

SMEs engaged in automotive components have mixed perspectives on participation in GVCs, which varied with the size of the firms. A total of 55% of firms with a large turnover and transnational ownership structure and substantial experience of supplying to transnational OEMs along with a dominant automotive component product profile are more aware of GVC concepts and processes compared to 45% of firms with a lower turnover and still learning about GVC-related issues. In recent years, the intensity of the relationship between MSIL and ACSs has changed significantly and is expected to change further in the coming years with increasing competition. Smaller participating firms, comprising 45% of all firms, have few raw materials suppliers and have been suppliers to tier 1 suppliers and considered themselves part of GVCs, and therefore faced growing competition in terms of technology, investment, and quality standards, which varies substantially from firm to firm. Most sampled SMEs (80% of firms), comprising 35% of Indian subsidiaries and 45% of local firms, face substantial competitive threats from transnational firms via imported alternatives or their subsidiaries owning production technology.

7.2 Linkages in GVCs

Table 10 reveals that all participating JV firms of MSIL (25% of all firms) believe that the scale and scope of coordination processes had increased substantially due to which these firms became more integrated into the production processes of MSIL. Large SME suppliers (50% of all firms) have a track record of product and process research and design and opined that building trust with SME suppliers has been a key activity of MSIL, with whom it had worked over the years to enable them to retain a supply relationship. The participation of 45% of local components suppliers' plants in GVCs has helped maintain global standards, and production and logistics efficiencies.

Local suppliers (45% of all firms) in GVC have contracted to supply components for a particular model based on price, quality, and other factors with an opt-out clause in the case of substandard supplies. All participating firms revealed that MSIL's production depends on demand, and accordingly supply arrangements have been based on production schedules. Long-term supply and technology development relationships have been preferred by 45% of supplier firms; however, where necessary, short-term contracts have been arranged with 20% of firms. Regular coordination and personal interaction have also been emphasized to build trust with 45% of firms by MSIL.

Table 10: Cooperation and Types of Linkages in GVCs

Cooperation and Types of Linkages in GVCs	**SMEs** (No.)	**SMEs** (%)
Increase in scale and scope of coordination	5	25
Trust in SME suppliers by MSIL	10	50
Global standards and efficiencies	9	45
Supply components for a particular model	9	45
Supply based on production schedules	20	100
Long-term supply and technology relationships	9	45
Short-term contracts	4	20
Regular coordination and personal interaction	9	45
Specifications of international standards	9	45
JVs with local firms	5	25
JVs with foreign firms	1	5

Besides 25% of transnational participating firms, MSIL had been working to help 45% of existing local suppliers to meet specifications of international standards. With the increase in production of different models for domestic and international markets, there has been a significant increase in the number of JVs with 25% of local participating firms and 5% of global sourcing partners. The goal was to reduce the production costs with an increased value of supplies in the local market along with an increase in volumes. Most of the sampled SME suppliers (80% of firms consisting of Indian subsidiary firms and local suppliers) opined that the high-standard requirements of MSIL have increased costs and failed to provide a premium in prices within the automotive VC. Thus, 20% of sampled transnational firms would be able to leverage more benefits by complying with all the standards and system requirements.

7.3 Relationship between Lead Firm and Supplier

MSIL has been the most important business partner of all participating SMEs. Table 11 reveals that 45% of participating SMEs believe that transnational suppliers and JV firms have been the main intermediaries linked with MSIL, while 30% of participating SMEs have also learnt from other suppliers to OEMs. Logistics firms have played a significant role in getting inputs from suppliers and delivering to MSIL. MSIL has emphasized relationships with key suppliers, mainly 25% of its participating JV firms and their distribution agents. The proximity of all participating SMEs to the lead firm has strengthened participation in GVCs by building some level of trust over time, while 40% of comparatively small firms believe that their size in terms of employment and investment acts as an impediment to their GVC participation due to the fact that they do not have enough sources of technology and innovation to secure long-term supply relationships.

Table 11: Relationship Between Lead Firm and Supplier Firms

Relationship between Lead Firm and Supplier Firms	**SMEs** (No.)	**SMEs** (%)
Reasons for joining GVCs		
Transnational and JV firms linked with MSIL	9	45
Learnt from other suppliers	6	30
Relationships with key suppliers	5	25
Proximity strengthened GVC participation	20	100
Conditions to join GVCs		
International standard certifications	20	100
Invested in innovation and product development	4	20
Linkages with global component firm	1	5
Obstacle in joining GVCs		
Lack of technology and innovation	8	40
Attaining international standards difficult	4	20
High price competition and quality ratings	6	30
Difficult, expensive, and complex certification	13	65
Weaknesses in technology and product development	7	35

All the suppliers have international standard certificates, which were a mandatory condition of the lead firm, while 20% of firms revealed that attaining these standards has been difficult for small firms engaged in low-value components, but it strengthened their position in the GVC, whereas 30% of participating SMEs have seen a high level of price competition along with acceptable MSIL quality ratings. Most participating SMEs (65%

of firms) revealed that achieving international material certification was difficult, expensive, and complex. Lead firm revealed that 35% of local suppliers have weaknesses in terms of technology ownership, innovation, and product development, while 20% of firms had invested in such capability, but one firm had preferred to establish linkages with sampled global ACFs, and the rest of the participating SMEs had preferred not to do so due to poor human and technological capabilities, product development, innovation, R&D, and high-quality standards including regulatory restrictions to entering into collaborations with foreign firms and greater emphasis on indigenization.

7.4 Government Support

No firms were enthusiastic and optimistic about government support to improve their participation in GVCs. Table 12 reveals that 80% of firms believed that government has the necessary capacity to address their genuine needs, while 65% of firms have reported that government always remained very slow to intervene through skills development, investment incentives, technology development, and labor reforms. A total of 45% of firms were of the opinion that government should be proactive in order to benefit OEMs and small ACFs participating in GVCs, whereas 60% of participating SMEs had gained access to government schemes, including investment incentives and export opportunities, but the main challenges of the automotive sector remained unaddressed.

Table 12: Government Support to Enhance GVC Participation

Government Support for GVC Participation	**SMEs** (No.)	**SMEs** (%)
Not enthusiastic and optimistic about gov support	20	100
Gov has capacity to address genuine needs	16	80
Gov is slow to intervene	13	65
Gov should be proactive in providing support	9	45
Access to gov schemes	12	60

7.5 Impact of GVC Participation

The perceptions of SMEs were ascertained to understand the impact of GVC participation on their functioning and performance. Table 13 reveals that 45% of firms reported lower skill intensities with GVC participation and subcontracting resulting in a small decline in industry-level wages for low- and medium-skilled workers, whereas 30% of firms perceived a positive wage effect for workers employed in less manual-intensive manufacturing jobs. There has been a significant rise in the capital intensity of production resulting from the expansion of GVCs and a decline in the labor share in income of 55% of firms, and subcontracting has led to a widening wage gap between skilled and less skilled employees. A total of 65% of firms perceived a negative effect of GVC participation in the demand for high-skilled workers, while 25% of firms perceived that higher levels of foreign value-added support economic upgrading through GVC participation. SMEs engage in more intensive use of labor-intensive services in production other than body shop welding and painting, such as wire harnessing, circuit board assembly, and certain component assembly due to lower wage costs, which help them move up the VC, and improve competitiveness and profitability. All SMEs perceived that GVC integration leads to more intensive use of labor-intensive services. A total of 15% of firms confirm a positive effect of skills building on value-added gains.

GVCs coordinated and led by MSIL provide opportunities to upgrade technologically through participating in such networks.

Table 13: Impact of GVC Participation

Perceived Impact of GVC Participation	**SMEs** (No.)	**SMEs** (%)
Negative impact		
Decline in industry-level wages	9	45
Negative effect for high-skilled workers	13	65
Positive impact		
Positive wage effect	6	30
Rise in capital intensity and labor share in production	11	55
Intensive use of labor-intensive services	20	100
Positive effect of skills building	3	15
Improved productivity and competitiveness	11	55
Business expansion and R&D	11	55
Greater net output and total sales	11	55
Market extension and employment growth	11	55
Higher domestic value added and benefits	11	55
Improved productivity	5	25
Improve technology transfer	5	25
Improve access to business partners	6	30
International entrepreneurial possibilities	6	30
Subcontracting at reduced cost	7	35
Improved networking, training, and finance access	9	45
Better access to information and new markets	11	55
Technological learning and skills acquisition	11	55
Rapid learning and innovation	11	55
Attract more investment	5	25
Cheaper and better-quality inputs	5	25
Improved efficiency	5	25
Use of ICTs and improved transport network	6	30
Upgrading		
Support economic upgrading	5	25
Industrial upgrading	11	55
Functional upgrading to improve their profits	10	50
Functional or other upgrading	5	25
Human and technological capital upgrading	4	20
Challenges		
Challenges of global standards	9	45
Challenges of MNEs' managerial practices	9	45
Challenges of managerial and financial resources	7	35
Challenges to innovate and protect technology	7	35

In the case of 55% of firms, participation in automotive VCs has improved product quality, production capacity, productivity, competitiveness, and business expansion along with immense opportunities for alternative procurement and R&D. Similarly, 60% of older SMEs have greater net output and total sales compared to subcontractors. The impact on production, market extension, and employment growth has been significant. Improved networking, training, and finance access have been achieved by 45% of participating

SMEs. A total of 50% of small participating firms without sufficient capabilities to engage in functional upgrading adopt strategies to improve their profits, and in the case of 25% of firms, the occurrence of functional or other upgrading does not necessarily improve their ability to reap higher profits. The power asymmetries between MSIL and suppliers in the IAI are huge. MSIL often use their power to increase pressure on suppliers for on-time delivery, efficiency, cost reduction, and high standards. Functional upgrading of suppliers in automotive manufacturing remains outside design and branding. Functional upgrading within design and branding occurs in MSIL, which possessed more resources, robust industry position, and better institutional support than small components suppliers. Therefore, MSIL is engaged in product, process, and functional upgrading including design and branding functions.

In the case of 55% of firms, participation in GVCs provides rapid learning, innovation, and industrial upgrading through better access to information, new markets, and opportunities for fast technological learning and skills acquisition, which results in higher domestic value added and benefits both upstream suppliers of intermediates and downstream users. A total of 25% of MSIL JV firms' participating in GVCs attract more investment, improve productivity, provide the advantage of cheaper and better-quality inputs through subcontracting, improve efficiency, and induce technology transfer and knowledge spillovers from lead firms.

The use of ICTs and an improved transport network have improved 30% of JV firms' access to global markets, new business partners, and customers including the development of entrepreneurial possibilities through international strategic alliances, and mergers and acquisitions with MNEs via actual and virtual global networks. A total of 35% of firms have become specialized suppliers in GVCs and have benefited from subcontracting at reduced cost. Learning processes in GVCs improve human and technological capital upgrading of only 20% of firms due to the low level of human capital and technological capability on the part of participating SMEs and power asymmetries between the lead firm and suppliers. A total of 45% of subcontracting firms in GVCs face the challenges of conforming to global standards in terms of technology, quality, delivery, and after-sales service and adapting routines and managerial practices of MNEs at local and or/cluster level. Some SMEs (35% of firms) have also faced challenges in terms of managerial and financial resources, and the ability to upgrade, innovate, and protect their own technology due to not having sufficient R&D and skills to comply with product quality standards.

In brief, the participating firms have shown modest performance in terms of benefits from participation in GVCs, due to inadequate access to information, technological and managerial skill acquisition, and market opportunities for higher value added. Most participating SMEs faced barriers in attracting investment and cheaper and better-quality inputs from subcontracting, and technology transfer and knowledge spillovers from lead firms. SMEs also faced the obstacle of an inadequate transport network in accessing international markets and new business partners through overseas strategic alliances. Moreover, SMEs experienced obstacles such as inadequate learning to improve human and technological capital upgrading insufficient financial resources to upgrade, innovate, and protect their own technology due to a lack of in-house R&D and skills to maintain global quality standards.

Overall assessment of the impacts of GVC participation based on the results of interviews supports the argument that SMEs' participation in GVCs benefits them modestly, despite a negative impact on wages, which may be attributed to a higher labor supply on account of the youth bulge and mushrooming growth of technical institutions supplying technical graduates. However, restructuring of production through subcontracting and GVCs facilitates economic, industrial, functional, human,

and technical upgrading of SMEs. New niches for ACSs continuously emerge from production disruption, where SMEs can rapidly occupy those places by taking advantage of their flexibility and ability to progress fast.

8. POLICY IMPLICATIONS

Policy plays a significant part in leveraging SMEs' integration into GVCs, which calls for a broad range of policies by involving private players and strong political leadership for effective collaborative implementation focusing on services trade and efficient domestic markets including easing restrictions on foreign ownership as well as removing barriers to competition. Some SMEs lack the ability to upgrade and deliver products and production systems as per the expectations of the lead firm to meet quality, supply standards, and delivery times due to increasingly stringent quality requirements and therefore need support to meet global quality standards. Continuous technological upgrading is essential to meet standards. Government should support SMEs by providing financial incentives to invest in appropriate technology and strengthen the national innovation systems to develop their R&D capacity.

Some SMEs lack awareness of the complexity of the tasks and timely delivery. Therefore, the government could facilitate their participation in GVCs through raising awareness of the benefits and potential of subcontracting to improve competitiveness by rationalization of resources using market intelligence and managerial capacities. Technological upgrading is essential for participation of SMEs in GVCs, for which skills development programs should be initiated to promote partnerships between SMEs and global players focusing on technology transfer, products, processes, and management practices.

Only 20% of participating SMEs feel that participation in GVCs contributed to upgrading human capital and technological capability, therefore there is a need to raise technical and managerial skills in SMEs to facilitate greater integration into GVCs. There is also a need to promote technology and knowledge transfer by MNEs to local suppliers and subcontractors, which can influence them to develop business linkages with SMEs. Local suppliers should actively develop their network on a global scale to improve their innovation capability by knowledge sharing and collaboration to improve performance.

Government should provide the necessary support for inter-firm collaboration, allocate funds for the development of ACFs, promote partnership ventures to enable firms to work together, encourage OEMs to develop longer-term plans, and help local suppliers to work in partnership to build capabilities in design, engineering, and production engineering. The relative competitiveness of the automotive sector needs to improve to make India a production destination through labor reforms, supplying necessary skills, safety, and security, and infrastructure development.

SMEs face regulatory barriers, including different and concurrent quality standards, high technical standards, cost-efficiency, product liability, and industrial safety and environmental regulations, which require their capabilities and skills to be enhanced to meet new standards due to their strategic significance in the automotive sector and their integration into GVCs to be made as smooth as possible. Investment in product and process innovation must be met for GVC participation by addressing credit market imperfections and broadening the range of financing instruments available to SMEs. Institutional arrangements to implement logistics-related reforms must be evolved to facilitate greater SME participation in GVCs.

Robust institutions should be developed to increase the level of awareness of the opportunities for participation of SMEs in GVCs. Accurate information should be disseminated on the benefits of subcontracting and the needs of upstream and downstream partners in GVCs through complete databases and electronic platforms. SME clusters, incubation centers, and networks should be developed and strengthened at regional and subregional levels for continuous innovation and R&D. Institutional support should improve negotiating capacities and skills through supplier development programs in design and production engineering.

Skills development programs should focus on imparting specific technical and business skills with a view to collaborating with domestic and overseas partners. Information sharing should be targeted for technological upgrading of product quality and process standards, intellectual assets, and intellectual property. Development of in-house technological capabilities and innovation is essential for improving SMEs' competitiveness to create low-cost products, which requires transparency and robust information flow to lower-tier firms. There should be investment in technology, process upgrading, and R&D in order to protect SMEs' intellectual assets.

SMEs should be helped in acquiring quality certificates and achieving a zero-defect culture. There is a need to expand aftermarket activities and exports, as well as enforcing emission and safety standards to open global export markets. Digital and analytics-driven transformation of AC sector is essential for transforming automotive organizations across the value chain. Manufacturers can co-invest in R&D and product development through partnerships. Government should facilitate exports through encouraging cooperative supply chain in high-potential export markets. Assemblers should invest in and collaborate with tier 1 and tier 2 component manufacturers to help them build relevant human capital and technological and digital capabilities. Total quality management, robust SC management, quality certification, and total production maintenance should be promoted and strengthened.

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APPENDIX 1: CHARACTERISTICS OF INTERVIEWED SMES

SMEs	Capital/Ownership Structure	Main Production	Market Share in Parts and Component Industry in India	Linkage with MSIL
Jay Bharat Maruti Limited (JBML) Incorporated: March 1987 Factory location: Manesar (Haryana) Total employees: 500+	AC: INR270.00 million PC: INR216.50 million A subsidiary of JBM Group, and entered a technical assistance agreement with Hamamatsu Pipe Company Japan Accreditation: ISO/TS16949, OHSAS 18001, ISO 14001, ISO 9001	Sheet metal components, assemblies and sub-assemblies including welded assemblies, exhaust systems, fuel filters, chassis, rear axles, suspension parts, and components for automobiles	OEM: 01 Plants: 10	A JV of MSIL and supply its 100% components to MSIL
Sharda Motors Industries Limited Founded: January 1986 Factory location: New Delhi Total employees: 3,500+	AC: INR50.46 million PC: INR50.00 million Nongovernment company/Public/company limited by shares Accreditation: ISO/TS16949, ISO 9001	Processing technologies/ components	OEMs: 08 Plants: 10	Supply seat cushion frames. A JV between Suzuki, MSIL, and Sharda Motors
Magneti Marelli Powertrain India Private Limited Founded: November 2009 Factory location: Manesar (Haryana) Total employees: 115+	AC: INR150.00 million PC: INR150.00 million A nongovernment company limited by shares Accreditation: ISO/TS16949, EN 16001, ISO 50001, ISO 9001	Robotized gearboxes for automobiles/automated manual transmissions including electronic systems, suspension systems, exhaust systems, and automotive lightings	A subsidiary of foreign company OEM: 01 Plant: 01	Supply Fog light lamps, rear lamp bulbs, tail lamps, and automated manual transmissions. A JV between Magneti Marelli, Suzuki, and MSIL
Lumax D K Auto Industries Limited Incorporated: May 1997 Factory location: Gurugram Total Employees: 650+	AC: INR211.00 million PC: INR42.40 million A Private/Nongovernment company Accreditation: ISO/TS16949, ISO 9001	Gear shifters, parking brakes, plastic trim parts, precision components, bumper corner components, and exhaust finishers	A subsidiary of Lumax Auto Technologies Limited, Pune OEMs: 05 Pant: 01	Supplier of lighting lamps
Lumax Cornaglia Auto-Technologies Private Limited Incorporated: June 2007 Factory location: New Delhi Total Employees: 100+	AC: INR75.00 million PC: INR64.27 million A Private/Nongovernment company Accreditation: ISO/TS16949, ISO 14001, OHSAS 18001	Air intake systems and plastic granules for automobiles	A 50-50 JV with Cornaglia Group, Italy and a subsidiary of Lumax Auto Technologies Limited, Pune and a JV between Lumax Technologies and Cornaglia Metallurgical Products India Private Limited OEMs: 4 Plant: 01	Supplier of plastic granules for automobiles

continued on next page

Appendix 1 *table continued*

SMEs	Capital/Ownership Structure	Main Production	Market Share in Parts and Component Industry in India	Linkage with MSIL
Lumax-Gill Austem Auto-Technologies Private Limited Incorporated: November 2013 Factory location: Gurugram (Haryana) Total Employees: 20+	AC: INR90.00 million PC: INR49.40 million A Private/Nongovernment company Accreditation: ISO/TS16949, ISO 14001, ISO 50001	Lighting and illumination solutions	A 50-50 JV with Gill-Austem, US and a subsidiary of Lumax Auto Technologies Limited, Pune OEMs: 03 Plant: 01	Supplier of front lightings/head lamps
Denso India Limited Established: November 1984 Factory location: Manesar (Haryana) Total Employees: 1,200+	AC: INR320.00 million PC: INR320.48 million A Private/Nongovernment company Accreditation: ISO/TS16949, ISO 9002, ISO 9001, ISO 9000, OHSAS 18001	Transmission and spare parts	A subsidiary of Denso Global, Japan, and Denso International India Private Limited, New Delhi OEMs: 03 Plant: 01	Supplier of condensers, with radiators, fuel injectors, wiper systems and power windows
Futaba Maruti India Incorporated: November 2007 Factory location: Manesar (Haryana) Total Employees: 500+	AC: INR900.00 million PC: INR900.00 million A Private/Nongovernment company Accreditation: ISO/TS16949	Car exhaust systems, car exhaust pipes, steel car exhausts, magna flow exhaust systems, and silence exhaust systems for car silencers	A subsidiary of Futaba Industrial Gujarat Private Limited, Ahmednagar (Gujarat) OEM: 01 Plant: 01	A JV of MSIL and supplier of exhaust cold ends
Krishna Maruti Limited Incorporated: June 1991 Factory location: Manesar (Haryana) Total Employees: 1,773	AC: INR55.00 million PC: INR42.41 million A Private/Nongovernment company Accreditation: ISO/TS16949, ISO 9001, QS 9000, OHSAS 18001	Metal fuel tanks, gear shifter assemblies, cabin systems, seat structures, seat assemblies, door trim panels, automotive seating systems, alternate fuel systems, automotive fabrics, vehicle interior systems (door trims and roof headlines), vision systems, chassis systems, cabin systems, and body structure systems	A subsidiary of Krishna Group and an associate company of MSIL OEMs: 09 Plants: 02	Supplier of seat structures, seat assemblies, and door trim panels
Hella India Automotive Private Limited Incorporated: November 1980 Factory location: Gurugram (Haryana) Total Employees: 1,146+	AC: INR224.10 million PC: INR89.97 million A Private/Nongovernment company Accreditation: ISO/TS16949, E-mark, ISO 14001, ISO 9001	Modules, LED tail and plough lamps, LED products, decorative lamps, air temperature sensors, accelerator pedals, and fog products	A 100% subsidiary of HELLA GmbH & Co Germany OEMs: 17 Plant: 01	Supplier of air temperature sensors, accelerator pedals and fog products
Minda Industries Limited Incorporated: September 1992 Factory location: Greater Noida (Uttar Pradesh) Total Employees: 1,500+	AC: INR630.50 million PC: INR520.40 million A Private/Nongovernment company Accreditation: ISO/TS16949, ISO 9001, ISO 14001, OHSAS 18001	Switching systems, acoustic systems, alloy wheels, and floor consoles	A subsidiary of N K Minda Group OEMs: 33 Plants: 05	Supplier of floor consoles

continued on next page

Appendix 1 *table continued*

SMEs	Capital/Ownership Structure	Main Production	Market Share in Parts and Component Industry in India	Linkage with MSIL
Omron Automotive Private Limited Incorporated: January 2006 Factory location: Gurugram (Haryana) Total Employees: 500+	AC: INR300.00 million PC: INR155.58 million A Private/Nongovernment company Accreditation: ISO/TS16949, ISO 9001, ISO 14001	Electronic valves and tubes, central body control module and other electronic components	A JV of Omron, Japan OEMs: 05 Plant: 01	Supplier of central body control modules and other electronic components
Shiroki Technico India Private Limited Incorporated: May 2014 Factory location: Gurugram (Haryana) Total Employees: 200+	AC: INR0.50 million PC: INR0.13 million A Private/Nongovernment company Accreditation: ISO 9001	Alloy wheels and window regulators, seat devices and windows, regulators and sheet metal-related operations	A JV between Shiroki Corporation Japan and Technico Industries India OEMs: 05 Plant: 01	Supplier of seat recliners
Mitsubishi Electric Automotive India Private Limited Established: July 2001 Factory location: Manesar (Haryana) Total Employees: 192+	AC: INR190.00 million PC: INR190.00 million A Private/Nongovernment company Accreditation: ISO/TS16949, ISO 9001, ISO 14001, OHSAS 18001	Air conditioners for cars	A subsidiary of Mitsubishi Electric Corporation Japan OEMs: 03 Plant: 01	Supplier of various electric ACs
Jay Ushin Limited Incorporated: August 1986 Factory location: Manesar (Haryana) Total Employees: 200+	AC: INR150.00 million PC: INR150.00 million A Private/Nongovernment company Accreditation: TS16949, ISO 9001	Automotive batteries, locks and key sets, combination switches, control panels for heaters and door latches	A JV of Ushin Limited, Japan OEMs: 05 Plants: 07	Supplier of manual heater controls
UFI Filters India Private Limited Incorporated: June 2006 Factory location: New Delhi Total Employees: 200+	AC: INR210.00 million PC: INR210.00 million A Private/Nongovernment company Accreditation: ISO/TS16949, IATF 16949, ISO 9001, ISO 14001, OHSAS 18001	Automotive filters, diesel filters, and fuel filters	A subsidiary of UFI Filters Italy OEMs: 06 Plant: 01	Supplier of diesel filters
A Raymond Fasteners India Private Limited Founded: November 2007 Factory location: Gurugram (Haryana) Total Employees: 172+	AC: INR700.00 million PC: INR445.23 million A Private/Nongovernment company limited by shares Accreditation: ISO/TS16949, ISO 9001	Automotive electrical distribution systems, automotive fasteners, fluid connectors, and brake boosters	A JV of ARaymond, France OEMs: 13 Plant: 01	Supplier of fluid connectors, and brake boosters
Bharat Seats Limited Incorporated: 1986 Factory location: Manesar (Haryana) Total Employees: 200+	AC: INR70.00 million PC: INR63.00 million A Private/Nongovernment company limited by shares Accreditation: ISO/TS16949, ISO/IEC 17025, ISO 27001	Automobile seats, car seat assemblies, seat frames, and seating systems	OEMs: 0 Plant: 01	A JV of MSIL and supplier of automobile seats, car seat assemblies, seat frames, and seating systems
Amtech Auto Limited Founded: August 1988 Factory location: Manesar (Haryana) Total Employees: 1,300+	AC: INR800.00 million PC: INR496.51 million A Public/Nongovernment company limited by shares Accreditation: ISO/TS16949	Basic precious and nonferrous metals, brake assembly, brake drum equipments, etc.	An Indian MNC OEMs: 09 Plant: 01	Supplier of metals, brake assemblies, and brake drum equipments
Motherson Automotive Technologies and Engineering Limited Established: April 1995 Factory Location: Manesar (Haryana) Total employees: 1,000+	AC: INR 2500.00 million PC: INR 20.00 Accreditation: ISO/TS16949, ISO 9001, UDA 6.1	Brakes, gearboxes, axles, road wheels, suspension shock absorbers, radiators, silencers, exhaust pipes, steering wheels, steering columns, and steering boxes	OEMs: 09 Plant: 01	Supplier of small automotive parts and accessories