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The Indian Automotive Industry and the ASEAN Supply Chain Relations

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Abstract: *The topic of automotive supply chains has been increasingly studied as it raises questions of economic development, especially from the perspectives of simultaneous globalisation and regionalisation, and trade. While ASEAN is a prime example of intraregional production networks, supply chains that connect ASEAN and India have not been studied indepth. Therefore, this paper investigates the Indian automotive industry, which is composed of automobile original equipment manufacturers (OEMs) and parts and components producers, and other supply chain connections to the neighbouring ASEAN region.*

This study is structured as follows. First, we will take a look at the historic development of the automotive industry in India, as it provides the context for the development of companies and their capabilities that are crucial determinants for their ability to join supply chains. The investigation will not be limited to Indian firms because as case studies of the ASEAN region forcefully demonstrate, foreign OEMs and parts suppliers may use developing and emerging markets as specialised production bases of their global and regional supply chains. Second, against the historic background, the current condition of the automotive industry in India will be analysed by discussing industry data. Third, we will conduct case studies of automotive companies from India, Japan, and South Korea to investigate how India and ASEAN are connected through supply chains and determine which chains integrate Indian companies. We will analyse to which extent industrial and trade policies promote or hinder the extension of ASEAN supply chains to India and vice versa. As a final step, policy recommendations will be formulated based on the findings in order to improve the automotive trade between India and ASEAN.

Keywords: automotive industry, supply chain organization, production networks
JEL Classification: L62

1. Historic Development of the Automotive Industry in India

Production of automobiles in India started during the latter part of the colonial period when Ford and General Motors (GM) set up assembly facilities (Balcet & Bruschieri 2010, 136) in the 1920s. After gaining independence from the United Kingdom in 1947, India's economy can be characterised as *dirigisme* that was underpinned by socialist ideology. Hence, the economy was heavily regulated and the automotive industry was no exception. Importing completely built units (CBUs) was banned in 1949, followed by increased local content requirements for semi-knocked-down (SKD) assembly by domestic firms in 1953. In 1951, the government had introduced the Industrial Licensing Act, often referred to as the "license raj." This regulation had the following effects on the automotive industry. First, OEMs could only produce models that were approved by a license, meaning that they could only diversify their product range if they obtained additional licenses from state authorities. In practice, regulators did not grant new licenses, so that OEMs mainly produced two- and three wheelers (Bajaj), passenger cars (Hindustan Motors, Premier Automobiles, Standard Motors), or utility and commercial vehicles (Ashok Leyland, Mahindra & Mahindra, and Tata).[1]

Most models were based on designs of foreign OEMs, which had licensed the technology to Indian producers. Regulation via the licence raj also also prohibited OEMs to vertically integrate production as it required automobile producers to procure specific quantities of parts from domestic suppliers (Kumaraswamy, *et al.* 2012, 371). Due to these restritions, pioneering manufaturers Ford and GM abandoned their Indian operations. Moreover, the licence raj also specified the production volume, making expansion of the production volume dependent on linceses. Again, these were rarely granted because the political leadership saw cars as a luxury product that should only be produced in minimal quantities. This first and foremost regulation applied to passenger cars, the production of which was severely

[1] Formerly, Tata's motor division operated under the name Tata Engineering and Locomotive Company (TELCO).

limited to 25,000 units annually. The government, instead, focused on utility, mass transport, and agrarian vehicles (Tewari 2001, 10). For the same reason, price controls were enforced so that the market, especially for passenger cars, stagnated in the absence of any meaningful way to compete for increased profitability or market share (D'Costa 1995, 487). Thus, the vehicle market could not grow and the OEMs did not have any incentive to upgrade their technology and improve their product. Not only were the automobile producers regulated in this restrictive manner but the parts and components makers as well.

The situation slightly changed in 1977 when the component industry became subject to relaxed regulation. The aim of the government was to reduce inefficiencies that existed due to the limited scale of manufacturing, thus, the deregulation of parts and components industry started before the deregulation of the automobile market. It was the starting point for the professionalisation and differentiation of the supplier industry.

Shortly after this gradual liberalisation move, the Indian government initiated a deal that transformed the automotive industry with the creation of the Maruti-Suzuki joint venture (JV). The Indian partner, Maruti Udyog, had been formed in 1971 to develop an indigenous, affordable car even before the initial liberalisation steps were first taken. Maruti was headed by Sanjay Gandhi, the son of contemporary Prime Minister Indira Gandhi. Despite the political mission and backing, Maruti remained unsuccessful so that the Indian government started looking for a foreign partner to help turn Maruti Udyog around. Initially, the favoured partner was Volkswagen (VW) but the government realised that the preferred Golf model was too expensive for the Indian market. Thus, negotiations with Daihatsu, Mitsubishi, Nissan, and Suzuki were conducted. The latter turned out to be the successful candidate because Suzuki was willing to take a 26 percent stake in the JV with the option to increase its share to 40 percent later (Kale 2011: 13). Government originally wanted the partner to take 40 percent from the beginning but no OEM was willing to make such an investment. While the JV was set up in 1981, operations started only in 1983.

The entrance of Suzuki started to transform the automotive industry. As suppliers of Maruti-Suzuki had to be developed in order to localise production for cost reduction, a number of Indian suppliers modernised their production and

management. Kale (ibid: 23) has documented that 97 percent of parts had to be imported from Japan, exceptions being only tires and batteries. Government set the goal at 93 percent local content within five years, hence Suzuki and related suppliers started developing local companies by transferring modern Japanese manufacturing and management methods that can be subsumed as lean manufacturing. Gulyani (2001) has demonstrated that insufficient (road) infrastructure in India encouraged the emergence of automotive clusters around OEM plants. To avoid negative impacts on their supply chain, Maruti and other foreign OEMs devised strategies to locate key suppliers in close proximity around their assembly plants to mitigate infrastructure related problems. Hence, local agglomeration and cluster development can partly be explained as a coping strategy that enabled OEMs to implement just-in-time (JIT) supply chains. With the sharp increase of the Yen after the Plaza Accord in 1985, Suzuki had another strong incentive to reduce imports as much as possible to make the venture profitable.

Following the initial partnership between Maruti-Suzuki, other Japanese carmakers entered into JVs with Indian OEMs (D'Costa 1995: 488). While Mazda, Mitsubishi, Nissan, and Toyota entered JVs that produced localised versions of their original light commercial vehicles (LCVs),[2] Hino, Isuzu, and Nissan transferred technology to their Indian partners thereby allowing them to upgrade their models. This initiated a similar dynamic than in the Maruti-Suzuki case because immediate suppliers of these new JVs had to meet quality and price expectations. While this contributed to the development of the Indian components industry, growth mainly stemmed from the domestic market and not from exports (Kumaraswamy *et al*. 2012: 372). Japanese OEMs brokered JVs between their trusted *keiretsu* suppliers (or affiliates) from Japan and local Indian suppliers. These ventures are not only characterised by introducing advanced production and management techniques but also by traits typical of Japanese industrial relations, that is, trust-based relations between buyers and suppliers that are grounded on mutual dependence, equipment

[2] Initially, localised versions of the Titan, Canter, Cabstar, and Dyna models were produced. These tie-ups have all been dissolved: Nissan's partner Mahindra & Mahindra integrated the JV in 1993. Toyota withdrew from its partner DCM when South Korea's Daewoo took over in 1995. While Mitsubishi withdrew its stake in Eicher in 2009, Mazda ended its partnership with Swaraj in 2010, but Sumitomo Corp. and Isuzu hold stakes in Swaraj Mazda (44 percent and 15 percent respectively), which now mainly produces Isuzu models.

sharing between firms or inhouse unions (D'Costa 2004: 346-352).[3] This subsequent wave of Indian-Japanese JVs became possible because the government finally allowed OEMs to diversify their product line-up, meaning that this part of the license raj was effectively phased out. Increasing competition caused the established Indian car producers Hindustan Motors and Premier to lose significant market shares to Maruti, and Standard Motors to exit the automotive business altogether in the late 1980s.

Liberalisation became more encompassing after 1991. Foreign companies were allowed to have majority-owned or wholly-owned enterprises. Moreover, larger Indian and foreign firms were allowed to acquire up to 24 percent of domestic suppliers. Due to deregulation, international OEMs such as Daewoo, Daimler, Fiat, Honda, Hyundai, Mitsubishi, Peugeot, and Toyota entered the market[4], and Ford and GM made comebacks. Government authorities had initially prohibited the completely knocked-down (CKD) assembly process to protect domestic suppliers by forcing foreign OEMs to source locally. However, as it became clear that carmakers would not start operations without CKD, the government negotiated individual memorandum of understanding (MOU) with OEMs and specified to which extent the new market entrants would increase the local content of produced vehicles. Furthermore, MOUs contained targets for production and export volume. In 1997, government went away from negotiating individual MOUs and defined requirements for all new entrants (Kumaraswamy *et al*. 2012, 373): First, 50 percent local content had to be achieved within three years and 70 percent within the fifth year of operation. Second, entrant firms were required to export an amount equal to their SKD and CKD imports by the third year. By this measure, India ensured a balanced trade record while leaving it to companies to decide whether they wanted to fully localise their production quickly or use the country as an export hub. Third, in order to operate a wholly owned subsidiary, the minimum investment was US$50 million. Thus, policy forced investors to either make a large investment that would create considerable employment in India or to form a JV with a local partner which would

[3] D'Costa observed that the introduction of Japanese management and production methods is not dependent on a Japanese partner as Indian firms with British JV partners also introduced them.

[4] Again, most OEMs entered into JVs with local firms but with higher equity than in the 1980s. For a detailed overview of the investment projects during the mid-1990s, see: Humphrey *et al*. 1998: 158.

most likely result in technology and skill transfers. Hence, it can be stated that while regulation was scaled down, the Indian government still utilised the policy as a tool to promote employment or technology transfer via JVs.

In 2002, India's Ministry of Heavy Industries and Public Enterprises (MHIPE) introduced its Auto Policy that specified eight main goals, namely (MHIPE 2002):

1. Promote the automobile industry as a means to achieve economic and employment growth;
2. Nurture a globally competitive automotive industry, which includes exporting parts and components;
3. Establish India as a hub for small car manufacturing and export. The plan was to allow the nation to assume the same position in affordable passenger cars, tractors, and two-wheelers production;
4. Encourage balanced transition to open trade, meaning a careful shift from a protected to liberalised trade;
5. Induce modernisation and development of indigenous design, and research and development (R&D) capabilities;
6. Steer the Indian information technology (IT) industry towards producing automotive technology;
7. Develop vehicles that utilise alternative forms of energy;
8. Harmonise Indian standards with international technical and industry standards.

However, MHIPE merely defined these objectives without formulating any actual policies that could have induced or supported the automotive industry to reach these aims. Four years later, MHIPE released the Automotive Mission Plan (AMP) 2006-2016. This plan included goals similar to the preceding Auto Policy such as promotion of small car manufacturing and exports, creating a negative list of items and rules of origin for FTAs, and crafting of an appropriate tariff policy to attract investment or investment to the automotive industry (MHIPE 2006, 47). However, with regard to tariffs, the plan pointed out that India's import tariffs on commercial vehicles (12.5 percent) were significantly lower than those of the United States (US) at 25 percent or EU (22 percent) (MHIPE 2006, 31). Moreover, the AMP clearly

stated that the automotive industry should be protected from the anticipated effects of trade liberalisation. The document referred to 77 automotive and engine components that should be part of a negative list in free trade area (FTA) negotiations. Therefore, recommendations stated that the aforementioned discrepancy and negative list should be kept in mind when negotiating for FTA deals, especially with ASEAN, the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC)[5], China, the Economic Union (EU), Japan, South Korea, and Thailand. This implied that the government should either protect the market by not reducing tariffs or do so only under the condition that India gets similar concessions for its exports. Regarding tariffs in general, MHIPE called for maintaining a three-tier tariff structure on raw materials, intermediate, and finished products to make production in India more attractive (MHIPE 2006, 36). This time the government adopted the following measures to reach the formulated targets (Agustin 2012, 262):

1. Maintaining a lower excise duty for small cars (3.8m length or less)
2. Creation of the National Automotive Testing and R&D Infrastructure Project (NATRiP) to provide testing facilities open to OEMs in India. Allotted budget was INR 22.9 billion.
3. Creation of the Automotive Skills Development Council to develop employee's skills. Allotted budget was INR 85 million.
4. Under the Technological Upgradation and Development Scheme (TUDS), loans are provided to OEMs for technology investment. Allotted budget for loans was INR 75 billion.

These concrete steps suggested that AMP implemented policies aiming at technological development of the industry and particularly encouraged production of the small car segment.

Hence, the combination of Yen appreciation after 1985, the poor condition of transport infrastructure in India, R&D and technology support as well as gradual and strategic phase-out of policies that promoted localisation explains why foreign OEMs

[5] BIMSTEC member countries are Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka, and Thailand.

created supply chains in India to serve local assembly operations. These factors as well as the strikingly similar process within ASEAN might explain why empirical analysis found that automotive inter-industry trade – which can be translated as supply chains – between India and most Asian countries, with the notable exception of Indonesia, was insignificant despite rapid expansion (De 2011, 87-89). It has further been found that India applies among the highest tariffs on vehicles in the Asia-Pacific region and on auto parts in the main global markets, if not isolated categories are highlighted but relevant Harmonized System (HS) code items are aggregated (Kohpaiboon and Yamashita 2011, 329-331). Thus, it can be stated that India still protects the domestic market to a considerable degree. India is certainly not exceptional in this regard as Thailand, the main assembly hub in ASEAN, also protects domestic production through selective tariff reduction in FTAs (ibid). Given this historic background, it appears that companies largely aimed at creating high degrees of localised production within India and within ASEAN that were supplemented with imports of unavailable and critical components from OEMs' home countries. This implies that manufacturers created supply chains within India and ASEAN but not between these two. However, if elimination of trade barriers via FTAs continues, it would be possible that the already increasing trade may extend to the creation of new production networks between the ASEAN region and India.

Concerning the existing FTA between India and ASEAN, some clarifications need to be made. India is going to reduce tariffs on goods – with some restrictions[6] – for all ASEAN member states except the Philippines from 2011 until 2016. At the same time, Brunei, Indonesia, Malaysia, Singapore, and Thailand are going to lower their tariffs for India. The so-called CLMV countries – Cambodia, Lao PDR, Myanmar, and Vietnam – are going to reduce tariffs for Indian goods from 2016. Also from 2016, India and the Philippines are going to lower tariffs on a reciprocal basis. Simply put, it can be stated that while India is in the process of reducing tariffs for all ASEAN members except the Philippines, only the more advanced ASEAN members are opening up for exports from India.

[6] Items that India classified on the "highly sensitive track" are agricultural products such as black tea, coffee, palm oil (crude and refined), or pepper. Thus, the automotive sector is not subject to special protective measures.

CLMV countries enjoy a special status during a transition period until 2016; they get a more liberal access to the Indian market without opening their markets for Indian products in a similar fashion.[7] Regarding automotive parts, the tariff reduction schedule for India does not reveal signs of strong protection for certain products. However, tariffs on certain products (clutches, flywheels, and gaskets) are only mildly reduced from 7.5 to 5 percent by 2020. As will be discussed in one of the case studies, this lowered level of protection might still be high enough to make exports from India to ASEAN less attractive than sourcing within ASEAN.

2. Current Condition of the Automotive Industry in India

Looking at the Indian automobile industry in more detail, what general patterns can be observed? Available information from the Society of Indian Automobile Manufacturers (SIAM) reveals several aspects about the automotive industry's condition. Production has roughly doubled between 2007 and 2012 (Table 1).

[7] Studying individual countries' tariff reduction schedules reveals that CLMV countries actually reduce tariffs but to a lesser degree and in a slower pace.

Table 1: Vehicle production in India

	Financial year										
	2001	2002	2003	2004	2005	2007	2008	2009	2010	2011	2012
Passenger cars	564,052	608,851	842,437	960,505	1,045,881	1,777,583	1,838,593	2,357,411	2,982,772	3,146,069	3,233,561
Commercial vehicles	268,175	318,176	421,327	599,182	654,110	549,006	416,870	567,556	760,735	929,136	831,744
Three-wheelers	212,748	276,719	340,729	374,414	434,424	500,660	497,020	619,194	799,553	879,289	839,742
Two-wheelers	4,271,327	5,076,221	5,624,950	6,526,547	7,600,801	8,026,681	8,419,792	10,512,903	13,349,349	15,427,532	15.721,180
Total	**5,316,302**	**6,279,967**	**7,229,443**	**8,460,648**	**9,735,216**	**10,853,930**	**11,172,275**	**14,057,064**	**17,892,409**	**20,382,026**	**20,626,227**

Source: SIAM.

Production of all vehicle types has increased rapidly but it is clear that India currently specialises in the production of two-wheelers. If one considers a longer timeframe, the development is even more impressive: Total vehicle production reached 6,279,967 units in financial year 2002, which means that production more than tripled between 2002 and 2012.

It must be stated that this is strongly related to domestic conditions where mobility is still largely achieved through two-wheelers, which make up the majority of domestic sales (Table 2). This highlights India's status as a developing country where most citizens cannot afford a car.

Table 2: Indian vehicle sales by vehicle class

	FY 2007	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**	**FY 2012**
Passenger cars	1,549,882	1,552,703	1,951,333	2,501,542	2,618,072	2,686,429
Commercial vehicles	490,494	384,194	532,721	684,905	809,532	793,150
Three-wheelers	364,781	349,727	440,392	526,024	513,251	538,291
Two-wheelers	7,249,278	7,437,619	9,370,951	11,768,910	13,435,769	13,797,748
Total	**9,654,435**	**9,724,243**	**12,295,397**	**15,481,381**	**17,376,624**	**17,815,618**

Source: SIAM.

While car sales have increased by around 70 percent between 2007 and 2012, two-wheeler sales grew by almost 85 percent in the same period and from a much higher base. At the moment, mobility is first and foremost achieved by two-wheelers, not cars. However, carmakers see the potential that present owners of two-wheelers want to become car owners in the future and therefore have entered the market early. Moreover, India's huge population represents potential future customers. This may explain why the automobile industry in India is strongly focused on the domestic market and exports are only a recent phenomenon (Table 3).

Table 3: Vehicle exports from India

	2000	2001	2002	2003	2004	2005	2007	2008	2009	2010	2011	2012
Passenger cars	22,990	50,088	70,828	126,249	160,677	170,193	218,401	335,729	446,145	444,145	507,318	554,686
Commercial vehicles	17,892	14,947	13,432	20,294	35,685	46,160	58,994	42,625	45,009	74,043	92,663	79.944
Three-wheelers	16,263	15,462	43,366	68,138	66,801	76,885	141,225	148,066	173,214	269,968	362,876	303,088
Two-wheelers	111,138	104,183	179,682	264,669	366,724	513,256	819,713	1,004,174	1,140,058	1,531,619	1,947,198	1,960,941
Total	168,283	184,684	307,308	479,350	629,887	806,494	1,238,333	1,530,594	1,804,426	2,319,956	2,910,055	2,898,659

Source: SIAM.

Again, taking a longer timeframe into consideration reveals the automotive industry growth: total vehicle exports were at a mere 307,308 units in financial year 2002, meaning that exports almost increased tenfold within 10 years. While exports are increasing rapidly, the similarities to the domestic market are clear: India largely exports two-wheelers, not cars. Thus, while India is strong in this vehicle type, it is also clear that two-wheelers are less profitable and less technologically complex than other vehicles. However, these vehicle exports are largely conducted by domestic OEMs, especially Bajaj. In 2012, Bajaj exported 1.3 million units, the lion's share of the total 1.96 million

Regarding passenger car market shares, while Suzuki-Maruti is still in a leading position, the entrance of foreign OEMs as described earlier resulted in heightened competition and a more segmented market (Table 4).

Table 4: Passenger car sales by brand, FY 2011 and FY 2012

	Sales	
	FY 2011	**FY 2012**
Maruti-Suzuki	855,730	861,337
Hyundai	387,168	382,851
Tata	257,966	174,692
Ford	90,423	75,771
Honda	54,108	73,182
Toyota Kirloskar	90,969	72,000
GM	86,849	67,220
VW	78,265	65,379
Nissan	32,971	35,504
Skoda	32,334	27,941
Mahindra & Mahindra	17,839	15,344
Renault	3,301	12,887
BMW	9,593	7,221
Fiat	16,074	6,933
Audi	6,547	6,901

Mercedes-Benz	7,419	5,006
Hindustan Motors	2,954	3,485
Jaguar-Land Rover	796	1,597
Porsche	0	220

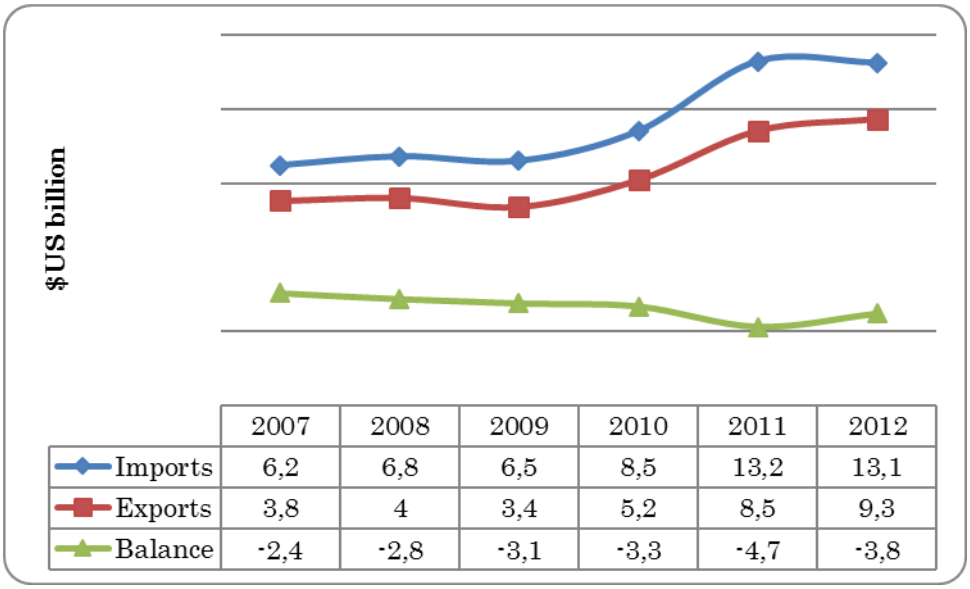
Source: The Hindu, 04.10.2013; based on SIAM data.

As data indicate, Maruti-Suzuki still accounts for more than 40 percent of total sales. This is more than double that of the second-largest competitor, Hyundai. Third-ranked Tata is the only Indian OEM with a significant share in the passenger car market. However, these data must be put in the industry context; they underrepresent the strength of two OEM groups. If one adds up all brands of the VW group (Audi, Porsche, Skoda, and VW), total sales reach 100,441 units, which would put it in the fourth position. Also, the Renault-Nissan alliance is stronger (48,391 units) if one adds up their figures. Jaguar-Land Rover belongs to Tata but currently this brand does not play a strong role in the Indian market.

It is necessary to point out that these data conflict with SIAM data. While the brands' disaggregated data totalled 1.895 million units in 2012-13, SIAM reported a total of 2.686 million in the same period; this is a huge gap. Significantly, the disaggregated version would mean that car sales declined for the first time in 10 years (by 6.69 percent), while the aggregated version reports a minimal increase. Therefore, these data must be considered carefully when drawing conclusions.

Before turning to case studies, it is important to clarify the situation of the automotive components industry. It can be claimed that almost all leading international parts and components makers have located in India at this point in time. However, how does this affect supply chain relations between India, ASEAN, and the rest of the world? According to data from the Automotive Component Makers Association of India (ACMA), both imports and exports have rapidly expanded over the recent years (Figure 1).

Figure 1: Indian automotive components imports, exports, and trade balance



	2007	2008	2009	2010	2011	2012
Imports	6,2	6,8	6,5	8,5	13,2	13,1
Exports	3,8	4	3,4	5,2	8,5	9,3
Balance	-2,4	-2,8	-3,1	-3,3	-4,7	-3,8

Source: ACMA.

While both exports and imports have more than doubled between 2007 and 2012, India's trade deficit in automotive components also increased significantly. This at least superficially suggests that Indian suppliers are mainly exporting simple technology and intermediate parts while importing more complex and costly components.

If one compares import and export destinations (Figures 2 and 3), it becomes clear that Asia is the main source for imports, while exports are much more evenly distributed.

Figure 2: Automotive components' import sources (Source: ACMA)

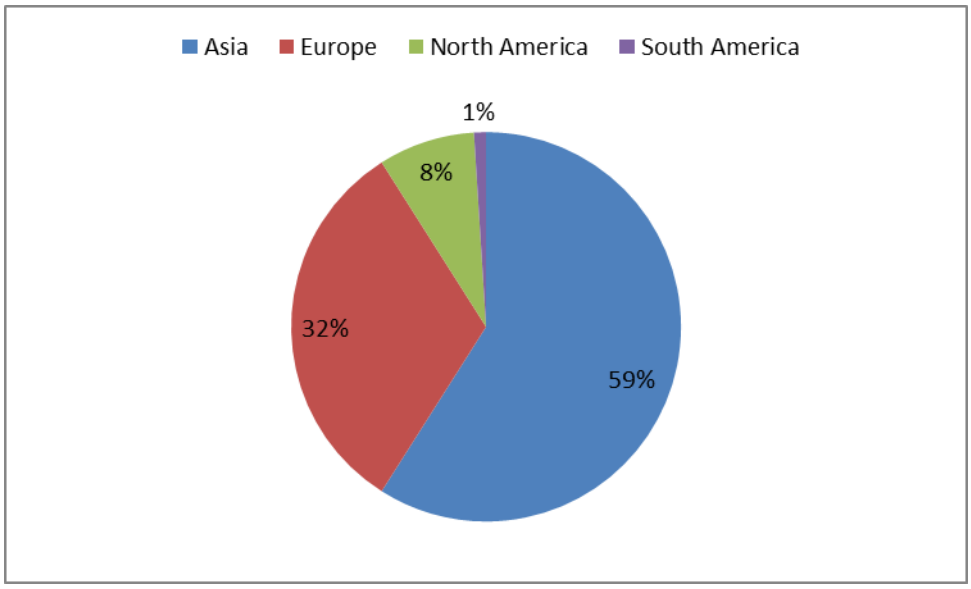
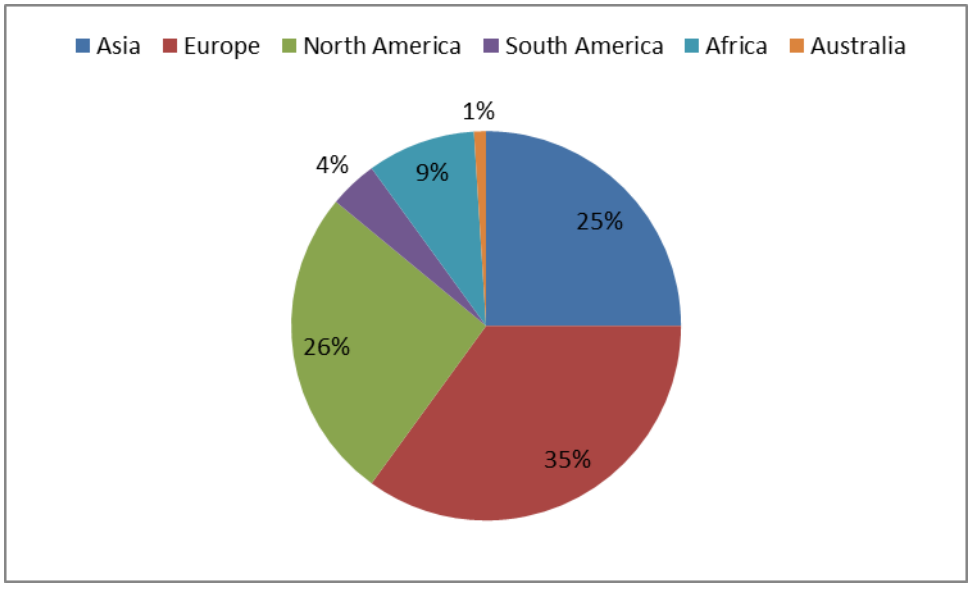


Figure 3 : Automotive components' export destinations



Source: ACMA.

These data show that currently, supply chains to India are much stronger than supply from India. Thus, given the underlying trade pattern, it can be concluded that presently, India absorbs parts imports from Asia but is unable to balance it with exports to the region.

A more general issue shall be discussed briefly. As the case studies in the following section will demonstrate, a repeating industry topic is localisation. This

trend has continued for roughly the last decade and is somewhat contradictory to regional or global supply chains. The drive towards localisation can be described as two-fold. First, governments – especially of larger countries – demand localisation to reap the benefits of local production, namely employment and technological development through the forward and backward linkages typical in the automotive industry. Second, companies seek localisation, partly in response to those demands and also to avoid expansive imports from their respective country of origin. Third, localisation is further promoted by the emergence of trade blocks such as ASEAN, the EU, North American Free Trade Agreement (NAFTA), and Common Market of the South (MERCUSOR). These regional regimes reduce or eliminate tariffs on intra-regional trade that promotes the creation of localised production. While this trend does not counter supply chains in general, it forces markets to adopt a more nuanced perspective. It appears that localisation is first and foremost taking place within regional trade blocks and not so much between them. While certainly there are supply chains between those blocks, localisation in the automotive industry seems to occur mainly in these blocks. In this regard, India and China are exceptional. These two countries have such huge domestic markets that they could maintain comparatively restrictive tariff and policy regimes, are not part of any regional trade block and yet able to successfully attract investment by OEMs and component makers. Our case examples largely suggest that the same localisation trend applies to India: foreign OEMs seek to achieve high local content ratios to drive costs down by reducing expansive imports for local assembly.

Before turning to the case studies, the main obstacles for automotive trade between India and ASEAN should be discussed.[8] First, it needs to be pointed out that while the ASEAN Economic Community (AEC) 2015 is bringing down import tariffs to zero by conducting tariff elimination, the India-ASEAN FTA is only reducing tariffs. Hence, in comparison to intra-regional trade, trade with India is less attractive, which means that supply chains are more likely to further evolve inside ASEAN than between India and ASEAN.

[8] If not indicated otherwise, this section is based on discussion with staff of automotive logistics company Vantec Corporation on 27 January in Tokyo and with JETRO and Nippon Express in Singapore, both conducted on 27 February 2014.

Second, interstate taxes in India were frequently mentioned in interviews with OEMs and suppliers conducted for this research. This issue and the related absence of a common value-added tax (VAT) are well known and subject to prolonged political and scientific debate (Rao, 2000; Cnossen, 2013). Indeed, AMP specifically identified the complicated tax system and the non-existence of a common VAT as an obstacle for exporting from India (MHIPE 2006, 36). As the timeframe of these publications indicates, India has not yet found a solution. Nayar (2011) has identified India's federal structure – more precisely the veto power of the states, their interest in making reform revenue neutral, and intermingling reform with party politics – as the main reason why the introduction of a common VAT referred to as goods and service tax (GST) has not made headway. Certainly, it appears that India's political economy does not suffer from ignorance but from its inability to find a viable compromise between all political actors. While they aim to eliminate obstacles, the truth is that such problems still exist. The consequences are visible on transportation, logistics, and eventually trade. One such effect is this: considerable administrative paper work from check points between Indian states that produce long waiting times, which in turn may delay delivery. Under conditions of JIT production, this is a serious issue for OEMs, suppliers, and logistics firms. Therefore, the often articulated call for completing tax reform can only be re-emphasised without adding new suggestions.

Third, this issue is further complicated by infrastructure conditions. While roads were identified as the most serious issue, port and airport facilities are also problematic. Insufficient road conditions are responsible for many accidents, endangering the employees' lives and undermining production schedules.[9] Therefore, improving hard infrastructure is certainly a necessary condition to strengthen the automotive industry in India and its potential trade with the ASEAN region. A useful indicator for logistical issues is the Logistics Performance Index (LPI) developed by the World Bank. It shows that there are indeed significant problems in India as well as in some ASEAN member states (Table 5).

[9] One interviewed company illustrated problematic infrastructure conditions with photos of roads and crash sites. While the topic of the interview was India and ASEAN, the interviewee pointed out that all the photos were actually from India. While such anecdotes should not be overemphasised, this one represents the view of most interviewed companies.

Table 5.5 Logistics Performance Index ranking of ASEAN member states and India

	Rank	Score	Customs	Infrastructure	International shipments	Logistics competence	Tracking and tracing	Timeliness
Singapore	1	4.13	4.10	4.15	3.99	4.07	4.07	4.39
Malaysia	29	3.49	3.28	3.43	3.40	3.45	3.54	3.86
Thailand	38	3.18	2.96	3.08	3.21	2.98	3.18	3.63
India	46	3.08	2.77	2.87	2.98	3.14	3.09	3.58
Philippines	52	3.02	2.62	2.80	2.97	3.14	3.30	3.30
Viet Nam	53	3.00	2.65	2.68	3.14	2.68	3.16	3.64
Indonesia	59	2.94	2.53	2.54	2.97	2.85	3.12	3.61
Cambodia	101	2.56	2.30	2.20	2.61	2.50	2.77	2.95
Lao PDR	109	2.50	2.38	2.40	2.40	2.49	2.49	2.82
Myanmar	129	2.37	2.24	2.10	2.47	2.42	2.34	2.59

Note:*Brunei Darussalam has not been ranked
Source: World Bank 2012.

As the index shows, there are significant differences: Singapore is the global leader, Malaysia and Thailand follow, then India. The Philippines, Viet Nam, and Indonesia are somewhere in the middle ranks, while Cambodia, Lao PDR, and Myanmar are performing below average.

Fourth, interviewed logistics service providers aired their grievances on corruption in India. Independently from each other, it was reported that government officials approached companies to offer faster procedures in exchange for payment. However, India was not the only country covered by this research that faced corruption issues. Indonesia was reported to have a similar level of attempted misuse of official power. Further, Nippon Express also identified Viet Nam and Myanmar as problematic in this regard. As Vantec did not operate frequently in these markets, the company stated that it could not comment. On the other side, all interviewed companies stated that Singapore had excellent conditions and that corruption was not an issue in Malaysia and Thailand. Hence, in order to eliminate unequal treatment of companies, India and mentioned ASEAN members should intensify their anti-corruption measures.

Last but not the least, the quality and reliability of logistics subcontractors in India was described as problematic. From the perspective of the interviewees, subcontractors – but also partly their own local staff – do not understand the requirements of the automotive customers and therefore lack the quality deemed necessary. While it is not possible to argue the opposite, this point is rather secondary and does not require political intervention. In our view, it would be more effective if automotive and logistics service companies engage in transferring their best practice to Indian companies in order to overcome these issues.

3. India-ASEAN Supply Chains

As the focus is mainly on supply chains between India and ASEAN, the first step will be investigating the role of Indian OEMs and vehicle component producers.

TVS Group is an Indian conglomerate that specialises in automotive components manufacturing. Even non-automotive activities like several logistics subsidiaries have strong focus on supply chain solutions. The group's core company is TVS Motors, India's third-largest two-wheeler producer founded in 1911 (Table 6).

Table 6 Indian two-wheeler market in FY 2012 and FY 2013 (until November 2013)

	Market share	
	FY 2012	**FY 2013**
Hero	45.2%	42.2%
Honda	14.9%	18.8%
Bajaj	19.1%	18.5%
TVS	14.1%	13.0%
Suzuki	2.5%	3.0%
Yamaha	2.6%	2.6%
Mahindra	1.0%	0.9%
Royal Enfield	0.6%	0.8%
Piaggio	-	0.2%

Source: Business Standard, 11.01.2013.

TVS Motors set up a production site in Indonesia that became operational in 2007, making it the first overseas location of an Indian manufacturer. Furthermore, the company has repeatedly considered setting up production in China but so far these plans have not materialised.

TVS Group is characterised by an extensive web of JVs with foreign suppliers such as Borg Warner, Bridgestone, Dana, Delphi, Dunlop, Dynacast, Koito, Kokusan Denki, Lucas Industries (today integrated with TRW), and ZF Friedrichshafen (Table 7).

Table 7: Automotive parts JVs of TVS Group

JV name	JV partner	Foundation	Product
Lucas-TVS	Lucas	1961	starter motor, alternator, wiper motor, fan motor, small motor, ignition, horn
Brakes India	Lucas	1962	brakes
Wheels India	Dunlop	1962	wheels
Sundaram Brake Linings	Abex (Federal-Mogul)	1976	brake linings
Turbo Energy	Borg Warner	1982	turbochargers
Axles India	Dana	1983	axles
India Nippon Electricals	Kokusan Denki	1984	electronic ignition
Delphi TVS	Delphi	1989	diesel injections systems
Sundaram Dynacast	Dynacast	1993	die castings
India Japan Lighting	Koito	1996	lamps and reflectors
ZF Electronics TVS	ZF Electronics	2002	automotive and white good electronics, computer input devices

Source: compiled from company websites.

In most cases, detailed information about JV arrangements is unavailable, hence making it impossible to judge the actual strength of TVS Motor in these ventures. In case of Sundaram Brake Linings, TVS split away from its partner Abex in 1992 and is today a wholly-owned TVS subsidiary. In all other cases, exact arrangements are obscure. However, some JVs are not directly between the TVS Group and its respective partners but with Lucas-TVS (Delphi, Koito, and Kokusan Denki). In case of Koito, Lucas-TVS and the Japanese lighting specialist are equal partners (50 percent each). A case study on Lucas-TVS revealed that besides JVs, the company used several technology agreements, mainly with Denso but also with Mitsubishi and

Hitachi, to improve their technological capability (Sahoo, *et al.* 2011, 17f.). Technology transfer is conducted by short-term stays of Lucas-TVS engineers at partner companies. Since 1978, the company operated its own R&D department, meaning that it did not solely rely on external sources of knowledge. However, the company used Japanese consultants to introduce modern product development processes and acquire quality management certification (ISO/TS16949). Moreover, the company set up a benchmarking unit, which compares the company's products to those of competitors.[10] Furthermore, Lucas-TVS conducted supplier development among Tier2 and Tier3 manufacturers around Chennai, meaning that it not only absorbed foreign know-how but that it also transfers these skills and capabilities towards its own supplier base. These steps seemingly enabled the company to become more independent from foreign technology sources. It has been claimed that more than 70 percent of its sales turnover are generated by products developed inhouse (Sahoo, *et al.* 2011, 18). Hence, Lucas-TVS is an example that shows how companies may successfully move from technologic dependency towards independent, self-reliant technological capabilities: While initial absorption of foreign know-how is important to stay in the business, automotive suppliers need to complement this with their own R&D efforts to become independent.

Regarding the time of JV foundation, it can be stated that TVS already had business ties with foreign companies during the era of tight state regulation. However, the lion's share of ventures was created during or shortly after the creation of Maruti-Suzuki, which illustrates the aforementioned influx of foreign suppliers that accompanied the gradual modernisation and liberalisation of India's automotive sector.

Concerning supply chain relations, it appears that the bulk of customers are located in India. However, some TVS subsidiaries export. Lucas-TVS exports its products to Germany (Wabco), Italy (Denso, Iveco, Yamaha or Motori Minarelli), Malaysia (Proton) and the US (Cummins, Commercial Vehicle Group). Delphi TVS supplies Ford in the UK and Peugeot in France in 1997. Axles India exports to one of its stakeholders, Dana, in the US. In a similar fashion, India Nippon Electricals

[10] While benchmarking is a modern term, the practice basically is nothing else than reverse engineering. Through industry contacts, we can state that is by no means limited to emerging country firms but also common among advance OEMs and suppliers.

supplies Kokusan Denki in Japan. However, this JV has been exporting to Diesel engine manufacturer Lombardini in Italy since 2004. Thus it appears that most customers served by exports are not located in ASEAN but in Europe and the US. One possible explanation for this phenomenon could be that JV partners – like the Hero-Honda case explored below – already have subsidiaries in the ASEAN region so that they do not need or explicitly prohibit exports from India. However, given the unclear status of the JVs, it is impossible to determine if foreign partner interest could prevent TVS from extending exports to ASEAN.

Hero Motors, another two-wheeler OEM illustrates the limitations of domestic companies. According to the JV, its former partner Honda could not sell its motorcycles in India to protect Hero as it specialised in motorcycles. Honda could only sell scooters, which Hero does not manufacture. In turn, JV arrangements barred Hero from exporting motorcycles to markets where Honda was active, which virtually prohibited exports (Economic Times of India, 28.05.2013). Here, two crucial points must be made. First, such arrangements are usually not disclosed, so that invisible export barriers may exist. These contractual arrangements between JV partners may even have more impact on trade than formal tariffs. The problem is, of course, that information about such arrangements is usually not disclosed or shared only on a mutual understanding basis that it cannot be published. Information tends to be only disclosed if a JV brakes up, that is, *ex-post*. Hence, there is little or no evidence that would allow an estimate of the impact of these contractual barriers. Second, despite such contractual limitations on trade, JVs are a common phenomenon in emerging countries. The simple reasons are technology and supply chain. In Hero's case, it appears that the Indian OEM was largely dependent on Honda's technological know-how. Apparently, Hero tries to balance the loss of its former partner by entering new relations with Austrian (engines), Italian (design) and US (premium bikes) partners. In order to be competitive, Indian companies often need access to know-how from their foreign partners. Moreover, in case of suppliers, the access to technology is a critical condition for joining a supply chain. Therefore, emerging country firms have little choice but to accept that their foreign partners may only transfer technology under the condition that partners do not enter into their established markets. However, the example of Bajaj shows that companies can be

successful without a foreign partner if they have sufficient design and R&D capabilities.

Another rather successful case is Tata Motors. Like many Indian companies, it is a subsidiary of a large conglomerate. As mentioned, Tata used to specialise in commercial vehicles. Initially, the company cooperated with Mercedes-Benz but the relationship was dissolved in 1969. During the economic reform era, Tata diversified into sport utility vehicle (SUV) production by launching the Sierra in 1991. Following this diversification trajectory, the OEM released the Indica mini car in 1998. Although the car body was designed in Italy, the model can be regarded as the first passenger car developed in India because major components like the engine were developed domestically. It is also noteworthy to mention that Tata sold a rebadged version of the Indica, the Rover CityRover, in the UK.

While being largely focused on the domestic market, Tata actively sought to internationalise its business via JVs and takeovers. It now appears that Tata's commercial vehicle business is more internationalised in terms of sales and production. In 2004, Tata acquired the commercial vehicle division of the defunct Daewoo *chaebol*, which had been spun off in 2002. While the core of production remains in South Korea where the company is the second largest truck manufacturer, completely knocked down (CKD) kits are exported to India and Pakistan for final assembly. In 2005, Tata started with a holding a minority stake of 21 percent in the Spanish Hispano Carrocera – one of Europe's largest bus and coach cabin manufacturers – and then acquired the company in 2009. By doing so, Tata entered the European commercial vehicle market and gained access to manufacturing know-how.[11] Similarly, Tata strengthened this business segment by forming a majority JV with Marcopolo (51:49), a bus manufacturer from Brazil. Buses for the Indian market are produced in Dharwad, Karnataka and combined body design and manufacturing know-how from the Brazilian partner with Tata chassis and engines. In 2011, Tata set up production in South Africa by forming a JV with Tata Africa Holdings, another company of the Tata group (Tata Group, 22.07.2011). In a plant near Pretoria, SKD kits are assembled for African markets. Historically, Tata Motors

[11] However, due to the economic crisis in the Euro Zone, which especially affects southern Europe, Tata closed down operations in Zaragoza, the main plant of former Hispano Carrocera in 2013.

had exported commercial vehicles to South Africa since 1998, followed by passenger cars since 2004. According to Tata, around 32,000 commercial vehicles and 31,000 passenger cars had been exported since then. It appears that the relatively simple SKD production is a necessary step to start localised production in another emerging market.

Concerning passenger cars, Tata formed a 50:50 JV with Fiat that encompassed joint production of vehicles, engines, and transmissions. Through this collaboration, Tata gained access to Fiat's diesel engine technology as locally produced engines are used for Fiat's Linea and Grande Punto as well as in Tata's Indica, Indigo, Manza, and Vista models (Business Standard, 10.11.2011). In 2008, Tata took over Jaguar-Land Rover (JLR) from Ford, which includes the Jaguar, Land Rover, and Rover brands. Taking over well-known but commercially unsuccessful brands, with the exception of the Land Rover, shows that Tata seems to be mainly interested in the know-how. However, regarding investment decisions to the UK, it appears that Tata intends to further strengthen the Land Rover, which already is successful in its particular niche market, and to revive Jaguar. So far, plans for the Rover brand are still unknown.

Also in 2008, Tata's majority JV (70 percent) with Thai assembler Thonburi Automotive (30 percent), who also manufactures Mercedes-Benz passenger cars, released locally produced Tata Xenon pickup trucks in Thailand (Economic Times of India, 18.12.2006).[12] Different Xenon versions are available, the first ones were produced with diesel engines, which are popular in Thailand, and the latter versions came with compressed natural gas (CNG) engines. Local content of Xenon variants is at 45 percent, just enough to evade tariffs. It also appears that Tata did not encourage its Indian suppliers to enter the Thai market to support Thonburi's production. The reason for not localising its supply chain seems to be insufficient volume as sales are simply too small to justify a relatively large investment.[13]

While Tata entered the pickup segment via production, it decided against exporting passenger cars to Thailand because it regards tariffs as too high (The

[12] The JV agreement was reached in 2006, but operations began in 2008.

[13] During the research phase of this project, it was not possible to elucidate which components makers supply Tata assembly at Thonburi. Lacking hard evidence, the authors agree with Prof. Kriengkrai Techakanont (Thammasat University) that Tata will use a mix of imports from India and procurement from suppliers located in Thailand.

Nation, 16.08.2012). At the same time, the OEM declared that due to AEC 2015, it considered building an assembly plant with an annual production capacity of 50,000-60,000 units. Furthermore, established assembling nations Thailand and Indonesia are candidates for this planned assembly site. In 2013, Tata slightly altered its policy and went for limited sales of the Nano to expand brand sales (The Nation, 01.05.2013). Similarly, Tata announced its entry to Indonesia starting with passenger cars and commercial vehicles. While manufacturing operations are planned within the next two or three years after the brand launch in late 2013, Tata will initially use a dealer network fed through imports. Moreover, Tata has selected Pilipinas Taj Autogroup (TAJ) as its distributor in the Philippines in late 2013 (Manila Times, 09.12.2013). TAJ organised the sales network in the Philippines on behalf of Tata Motors. In Malaysia, DRB-HICOM became Tata's distributor for commercial vehicles in 2013 (Tata Motors, 09.09.2013).

All in all, it is still appears uncertain if Tata will set up production in Thailand or Indonesia. However, two reasons for this careful approach can be identified. First, viable assembly operations need a critical sales volume, so that the brand must be developed and Tata must test the market. Second, Tata representatives explicitly referred to the 40 percent local content requirement in ASEAN when explaining the intended business schedule (Jakarta Post, 08.07.2013). From an industry perspective, a subsidiary argument must be added to this point: meeting local content requirements depends on suppliers. Only if Tata can find component manufacturers that are able to meet its quality and cost requirements, it will be able to localise production. As will be demonstrated below, this would mean that the mostly non-Indian suppliers of the Nano can offer the same components at the same price in India as in ASEAN. Moreover, as many Indian suppliers of this model rely on foreign JV partners, it is not clear that they can follow Tata to the ASEAN market.

Despite the diversification into the passenger car segment, Tata Motors still mainly produces and sells commercial vehicles and SUVs (Tables 8 and 9).

Table 8: Tata Motors production volume by segment

	FY 2011	FY 2012	FY 2013 *
M & HCV	187,304	125,076	99,215
LCV	305,396	335,928	258,468
Utility	41,801	40,110	25,533
Passenger cars	215,507	160,168	88,109
Total	**750,008**	**661,282**	**471,325**

Note: *FY 2013 includes production figures until January 2014.
Source: Tata Motors.

Table 9: Tata Motors sales by segment and location

		FY 2011	FY 2012	FY 2013 *
M & HCV	Domestic	165,708	117,900	88,660
	Export	12,019	7,803	8,860
	Subtotal	177,727	125,703	97,520
LCV	Domestic	254,339	315,041	232,238
	Export	33,931	29,911	25,277
	Subtotal	288,270	344,952	257,515
Utility	Domestic	42,354	41,166	26,090
	Export	529	940	922
	Subtotal	42,883	42,106	27,012
Passenger car	Domestic	199,540	158,020	88,400
	Export	5,817	4,629	5,009
	Subtotal	205,357	162,649	93,409
Total		**714,237**	**675,410**	**475,456**

Note:*FY 2013 includes production figures until January 2014
Source: Tata Motors.

As the production and sales figures indicate, Tata is currently experiencing difficulties, especially in the domestic market, particularly in the passenger segment. Indeed, while all segments of the Tata brand are registering decreasing sales in India and abroad, the company has managed to turn around JLR as Jaguar and Land Rover sales are increasing (Fourin 2014, 42). Jaguar brand sales increased from 53,860 in

2010 to 78,946 in 2013. Land Rover sales went from 178,584 units in 2010 to 346,302 units in 2013. While JLR increased its sales by 20.2 percent on a year-on-year basis in 2013, Tata Motors total sales fell by 30.2 percent in the same period.

These overall difficulties can be illustrated by Tata Motors' most well-known model, the Nano. Released in 2008, this model attracted attention as the world's cheapest car. In the context of supply chains, the Nano is also an interesting subject. Industry weekly Automotive News (03.03.2008) identified key suppliers for the model and found that most of them were global MNCs such as Bosch (body electric parts and brake system), Continental (fuel level sensor and fuel supply pump), Delphi (instrument cluster), Denso (windshield wiper system), Federal-Mogul (pistons and gaskets), Mahle (camshafts, fuel, and air filters), Saint-Gobain (car glass), and Teksid (engine block), among others. Indian parts producers could also supply components but often only in cooperation with international partners, such as TVS-Lucas and Bosch (alternator and starter motor) and Wheels India (wheels); well as Subros[14] and Behr (HVAC module); or Tata Auto Comp Systems (TACO) with its JV partner, Visteon (air induction system).

TACO supplied a large number of components for the Nano through these JVs: Ficosa (gear shifter and mirror), GS Yuasa (car batteries), Johnson Controls (seats), T.Rad[15] (radiator fan module), and Yazaki (wire harness) (TACO, 24.03.2009). Moreover, TACO independently supplied several other components such as bumpers, dashboard, and several drivetrain plastic components, among others. Again, it must be highlighted that it is mainly parts with relatively low level of technological complexity are independently produced while more complex components are manufactured under JVs. Hence, with much caution, it could be stated that Tata produced the Nano with many parts that were produced by vertically integrated companies. However, TACO is another typical case for an Indian supplier that mainly consists of JVs with foreign companies. Again, as in previous examples, it is not possible to determine the ownership structure of most JVs, thus making it hard to determine how much control Tata actually has over these companies and the level of related know-how. Therefore, caution about the possibly misleading

[14] Subros is a JV that was established in 1985 between Suzuki (13%), Denso (13%) and the Indian Suri family (40%) to supply air conditioning systems for Maruti-Suzuki.
[15] The company was formerly known as Toyo Radiator.

previous statement is absolutely necessary. TACO is simply not transparent enough to draw a clear conclusion. In 2012, TACO's JV (50:50) with wiring harness producer Yazaki ended when the Japanese company was able to integrate its operations and become a wholly-owned subsidiary by acquiring TACO's stake (Yazaki, 05.11.2012).

Similar to TACO, wholly-owned Indian parts manufacturers such as Natesan Synchrocones (bronze synchroniser rings), Parkash Automotive (sheet metal components), Shivani Locks (hood latch), and Yeshshree Press (wheel back plate) only supplied relatively low technology components. Some of these companies are SMEs with less than 50 employees and they are effectively confined to the role of Tier2 or Tier3 suppliers.

While many observers – including scientists – nevertheless expected that the Nano would revolutionise the automobile industry, these forecasts proved false. One particular issue of the Nano was that 50 percent of initial bookings were made for the most expensive version, 30 percent for the mid-range, and only 20 percent for the base version (Wells 2010: 448). These figures indicate that the idea of a no-frills car was not appealing to most customers and so the potentially revolutionary nature of the minimalist configuration approach did not find a market niche. Hence, sales did not reach the expected level while the factory was laid out to produce 350,000 units per year (Table 10).

Table 10: Tata Motors' Nano sales

	Sales
FY 2009	30,350 (estimate based on production figures reported by Business Week)
FY 2010	70,432
FY 2011	74,527
FY 2012	53,848

Source: Indian Express, 26.04.2012; Business Week, 11.04.2013; Hindustan Times, 05.05.2013.

Thus, Tata has only sold 229,157 units of the Nano in four years, less than its projected annual production capacity. Moreover, Tata could not keep the initial price of INR100,000 (US$2,000), so that it went up to INR142,000 (US$2,600). Despite

the mediocre performance of the Nano, Tata Motors is still by far the strongest domestic car producer. However, the dramatic decline in FY 2012 sales suggests that Tata must adapt to increasing competition with foreign OEMs.

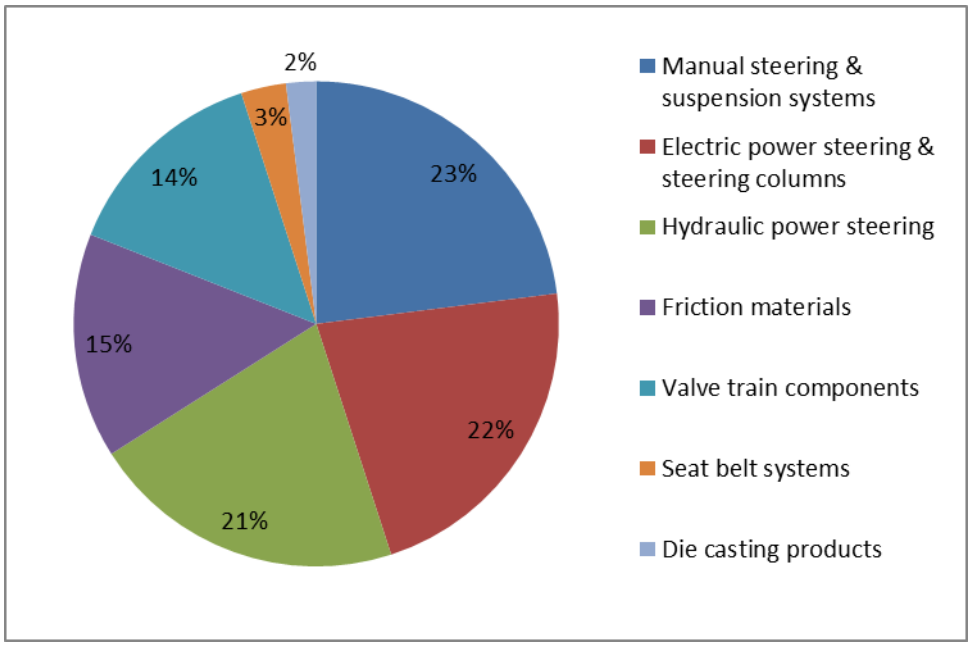
Concerning the topic of supply chains between India and ASEAN, Tata is again an example showing how Indian companies are not quite integrated with the ASEAN region. It appears that instead of the adjacent ASEAN region, Tata targets different markets. If one considers Tata's commercial vehicle section with a contracted production in Thailand, the only ASEAN countries where models are sold are in Thailand and Myanmar. On the other hand, Tata only produces in South Africa but sales and distribution units cover a large number of African countries.[16]

Based on the background laid out in this paper and a look into the establishment of sales networks in ASEAN, data suggest that Tata has only recently discovered ASEAN member states as a possible market. As the Indian market becomes more difficult, the currently booming ASEAN market becomes a target for expansion. AEC 2015 apparently is a second major motivation for setting up production in ASEAN. If the OEM is successful in localising production, this could lead to a further intensification in automotive components trade between India and ASEAN. However, it is not clear if such a development would support suppliers from India, ASEAN member states or even the West as Japanese, and Korean suppliers already active in ASEAN.

A further example for an Indian parts manufacturer is Rane Group, a Tier2 supplier that mainly produces safety relevant components (Figure 4). Rane has established several JVs with international suppliers, which are its strategic partners. It collaborates with TRW (hydraulic power steering), NSK (electric power steering), and Nisshinbo (friction materials & brakes). In the case of NSK, the Japanese supplier took control over the JV in 2010 with a 51 percent stake. TRW and Rane, on the other hand, are equal partners (50-50). Rane holds 42.5 percent of the venture with Nisshinbo.

[16] African countries include Algeria, Angola, the Democratic Republic of Congo, Djibouti, Ghana, Kenya, Mozambique, Nigeria, Senegal, South Africa, Sudan, Tanzania, Uganda, and Zambia.

Figure 4: Rane Group sales in 2012, by product



Source: Rane Group 2013a.

The company is India's leading engine valve supplier with 85 percent market share. Its main customers in India are domestic OEMs as well as Hyundai, Honda, Maruti-Suzuki, and Toyota. In the case of Hyundai, valves for the so-called Kappa engine are supplied to Hyundai-Wia, an affiliated supplier which mainly produces transmissions, constant velocity joints, engines, and machine tools. Rane further exports engine valves to Audi, Deutz, and VW in Germany, VW in Brazil, and Skoda in the Czech Republic. Its supply relation with VW started in 2003. Moreover, Rane became a global supplier of Yamaha in 2003, exporting valve guides to Taiwan and Thailand. Of its valve products, 30 percent of passenger car engine valve sales are shipped abroad while 46 percent of commercial and agricultural engine valve sales are generated through exports (Rane Group, 2013b). The die casting business does not contribute much towards total sales turnover but still, 78 percent are exported. However, the export share of JVs' sales is significantly lower: the TRW JV export share reaches 14 percent but only six percent for the Nisshinbo JV and the venture with NSK only exports a mere 0.66 percent of total sales. Among these activities, the NSK JV exports steering systems to Nissan in Mexico. Steering components produced in the TRW JV are exported to Renault – to its low cost brand

Dacia – in Romania (since 2010) and Brazil (since 2011). Domestically, a Rane subsidiary supplies brake linings for Tata Motors' Nano.

Present situation suggests that Rane largely depends on technology from its JV partners. Apparently, self-controlled business units such as die casting or engine valve production have a higher export ratio than JV units. Hence, the company's own expertise seems to be critical for exports. As the technology used by the JV partners should not be the constraining export capability, it appears that these ventures were set up to cater to the domestic market. Thus, from its leading position in this segment of the Indian market, Rane diversified activities with the help of foreign JV partners. It appears that the company wants to become less dependent on its partners, which is indicated by the fact that R&D investment increased from 0.5 percent of sales turnover to 1.5 percent (Rane Group, 2013b). While this investment ratio is marginal in comparison to leading suppliers, this plan reflects the need to have some degree of learning and innovative capability to survive in the industry in the long run. This phenomenon is not limited to India, it is global. Due to supply chains and the role of assembling OEMs and their trusted Tier1 suppliers in the networks, parts and components manufacturers must upgrade their technology so as to be integrated in these chains. Otherwise, they will not get orders or will only be confined to the role of Tier2 or Tier3 suppliers that are largely dependent on cheap labour inputs. These findings are very similar to Humphrey's (2003) study on the automotive industry in Brazil and India, observing that OEMs increasingly rely on Tier1 suppliers and therefore encourage "follow sourcing". Hence, these Tier1 suppliers aggressively enter markets at the same time that their main customers set up local production. Even in a relatively high developed country with an indigenous automotive industry like the Czech Republic, the transformations after the collapse of the Soviet Union resulted in the removal of two-thirds of Skoda's pre-1990 suppliers from its supply chain during the socioeconomic transformation in the 1990s (Pavilinek and Zenka 2010, 573).

In general, it appears that successful Indian suppliers have developed production know-how and technology in cooperation with foreign partners. As the case of Hero highlights, even OEMs may need expertise from advanced production country partners in order to be competitive. A case study covering Mahindra & Mahindra and

supplier Bharat Forge (Balcet and Bruschieri 2010, 137-154) offers a useful comparison to this paper's own findings; Mahindra & Mahindra operates through a conglomerate structure, has its own parts manufacturing division, and although selling to various countries, ASEAN is not an important export destination. However, it retreated from former OEM JVs and appears determined to succeed by simultaneously acquiring expertise through acquisitions and increased R&D spending.[17] Bharat Forge is somewhat different as it mainly accessed technology initially by purchasing modern production equipment, introducing modern management practices, and relying on IT-based organisation. Differing from all mentioned cases, Bharat Forge exports around 40 percent of total sales. Again, ASEAN is not an important export destination unlike the US, UK, and Japan. While it is beyond the scope of this study to determine why ASEAN plays such a minor role for Indian automotive companies, it would be an interesting question for future research. The relative neglect of the ASEAN market can be linked to a recurring pattern of a dual focus on developing countries – in particular, Africa and South Asia – and developed markets such as the USA and Europe.

The cases of Hyundai and its related suppliers should be considered. Hyundai entered India in 1997 by setting up a wholly owned subsidiary, making it the first international OEM to do so. Park (2004, 3553f.) described that Hyundai encouraged trusted Korean suppliers to set up production within a 50km radius of its assembly plant. Suppliers which followed Hyundai to India chose various modes of entry, including wholly-owned subsidiaries or either majority or minority JVs with Indian or other foreign firms. Hence, it can be claimed that Hyundai implemented a clear "follow sourcing" strategy, urging key suppliers such as Mando or Sungwoo to establish production in India in order to ensure quality. As mentioned, this is by no means exceptional: Humphrey and colleagues (1998: 175) have documented that when Fiat entered India, its most critical suppliers from Italy also set up operations. Subsequently, Hyundai successfully conquered market shares from Maruti. Although localised models are all in the mini (or city) and subcompact segment, Hyundai chose to sell imported larger models. And aside from expanding its domestic sales by steadily increasing exports from India (Table 11), it has become the country's

[17] In 2011, the Indian OEM took over SsangYong Motors from South Korea.

principle passenger car exporter with 48 percent of total exports. According to Hyundai, it exports six models to 119 countries.

Table 11: Hyundai's domestic sales in and vehicle exports from India

	Domestic sales	Exported units
1998	8,447	0
1999	17,627	20
2000	82,896	3,823
2001	87,175	6,092
2002	102,806	8,245
2003	120,325	30,416
2004	139,759	75,871
2005	156,291	95,560
2006	186,174	113,339
2007	200,411	126,749
2008	245,397	243,919
2009	289,863	270,017
2010	256,717	247,102
2011	373,709	242,330
2012	391,276	250,005

Source: compiled from Hyundai Motor India website.

These data document Hyundai's strategy of not only conquering this emerging market but of its clear plan to use India as its small car export hub. Initially, the Korean OEM used India to produce SKD and CKD kits that were exported to neighbouring South Asian markets such as Bangladesh, Nepal, Pakistan, and Sri Lanka. Afterwards, key components of Indian market model Santro such as engine, transmission, and body panels were exported to South Korea and assembled in its Ulsan plant as the Visto (Park, 2004, 3554). It should be highlighted that Hyundai first used India to enter adjacent South Asian markets via knock-down kit assembly, it did not export to ASEAN. Moreover, it appears that the small car hub strategy came under questioning and then partly abandoned. India is still the Korean's second

largest production base after its home country but Hyundai faced repeated problems. India had been the sole production base for the i10 and i20 models but the OEM shifted the volume for the European market from Chennai to Izmit, Turkey in order to balance exports with domestic sales and reduce waiting times for popular models in India (The Hindu, 22.03.2010). Repeated strikes including violence against firm property and even among fellow workers in Chennai came up as a secondary reason for partly shifting production to Turkey (Economic Times of India, 07.06.2010).

Humphrey *et al.* (1998, 176) and Park (2004, 3554) have listed firms that followed Hyundai's expansion to India in 1997 and these are mainly Korean Hyundai affiliates that entered into JVs with local Indian companies. How did these companies develop over time? Are they confined to the Indian market or did they become integrated into global supply chains?

Our first example is Daewha Fuel Pump from Incheon near Seoul. In its home market, Daewha's main customers are Hyundai, Kia, and Daewoo, which is owned by GM since the collapse of the Daewoo *chaebol* during the Asian financial crisis. The company mainly produces different fuel pumps (mechanic and electric), die casting parts, and engine mounts. When the company entered the Indian market, it formed a JV called Pentadaewha with Pentafour, a local conglomerate with automotive, chemical, solar energy, and media divisions. At the time of entry, Daewha had a 51 percent majority stake and Pentafour held the remaining 49 percent stake (Park 2004, 3554). A detailed list of products and customers of the Indian facility is available from Daewha's website (Table 12).

Table 12: Pentadaewha customers by product

Product	**Customers**
Fuel pump	Hyundai, Tata, India Japan Light, Lucas-TVS, Bosch, Hanil Lear
Fuel filter	Nissan, Hyundai
Oil filter	Maruti, Tata, Hyundai
Plastic injection parts	Hyundai
Press and die castings products	Hyundai

Source: Daewha Fuel Pump.

Pentadaewha mainly supplied parts for Hyundai's subcompact Accent (Verna) and mini Santro (Atos) models, which are produced in Chennai. This suggests that the Indian subsidiary mainly catered to Hyundai, but gradually extended its customer base. As the list shows, customers are either JVs between Indian and foreign firms or even between two foreign firms.[18] However, the list suggests that customers are largely based in the Chennai area. Hence, the company is an example of localising an already existing supply chain of trusted suppliers, in this case through partnering with local companies. While the export performance of Daewha itself was limited, it must be kept in mind that the end customer Hyundai uses India as a global export hub for small cars. However, according to information provided by Daewha (14.02.2014), the company sold the plant to INZI Controls, another Korean automotive parts supplier in 2007. Daewha did not disclose the reason for selling the Indian factory, but explained that the received funds were used to set up production in the Kaesong industrial region, located north of the inner Korean border.

JKM Dae Rim is a producer of engine and transmission components. Since its foundation in 1979, it supplies Hyundai with components. The company exported it products to the USA and Japan, but India was the first production facility outside of Korea. It formed a minority JV (27 percent) called JKM Dae Rim Automotive with local conglomerate Dynamatics Technologies (73 percent), which is active in various engineering related fields such as hydraulics, aerospace, and defence. Dynamatics has a long-term relationship with Mahindra & Mahindra, which it supplies with hydraulic gear pumps for its tractors. Similar to Daewha's JV, components for the Accent and Santro models were delivered to Hyundai. Indian operations apparently grew to such an extent that a new factory was established in 2007 to serve Hyundai, but also other customers. Concretely, unspecified transmission components are procured from agricultural machinery producer John Deere and Fiat-Tata in Pune. Water pumps are supplied to Komatsu Cummins and compressor housings to Honeywell. Moreover, main engine bearing caps are delivered to Ford in Argentina, South Africa and Thailand. In the same year, Dynamatics acquired a production

[18] Hanil Lear is a 50:50 JV of US-based Lear and the Korean Kia-affiliate Hanil E Hwa, which are both automotive seat producers.

facility in the UK to internationalise its business, especially the automotive and aerospace divisions.

In 2008, Dynamatics bought out JKM Dae Rim, taking full control of the Indian operations. In 2011, Dynamatics took over Eisenwerk Erla, a German foundry that is active in Germany and Chennai, and supplies Bayerische Motoren Werke AG (BMW), Borg Warner, Daimler and VW Group (Audi and VW brands). Operations of Eisenwerk Erla and JKM Dae Rim Automotive were subsequently unified as JKM Erla Automotive. Differing somewhat from Daewha, JKM Dae Rim has sold its Indian business to its partner Dynamatics, which appears to internationalise its operations via acquisitions. As part of the process, its customer base diversified, but apart from exporting to several Ford subsidiaries, Dynamatics appears to largely serve customers directly in India, and through its acquired subsidiaries in Germany and the UK.

Another supplier that entered the Indian market is SL Corporation, formerly known as Sam Lip. The company produces various automotive parts and components such as lighting, mirrors, chassis parts and front-end modules. When SL followed Hyundai to Chennai, it created a majority-owned JV (75.2 percent) called SL Lumax with Lumax (20.3 percent) and Hyundai (4.5 percent) (Park, 2004, 3554). Lumax is part of Indian conglomerate DK Jain Group and has a long-term partnership with Japanese component supplier Stanley Electric. Lumax and Stanley Electric teamed up after Maruti-Suzuki was founded in 1984 and today Lumax has rounded 60 percent of the market in automotive lighting systems in India. However, this figure must be qualified as Lumax does not own the majority of SL Lumax. The status of the other eight production sites could not be elucidated. According to Lumax, its shares are owned by Stanley Electric (35 precent), Indian promoters (35 percent) – most likely DK Jain – and unnamed institutions (30 percent). Thus, the somewhat non-transparent ownership structure suggests that Lumax has created many JVs in the automotive lighting segment but it is not possible to state if it controls all these companies. As mentioned in the case of SL Lumax, it only owns a minority stake, while the rest is controlled by SL and Hyundai. SL Lumax in Chennai today produces lighting, trim and chassis parts. SL Lumax was formerly dedicated to

Hyundai, but according to SL Corp., it also supplies Indian operations of GM (chassis parts and lamps) and Ford (lamps).

Nevertheless, Lumax deserves attention, even if the JV with SL Corp. urges caution against overrating it. Lumax has created dedicated production sites to serve Bajaj (Waluj, Aurangabad), Maruti-Suzuki (Gurgaon), Tata (Pune), and former Hero-Honda (Haridwar). Moreover, Lumax is interesting in the context of this article because its non-domestic customers include Nissan, agricultural vehicles producers CNH and John Deere, Italian scooter manufacturer Adiva as well as commercial vehicle lighting specialists Truck-Lite (USA) and Vignal (France). As all production is located in India, these clients import from India. Thus, it can be stated that Lumax is a company focused on the Indian market and partly dependent on the technological know-how of its partner Stanley Electric. However, products are competitive enough to export to certain international customers.

Turning our attention to a representative Japanese presence in India with regard to geographic clustering in India, it has been observed that Japanese investment has been concentrated in Bangalore, Chennai, New Delhi, and Pune (Horn *et al*., 2010, 355). This is remarkable as the last three are regularly described as the centers of India's automotive industry (e.g. Kumaraswamy *et al*., 2012, 374f.). Thus, it can be stated that foreign investment created a fourth centre in Bangalore.[19]

Denso, one of world's leading suppliers is headquartered in New Delhi. As the company established its presence in India in 1984, it can be safely concluded that Denso was one of the companies that supplied Maruti-Suzuki from the beginning. The company is also interesting in one regard, it is involved in the creation of a regional supply system in ASEAN and in India. For the ASEAN region the company employs a strategy that can be summed up as centralising the production of small components in a single country and producing bulky components in various countries with OEM assembly plants (Table 13).

[19] Horn and colleagues (2009, 357f.) find that by 2008, 11 Toyota-affiliated companies had invested in Bangalore. However, they also point out that different from Honda or Suzuki, Toyota *keiretsu* firms are much more dispersed among the four centers. Thus, while the location choice of an OEM can cause localisation of suppliers, Bangalore's development into India's fourth automobile centre should not be solely attributed to Toyota. *Keiretsu* members such as Aisin Seiki, Denso, Tōkai Tekkō, Toyoda Gōsei, Toyota Bōshoku, and Toyota Tsūshō are located in Bangalore, which also hosts Continental, Faurecia, software development by Delphi and Bosch's India headquarters.

Table 13: Centralised and localised components production in ASEAN and India

Category		Component	Thailand	Indonesia	Malaysia	Philippines	Viet Nam	India
Heat control	A/C system	HVAC*	●	●	●	●		●
		Evaporator	●					●
		Condenser	●		●			●
		Compressor		●				
		Radiator	●	●	●			●
Electric		Starter, alternator	●					●
		Electric power steering ECU**			●			
Electronic		Meter				●		●
		Engine ECU**			●			●
		Relay	●					
		Relay flasher	●					
Powertrain		Air cleaner	●	●		●		●
		Oil filter	●					
		Fuel pump module	●			●		●
		Common rail	●					
		Gasoline injector	●					●
		Spark plug, coil, O_2 sensor		●				

	Horn		●				
	Exhaust gas recirculation valve						
	Accelerator pedal module					●	
Small motors	Wiper motor		●				●
	Wiper arm & blade			●			
	Power window motor		●				●
	Electric power steering motor		●				
	Variable nozzle turbo motor		●				

Note: * Heating, ventilation, and air conditioning
** Electronic control unit
● Produced in multiple countries
● Centrally produced
Source: Information provided by Denso.

The classification in Table 13 has been adopted from the original plan and it shows that the supplier regards India as only loosely connected to ASEAN. Although labelling parts produced in India as "produced in multiple countries" is somewhat misleading, this indicates that Denso established different production networks for ASEAN and India. Clearly, India is not a part of the ASEAN system as both small and bulky components are produced with few exceptions, that is, an extensive range of products is locally produced within India and that only a limited number of components must be imported. Denso provides a perfect example of separated markets, a Tier1 supplier that created dedicated supply chains for both ASEAN and India. Hence, an integrated production in a multi-country network is mainly limited to ASEAN and rarely incorporates India.

One of the world's leading OEMs, Toyota, has relocated to Bangalore after forming the Toyota Kirloskar JV in 1997. Its partner Kirloskar, a conglomerate mainly producing machinery and technical equipment such as valves, pumps, engines or electric motors, initially had a 24 percent stake, which it later reduced to one percent and re-raised to 11 percent. Toyota Motor Corp. and Toyota Industries Corp. own the remaining stakes. Thus, this JV is somewhat different from others in that the partners are not both automobile OEMs. It has been said that Kirloskar was interested in cooperating in order to learn modern processes and indirectly benefit from clustering for its machine-tool business (Richet and Ruet 2008, 456). Indeed, after this initial JV, Kirloskar and Toyota created five additional ventures.

One of these is Toyota Kirloskar Auto Parts (TKAP), which was founded in 2002.[20] Its ownership structure is similar to the initial JV, with stakes of Toyota Motor (64 percent), Toyota Industries (26 percent), and Kirloskar Group (10 percent). TKAP is located just 2.3 kms away from Toyota Kirloskar Motor, the original assembly JV. Although the adjacent location suggests that its primary function is serving local production, it is also playing a role in Toyota's global supply chain. This particular company allows some insights into the developing supply chains between India, ASEAN, and the rest of the world. After its foundation, TKAP initially produced axles and shafts for locally produced model Qualis. Facilities were enlarged to produce manual transmissions, first for export and

[20] If not indicated, all information in this section relies on TKAP.

subsequently for domestic production. Manufactured transmissions were dedicated to Toyota's Innovative International Multi-purpose Vehicle (IMV) project. Toyota began planning the IMV project in 2002 and began manufacturing operations of IMV models in 2004. Key components for IMV models are produced in India and ASEAN countries. Manual transmissions were produced by TKAP in India and another Toyota subsidiary in the Philippines, gasoline engines were produced in Indonesia and Diesel engines in Thailand. These components were initially assembled into complete vehicles in Indonesia, Thailand, South Africa, and Argentina, which are the main export hubs of the IMV project. According to TKAP, it only supplies transmissions for production of the Hilux pickup truck in Thailand and Argentina, which suggests that Indonesia and South Africa are supplied through the Philippines. Since 2005, the IMV-based Innova mini-van is produced by Toyota Kirloskar Motor in Bangalore and TKAP supplies its propeller shaft, front and rear axles. In 2009, the production of the Fortuner SUV, another IMV model, started at Toyota Kirloskar, which uses locally produced transmission from TKAP. Regarding the role of India in the supply chain, it is relatively small, especially in comparison to the Philippines (Table 14).

Table 14: Production and export of components under the IMV project

	Component	Production (2011)	Export (2011)
India	Manual transmission	148,000	137,000
Indonesia	Gasoline engine	115,000	40,000
Philippines	Manual transmission	333,000	325,000
Thailand	Diesel engine	370,000	131,000

Source: Toyota 2012.

Reported production and export figures reveal that India – like the Philippines – is mainly a component export base for Toyota's supply chain. On the other hand, Thailand and Indonesia export significantly less components, indicating their functions as assembly locations. It appears that Toyota mainly relies on it established production bases in ASEAN as assembly locations and export hubs while Argentina

and South Africa are its regional assembly and export hubs. Other countries have only limited assembly capacities that cater to domestic markets. This can also be backed up by information Toyota released about the IMV project (Table 15).

Table 15: IMV project overview

	Plant	Produced model	Start of production	IMV production capacity*	Production (2011)	Export (2011)
Thailand	Samrong	Hilux	Aug. 04	230,000	338,000	202,000
	Ban Pho	Hilux	Jan. 07	120,000		
		Fortuner	Jun. 10			
Indonesia		Innova	Sep. 04	100,000	107,000	38,000
		Fortuner	Oct. 06			
South Africa		Hilux	Apr. 05	120,000	117,000	87,000
		Fortuner	Feb. 06			
Argentina		Hilux	Apr. 05	92,000	70,000	47,000
		Fortuner	Sep. 05			
India		Innova	Feb. 05	90,000	63,000	n.a.
		Fortuner	Aug. 09			
Philippines		Innova	Jan. 05	n.a.	12,000	n.a.
Malaysia		Hilux	Mar. 05	n.a.	23,000	n.a.
		Innova	May 05			
		Fortuner	Aug. 05			
Viet Nam		Innova	Jan. 06	n.a.	12,000	n.a.
		Fortuner	Feb. 09			
Taiwan		Innova	Jun. 07	n.a.	3,000	n.a.
Venezuela		Hilux	Jul. 05	n.a.	5,000	n.a.
		Fortuner	Mar. 06			
Pakistan		Hilux	Oct. 07	n.a.	4,000	n.a.
Egypt		Fortuner	Apr. 12	n.a.	n.a.	n.a.

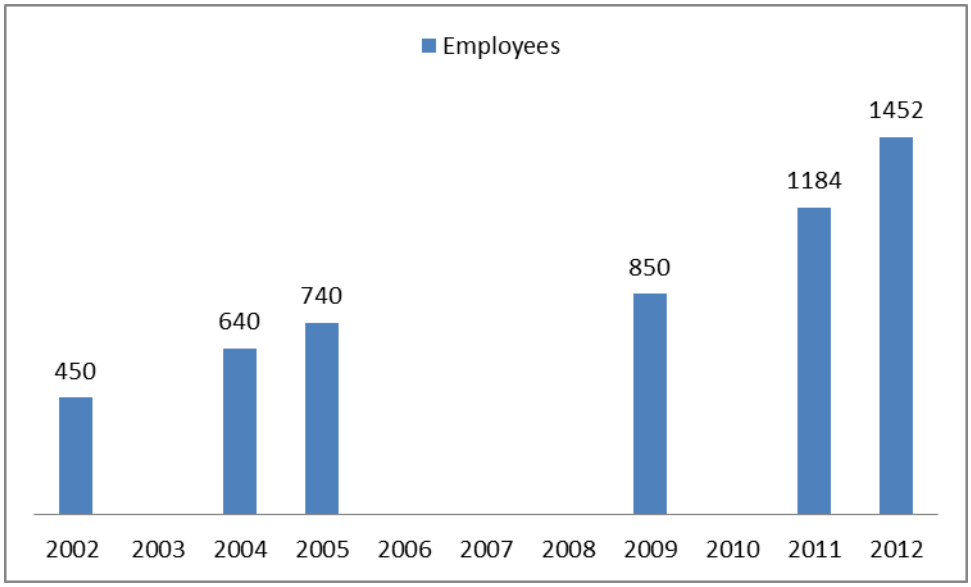
Note: *Toyota defines production capacity as two shifts without overtime. Hence, actual production can exceed production capacity if overtime or extra shifts occurred.
Source: Toyota 2012.

Since 2012, TKAP became involved in supply chain activities for a new Toyota model. It produces transmissions and gasoline engines for the Etios sedan and hatchback models. With the localised sourcing of these components from TKAP, the local content ratio of the Indian Etios rises over 90 percent. In this case, engines are only produced for domestic assembly. However, transmissions are both utilised for local assembly (45 percent) and for export to Brazil (55 percent). It appears safe to assume that the common use of flex-fuel engines in Brazil effectively prohibits exports of normally configured engines, which explains why Toyota points out that the Etios models sold in Brazil are capable of using bio-ethanol-gasoline blends (Toyota 2013: 12). However, an interview with Toyota Asia-Pacific in Singapore (26.02.2014)[21] revealed that while Toyota has some Indian suppliers, these are mostly JVs with Japanese or other foreign firms. This means that the OEM relies on the non-Indian suppliers to ensure the quality of delivered parts.

The steady expansion of Toyota's Indian activities can be traced through the increase in TKAP's workforce (Figure 5).

[21] For Toyota, operations in Asia-Pacific are not controlled centrally in Singapore. The city state is the finance and trading hub for regional operations while engineering and R&D-related functions are located in Bangkok.

Figure 5: Number of Toyota Kirloskar Auto Parts employees



Source: Toyota Kirloskar Auto Parts.

It is noteworthy that the increasing number of employees correlates with mentioned events like the sourcing for the IMV project (2004), subsequent localised production of IMV models (2005; 2009), and localisation and global sourcing of Etios components (2012).

Overall, the inclusion of its Indian subsidiary TKAP into the IMV and Etios supply chains is directed by Toyota. The growing, but nevertheless still limited, role of India as a sourcing location indicates that Toyota gradually integrates its Indian operations into the global supply chain. ASEAN member states still play the major role in this supply chain, which can be explained by the fact that they were the first to be integrated as both components sources and regional assembly locations. From Toyota's perspective, it is only natural to integrate additional countries as supporting roles to the already established main actors in ASEAN.

A remarkable point is that sourcing for the IMV project from India coincides with the India-Thailand FTA of 2004. Also, India and MERCUSOR signed a Preferential Trade Agreement (PTA) in 2004, which became effective on 1 June 2009.[22] However, the mentioned planning process of the IMV project that started in

[22] MERCUSOR can be described as a common market and customs union. Original members are Argentina, Brazil, Paraguay, and Uruguay. Venezuela joined in 2012. Moreover, Bolivia (1997),

2002 suggests that the existence of an FTA was not the main factor for choosing India as a sourcing base. This is even reinforced by the supply link to Argentina, which was served from India in absence of an FTA or PTA. Hence, it must be concluded that FTAs are not necessary condition for sourcing arrangements in supply chains. Rather, FTAs can promote and reinforce already existing supply chains through inter-industry or even intercompany trade.

However, two other Japanese OEMs show that India and ASEAN can be connected in different ways. First, Mitsubishi entered into an agreement with Hindustan Motors in 1998 to use the latter's facility near Chennai to assemble the Montero, Outlander, and Pajero SUVs as well as Mitsubishi's Cedia sedan.[23] The Indian partner also operates a dealer network for Mitsubishi, which enables the company to benefit from the downstream business. In the case of the Pajero Sport model, CKD kits are imported from Thailand and locally assembled. Before CKD assembly commenced, CBUs were imported from Thailand. Through localisation via CKD assembly, the company could reduce the sales price by around 7.6 percent, which shows why companies seek to localise production. Initially, local content was only at 14 percent, but the aim was to reach 30 percent in 2013. Locally sourced parts included alloy wheels, battery, headlining, lamps, seat belts, tires, window glass, and wiper assembly (Hindustan Motors, 18.12.2012). However, at a Mitsubishi Motors interview in Thailand (28.02.2014), Mitsubishi staff pointed out that local suppliers for Pajero Sport CKD kits are mostly JVs with foreign companies. This indicates again that foreign OEMs in India mostly rely on foreign companies for parts supply, whether in a JV with or local company or by wholly-owned subsidiaries. Moreover, it was pointed out that the decreasing exchange rate of the Thai Baht against the Indian Rupee was a concern for the operations.

While Mitsubishi uses ASEAN as a source of CKD assembly kits for India, Nissan takes the opposite approach for certain ASEAN markets. In Viet Nam, the

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Chile (1996), Columbia (2004), Ecuador (2004), Guyana (2013), Peru (2003), and Suriname (2013) are associated members. Bolivia became an acceding member in 2012, which means that it has to implement rules to become a full member.

India and Argentina had signed a first trade agreement in 1966, but it seems to have had little impact.

[23] In 2013, Hindustan Motors reached an agreement with Izusu to assemble models of the Japanese OEM in the same facility.

Nissan Sunny (Almera) is assembled by Tan Chong Industrial Equipment (TCIE), a subsidiary of Malaysia's Tan Chong group.[24] Located in the Hoa Khanh Industrial Zone in Da Nang, TCIE assembles the Sunny for the local market, other models may be added later to diversify the available product lineup. The base model is produced in India with most components of CKD kits imported from Chennai where Nissan and Renault operate a plant and so-called International Parts Centre (IPC). Other components are imported from China, Japan, and Thailand as well as from Renault operations in Spain. TCIE is not involved in supply chain logistics as it only orders from Renault and Nissan Asia Pacific, which is located in Thailand, but is responsible for regional supply chain management, among other tasks. In turn, Nissan Asia Pacific coordinates delivery from mentioned Asian locations to Viet Nam.

Locally produced parts only include antenna, battery, seat, and wheel. One particular component–seats–can be used to illustrate the impact of regulation and business considerations on automotive parts suppliers. The seats of the Sunny are locally produced by a Japanese seat manufacturer in Da Nang, 500m away from TCIE's plant. Regulation provides the first main reason for localisation. According to breakdown regulation, imported CKD seats must be separated into head rest, back rest, and seat base in order to receive reduced tariff rates. However, the design of the seat manufacturer is incompatible with this regulation as the back and head rest are fixed together and cannot be separated. Thus, in order to avoid violating Vietnamese breakdown regulation, Nissan required its seat supplier to localise production in Da Nang. As the volume is still limited (to 2,500 units per annum in the start-up phase), it is highly likely that the supplier operations are not profitable, so that the incompatibility between seat design and regulation must be regarded as a major factor for localising production. Local content is a secondary regulative impact. If a Sunny is ordered with leather seats, this part alone represents 13 percent of total value (in case of other trim material, it is around 8 percent). Hence, localising this single component is an effective way of increasing local content and meeting requirements. The second reason is more business related. Importing finished seats

[24] The following section is based on information obtained from a TCIE staff in an interview and plant visit in Da Nang on 25 February 2014.

has the downside that these items are relatively heavy and bulky, making imports comparatively expensive. Hence, by localising seat production, OEMs can evade associated costs.

The impact of the India-ASEAN FTA on operations in ASEAN can be well described through the following case. Initially, the agreed plan of Nissan and TCIE was to source around 80 percent of content from India but due to remaining tariffs, imports are quite costly and reduced the margin of TCIE. Thus, TCIE renegotiated with Nissan to not source parts from India but from the ASEAN region. Using the Harmonised System (HS) Code, company staff compared tariffs for imports from India and ASEAN to track down particularly suitable components to be sourced from ASEAN instead of India. As TCIE was capable of providing exact information which components should be sourced from ASEAN to reduce costs and make operations more viable, Nissan agreed to shift delivery, so that Indian content decreased to roughly 40 percent or half of the initial percentage. Thus, due to lower tariff barriers between ASEAN members than between ASEAN and India, the original plan of mainly sourcing from India was given up. This case also illustrates that the slower tariff reduction in CLMV countries allows Viet Nam to maintain higher tariff barriers towards India. The effect is that it is cheaper to source products from ASEAN than from India for newly set-up production sites in CLMV countries. Hence, this case illustrates that intra-ASEAN automotive components trade is currently significantly easier and less costly than between ASEAN and India. Therefore, the issue in the automobile industry regarding the trade between India and ASEAN revolves on the notion that FTA reduces tariffs, not eliminates them. This explains why sourcing for production in ASEAN is predominantly relying on the intra-regional supply chain, not on components imported from India.

Regarding Chennai, Horn *et al.* (2010, 356) mention investments of BMW, Ford, Hyundai, and Renault-Nissan. In 2012, Daimler joined these OEMs by opening a new truck plant in Chennai. Production of Daimler's Japanese subsidiary Fuso is also taking place in this facility. However, products are branded differently for different markets and segments, either as Bharat Benz (India and South Asia) or Fuso (India, ASEAN, Africa, and Arab Gulf Cooperation Council (GCC) states). Initial export destinations for Fuso trucks are Kenya, Sri Lanka, and Zambia (BharatBenz,

26.09.2013). Despite different branding, vehicles share similar components. While Daimler planned to create a common group platform to share as many components as possible, this plan was given up as it was found that creating a standard had numerous technical difficulties. Overcoming these difficulties would have made the common platform expensive, hence reducing benefits. Thus, a standard may only be created for future models. Regarding content, Fuso seeks to achieve 80-90 percent localisation.

Daimler's initial plan was very similar, stipulating that 41 percent of all components should be procured from Tamil Nadu or from companies located in relatively close proximity to the assembly plant, 44 percent should be delivered from other Indian states, and the remaining 15 percent of components will be imported (Daimler, 2012). This level of localisation should be achieved by using parts from local suppliers, sometimes based on Daimler or Fuso designs. However, Fuso experienced some problems in finding capable suppliers. Even though drawings were provided, Fuso's procurement division found that delivered parts lacked sufficient quality. Addressing this issue, Fuso invited engineers from local suppliers to come to Japan in order to receive trainings from Fuso engineering staff. Thus, the OEM engaged in direct supplier development to solve quality issues. This case suggests that the limited technological capability of suppliers is not only a problem in getting orders from India but may be a major constraining factor for exports.

On the other hand, engines are a key component locally produced in Chennai, one among three Daimler commercial vehicle plants that do so. In general, all medium- and heavy-duty Fuso trucks are utilising engines from Mercedes-Benz[25] and light-duty trucks use engines jointly developed by Iveco and Fiat.[26] While heavy-duty engines are produced with 63 percent local content, Fuso's older light-duty 4D34 engine is localised up to 74 percent and is produced by Avtec, a company of the CK Birla group. The latter company is another major Indian conglomerate whose flagship company is Hindustan Motors. Lastly, Korean body parts supplier MS Autotech and Indian frame maker KLT Automotive are located in the Daimler complex.

[25] This also applies to Daimler's US subsidiaries Freightliner and Western Star.

[26] Some models still use older engines, but this engine will become part of Fuso's global platform. All light-duty trucks will use this engine, sometimes with minor modifications.

Conclusion

Summing up, it can be stated that the historically separated automotive industries and markets of India and the ASEAN region are slowly becoming more integrated. While intra-regional components trade in ASEAN is still far more important and advanced in comparison to automotive parts trade between India and ASEAN as the case of Tan Chong (Nissan) demonstrates, India's automotive industry has rapidly evolved in the last decade.

However, our case studies suggest that similar to the ASEAN occurrence – in much the same way as in Eastern Europe, Mexico, or Brazil – the development is mainly induced and driven forward by foreign OEMs and suppliers. Here, different strategies can be identified. First, companies like Toyota mainly are interested in the domestic market and take an incremental approach towards integrating India into its existing global supply chain by upgrading the technological capability of the Indian subsidiaries. Interestingly, as the Japanese OEM already has a developed supply chain network in ASEAN, India only plays a minor role in supplying parts to this region and is utilised to serve assembly hubs in South America.

Second, companies such as Mitsubishi with an established supplier base in ASEAN use these networks to produce CKD kits and then ship them to India for final assembly. Unlike Toyota, India becomes another market and not a production location to be gradually developed. Hence, the main difference is that Mitsubishi's supply chain ends in India while in the case of Toyota, India is both final assembly location and component source for global supply chains.

Third, companies such as Hyundai-Kia and Daimler-Fuso (applies to the German majority owner) that do not have sophisticated supplier networks in ASEAN like many Japanese OEMs chose India as a major export hub besides their respective home bases.[27] Thus, Hyundai basically transplanted large parts of its Korean supply to India. From this site, Hyundai exports small cars to the global market without a strong focus on ASEAN. However, the Daimler-Fuso case demonstrates two aspects.

[27] A research by Kobayashi *et al.* (forthcoming) has shown that this is only partly correct. Hyundai-Kia entered pre-motorisation markets in ASEAN such as Lao PDR or Viet Nam where Japanese car makers have not yet occupied a dominant market position as in older markets such as Thailand or Indonesia.

One, it reveals that a large proportion of components can be sourced from India. Even if Fuso does not locally produce the most modern engine, fully outsourcing engine production to a local company shows that some Indian companies have reached a very respectable level of technology. Second, it appears that especially smaller Indian companies still need assistance to reach global quality requirements. This in turn could explain why automotive components exports cost lower than imports. Some Indian companies' technology is not competitive in the global market and other Indian firms can only access technology through their foreign JV partners. As illustrated by the cases of Hero, Rane, TVS, and partly TACO, using foreign know-how may come at the price of being confined to the domestic market or to those markets were partners are not active. Thus, the level of technology – more precisely an independent control of it – is an important factor for the participation in global supply chains. While JVs are an effective way to become part of a domestic supply chain, they may simultaneously turn into an obstacle in joining global chains.

Fourth, as the Tata and TVS cases show, Indian companies only recently developed an interest in the ASEAN region. They mainly seek to penetrate established markets such as Thailand and Indonesia via production. In the case of Tata, the creation of a regional dealership network can also be observed. However, the strategy could prove inferior to that of Hyundai-Kia in the long run. While Indian OEMs seek to gain market shares in relatively developed markets, Hyundai-Kia's and Tan Chong-Nissan's strategy is to enter markets and earn a brand reputation before the market takes off. Tata faces not only the established Japanese OEMs in the developed ASEAN markets but also Western carmakers: Volkswagen's partner DRB-HICOM started localised production through SKD kits of the Passat sedan and later through CKD kits of the Polo hatchback shipped from India and Jetta compact sedan in Malaysia and assembly of SKD kits of the T5 van imported from Germany by its partner Indomobil in Indonesia. Renault also partnered with Indomobil to assemble SKD kits of the Duster SUV imported from India.[28] These new entrants

[28] Renault also sells the Koleos SUV and Mégane RS hatchback in Indonesia that are imported from South Korea and Spain, respectively. Moreover, Renault intends to locally produce additional models from 2015 (Automotive News, 22.09.2013). These examples again highlight India as a source of limited CKD exports to ASEAN but VW intends to reach 40 percent local content in order to be able to export to the whole ASEAN region. Thus, analogous to the Tan

certainly can be related to forthcoming AEC 2015 as global OEMs seek their share of the ASEAN market. Therefore, all our interviewees expect competition in the region to intensify. This in turn is presumably more problematic for companies like Tata that lack the reputation and prestige of already globalised OEMs.

Our findings can be regarded as contrary to the research of Balcet and Bruschieri (2010), which highlights two success stories. The point is that these positive examples achieved their success by upgrading technology and developing design capabilities that are independent from foreign partners. Hence, taking steps into the same direction as Mahindra & Mahindra and Bharat Forge may be the main condition for Indian automotive firms to develop exports. Indeed, staff from a Japanese Tier1 supplier based in Thailand's Samut Prakan Province stated that the main reason why India is only loosely integrated with the ASEAN operations of the company is that Indian employees and companies lack *monozukuri* skills (Company D, 28.02.2014).[29] Thus, as companies – especially suppliers – in the automotive industry are mainly technology-driven, the importance of technological capabilities should not be overlooked. Therefore, besides eliminating tariff and non-tariff barriers to trade as discussed before, the Indian government should consider strengthening support to component makers such as giving them access to favourable finance to acquire technology or giving stronger R&D incentives. As Agustin (2012, 263f.) has shown, Indian OEMs use the National Automotive Testing and R&D Infrastructure Project (NATRiP) to save costs in procuring equipment. Hence, the Indian government should consider if NATRiP could be scaled up further, possibly by creating divisions dedicated to information dissemination to partner companies or specialised in training and know-how transfer to smaller parts suppliers. To survive in the automotive industry, technology is a key element and therefore, companies, preferably with government support, need to acquire skills and know-how in order to secure a place in either global or regional supply chains.

Chong example, it stands to reason that the OEM will try to replace content imported from India by parts sourced from local vendors.

[29] *Monozukuri* literally means "making things" and therefore is often translated as manufacturing. However, the term encompasses the notion of creating products through craftsmanship and has been scientifically defined as covering all value-creating activities, such as product development, sales and purchasing (Aoki *et al*. 2014: 373).

References

Agustin, T. L. D. (2012), 'The Development of India's Low Cost Car Segment as a Competitive Advantage', *Journal of the Graduate School of Asia-Pacific Studies*, 24, pp. 251-267.

Aoki, K. *et al.* (2014), '*Monozukuri* capability to address product variety: A comparison between Japanese and German automotive makers', *International Journal of Production Economics*, 147, Part B, pp. 373-384.

Automotive News (2008): *Car cutaway: Suppliers of the Tata Nano*, 3 March 2008, available at: http://www.autonews.com/article/20080303/CUTAWAY01/566778609 [May, 20, 2014].

Automotive News (2013), *Renault starts sales of locally built Duster in Indonesia*, 22 September 2013, available at: http://europe.autonews.com/article/20130922/ANE/130929994/renault-starts-sales-of-locally-built-duster-in-indonesia [March, 4, 2014].

Balcet, G. and S. Bruschieri (2010), 'Acquisition of Technologies and Multinational Enterprise Growth in the Automotive and the Pharmaceutical Industries: Drivers and Strategies', in: Sauvant, Karl P. *et al.* (eds.), *The Rise of Indian Multinationals. Perspectives on Indian Outward Foreign Direct Investment*. New York: PalgraveMacmillan. pp. 111-165

BharatBenz (2013), *BharatBenz triggers a powerful change in Indian Trucking*, BharatBenz press release 26 September 2013, http://www.bharatbenz.com/media/pressrelease/bharatbenz-triggers-powerful-change-indian-trucking [accessed February, 2, 2014].

Business Standard (2011), *Tata nod crucial to Maruti-Fiat diesel engine agreement*, 10 November 2011. Available at: http://www.business-standard.com/article/companies/tata-nod-crucial-to-maruti-fiat-diesel-engine-agreement-111111000011_1.html [accessed February 15, 2014].

Business Standard (2013): *Demand for foreign brands leads to shift in two-wheeler market: Today, every fourth two-wheeler sold in India is manufactured either by Honda, Suzuki or Yamaha* 11 January 2013. available at: http://www.business-standard.com/article/companies/demand-for-foreign-brands-leads-to-shift-in-two-wheeler-market-113011100117_1.html [February 2, 2014].

Business Week (2013), 'Tata's Nano, the World's Cheapest Car, Is Sputtering' 11 April 2013, available at: http://www.businessweek.com/articles/2013-04-11/tatas-nano-the-worlds-cheapest-car-is-sputtering [accessed Ferbruay, 15, 2014].

Cnossen, S. (2013), 'Preparing the way for modern GST in India', in: *International Tax and Public Finance*, 20(4), pp. 715-723.

D'Costa, A. P. (1995), 'The Restructuring of the Indian Automobile Industry: Indian State and Japanese Capital', *World Development*, 23(3), pp. 485-502.

D'Costa, A. P. (2004), 'Flexible practices for mass production goals: economic governance in the Indian automobile industry', *Industrial and Corporate Change*, 13(2), pp. 335-367.

Daimler (2012), *Daimler*. Presentation at Banker's Day India by Daimler India Commercial Vehicles CEO and Managing Director Marc Llistosena, available at: http://www.google.de/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=4&ved=0CD4QFjAD&url=http%3A%2F%2Fwww.equitystory.com%2FDownload%2FCompanies%2Fdaimlerchrysler%2FPresentations%2FDaimlerBankerDayLlistosellaDec42012.pdf&ei=RGgEU-a7OImnkQWIhID4Bw&usg=AFQjCNEXFRnqlipjiivxg4qbb1iM6TMgjw [Ferbruary, 19, 2014].

De, Debdeep (2011), 'Regional trade and international production networks: The context of automobile industry in Asia', in *International Journal of Technology Management & Sustainable Development*, 10(1), pp. 77-98.

Economic Times of India (2001), *Korean Samlip gives up plan to buy out Lumax stake*, 24 December 2001, available at: http://articles.economictimes.indiatimes.com/2001-12-24/news/27469364_1_lumax-foreign-equity-cent-stake [January, 25, 2014].

Economic Times of India (2006), *Tata Motors forms JV with Thonburi Automotive*, 18 December 2006, available at: http://articles.economictimes.indiatimes.com/2006-12-18/news/27421391_1_thonburi-automotive-assembly-plant-joint-venture-pickup-vehicles [February, 15, 2014].

Economic Times of India (2010), *Hyundai car production grinds to a halt; shifts cancelled*, 7 June 2010, available at: http://articles.economictimes.indiatimes.com/2010-06-07/news/27625071_1_ceo-h-w-park-labour-commissioner-korean-car [February, 5, 2014].

Economic Times of India (2013), *Hero MotoCorp.: Can the two-wheeler brand stay on top while Honda and Bajaj Auto claw into its market share?* 28 Mei 2013, available at: http://articles.economictimes.indiatimes.com/2013-05-28/news/39579994_1_hero-motocorp-hero-splendor-pawan-munjal [February, 5, 2014].

Fourin (2014), *Tata Motors, 2013 nen sekai hanbai ha 15.2% gen no 107 man dai*、*JLR ha 2 warimashi mo, Tata ga 3 warigen de fushin ga shinkokuka* (in Japanese) (Tata Motors sales in 2013 drop by 15.2% to 1.07 million; while JLR grows 20%, total Tata Motors drops 30%); Fourin's Monthly Report on Asia's Automotive Industry, No. 86 (February 2014).

Gulyani, Sumila (2001), 'Effects of Poor Transportation on Lean Production and Industrial Clustering: Evidence from the Indian Auto Industry', in *World Development*, 29(7), pp. 1157-1177.

Hindustan Motors (2012), *Mitsubishi Bets Big On Pajero Sport*, Hindustan Motor press release, 18 December 2012, available at: http://www.hindmotor.com/Files/MITSUBISHI-BETS-BIG-ON-PAJERO-SPORT.pdf [March, 3, 2014].

Hindustan Times (2013), *Popularity continues to elude Nano, sales down 88%*, 5 May 2013, available at: http://www.hindustantimes.com/autos/auto/popularity-continues-to-elude-nano-sales-down-88/article1-1055088.aspx [February, 15, 2014].

Horn, S. A. (2010), 'The strategies of Japanese firms in emerging markets: The case of the automobile industry in India', in *Asian Business & Management*, 9(3), pp. 341-378.

Humphrey, J. (2003), 'Globalization and supply chain networks: the auto industry in Brazil and India', in *Global Networks*, 3(2), pp. 121-141.

Humphrey, J.*et al*. (1998), 'Globalization, FDI and the Restructuring of Supplier Networks: the Motor Industry in Brazil and India', in Kagami, Mitsuhiro *et al*. (eds.), *Learning, Liberalization and Economic Adjustment*. Tokyo: Institute of Developing Economies (IDE), pp. 117-189

Indian Express (2012), *Two years on, Tata Nano sales yet to hit top gear*, 26 April 2012, available at: http://archive.indianexpress.com/news/two-years-on-tata-nano-sales-yet-to-hit-top-gear/941736/0 [February, 15, 2014].

Jakarta Post (2013): *Tata Motors eyes Indonesia as biggest export market*, 8 July 2013, available at: http://www.thejakartapost.com/news/2013/07/08/tata-motors-eyes-indonesia-biggest-export-market.html [February, 15, 2014].

Kale, D. (2011): *Sources of Innovation and Technology Capability Development in the Indian Automobile Industry*. Innovation Knowledge Development (IKD) working paper No. 60, available at: http://www.open.ac.uk/ikd/documents/working-papers/ikd-working-paper-60.pdf [January, 9, 2014].

Kohpaiboon, A. and N. Yamashita (2011), 'FTAs and the Supply Chain in the Thai Automotive Industry', in: Findlay, C. (ed.): *ASEAN+1 FTAs and Global Value Chains in East Asia*. ERIA Research Project Report 2010-29. Jakarta: ERIA. pp. 321-362

Kumaraswamy, A. *et al*. (2012), 'Catch-up strategies in the Indian auto components industry: Domestic firms' responses to market liberalization', in *Journal of International Business Studies*, 43(4), pp. 368-395.

Manila Times (2013), Pilipinas Taj named Tata Motors distributor, to launch in April 2014, 9 December 2013, available at: http://manilatimes.net/pilipinas-taj-named-tata-motors-distributor-to-launch-in-april-2014/59140/ [February, 20,2014].

MHIPE (2002), *Auto Policy*. New Delhi: MHIPE.

MHIPE (2006), *Automotive Mission Plan 2006-2016*. New Delhi: MHIPE.

Nayar, Baldev Raj (2011), 'Globalisation, the State, and India's Halting March to Common Market: The Political Economy of Tax Reform Under Federalism', *India Review*, 10(3), pp. 201-245.

Park, J. (2004), 'Korean Perspective on FDI in India. Hyundai Motors' Industrial Cluster', *Economic and Political Weekly*, 39(31), pp. 3551-3555.

Pavlinek, P. and J. Zenka (2010), 'Upgrading in the automotive industry: firm-level evidence from Central Europe', *Journal of Economic Geography*, 11(4), pp. 559-586.

Rane Group (2013a), *Driving towards a new future*. Company brochure. Chennai: Rane.

Rane Group (2013b), *Rane Group of Companies*. Investor information. Chennai: Rane.

Rao, M. Govinda (2000), 'Tax Reform in India: Achievements and Challenges', *Asia-Pacific Development Journal* 7(2), pp. 59-74.

Richet, X. and J. Ruet (2008), 'The Chinese and Indian Automobile Industry in Perspective: Technology Appropriation, Catching-up and Development', *Transition Studies Review*, 15(3), pp. 447-465.

Sahoo, T.*et al*. (2011), 'Strategic technology management in the auto component industry in India: A case study of select organizations', *Journal of Advances in Management Research*, 8(1), pp. 9-29.

SIAM (undated), *Domestic sales trend*, available at: http://118.67.250.203//scripts/domestic-sales-trend.aspx [February, 2, 2014].

SIAM (undated), *Exports trend*, available at: http://118.67.250.203//scripts/export-trend.aspx [February, 4, 2014].

SIAM (undated), Production trend, available at: http://118.67.250.203//scripts/production-trend.aspx [04.02.2014].

TACO (2009), *Tata AutoComp Systems powers Tata Nano*, TACO press release, 24 March 2009, available at: http://www.tacogroup.com/newsmedia/releases/200903mar/20090324_tata_nano.htm [accessed February, 17, 2014].

Tata Group (2011), *Tata Motors unveils assembly plant in South Africa*, Tata Group press release, 22 July 2011, available at: http://www.tata.com/article/inside/XriNx64w6sI=/TLYVr3YPkMU= [accessed February, 15, 2014].

Tata Motors (2013), *Tata Motors partners with DRB-HICOM for Commercial Vehicles in Malaysia*. Tata Motors press release, 9 September 2013, available at: http://mediacentre.tatamotors.com/PressReleaseDetails.aspx?pid=808&val=2013 [accessed February, 20, 2014].

Tewari, M. (2001), *Engaging the New Global Interlocutors: Foreign Direct Investment and the Transformation of Tamil Nadu's Automotive Supply Base*. Paper prepared for the Government of Tamil Nadu as a part of the Center for

International Development, Harvard University's Research and Advisory Project for the Tamil Nadu Government. Boston: Harvard University.

The Hindu Business Line (2010), Hyundai to shift some i20 production to Turkey, 22 March 2010, available at: http://www.thehindubusinessline.in/2010/03/23/stories/2010032352090300.htm [accessed February, 5, 2014].

The Hindu Business Line (2012), *Hindustan Motors starts local assembly of Pajero Sport*, 19 December 2012, available at: http://www.thehindubusinessline.com/companies/hindustan-motors-starts-local-assembly-of-pajero-sport/article4013149.ece [accessed March, 3, 2014].

The Hindu Business Line (2013), *Auto sales see first decline in a decade*, 10 April 2013, available at: http://www.thehindu.com/business/Industry/auto-sales-see-first-decline-in-a-decade/article4602718.ece [accessed February, 2, 2014].

The Nation (2012), *Either Thailand or Indonesia to host Tata's new Asean plant*, 16 August, 2012, available at: http://www.nationmultimedia.com/business/Either-Thailand-or-Indonesia-to-host-Tatas-new-Ase-30188408.html [accessed February 2, 2014].

The Nation (2013): *Nano coming to Thailand*, 1 May 2013, available at: http://www.nationmultimedia.com/business/Nano-coming-to-Thailand-30205159.html [accessed February, 20, 2014].

Toyota (2012), *Toyota IMV Sales Reach Global 5 Million-unit Mark*. Toyota City: Toyota. Available at: http://www2.toyota.co.jp/en/news/12/04/0406_3.html [accessed January, 16, 2014].

Toyota (2013), *Annual Report 2013. True Competitiveness for Sustainable Growth*. Toyota City: Toyota.

Wells, P. (2010), 'The Tata Nano, the global 'value' segment and the implications for the traditional automotive industry regions', *Cambridge Journal of Regions, Economy and Society*, 3(3), pp. 443-457.

Yazaki (2012): *Indian Wire Harness Manufacturing and Sales Company Tata Yazaki Autocomp Limited to become Yazaki wholly-owned subsidiary*, Yazaki press release, 5 November 2012 available at: http://www.yazaki-group.com/global/topics/007.html [accessed February,17, 2014].

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