

AB VOLVO

COMMERCIAL AUTOMOTIVE

STUDENT: FRANCISCO ONOFRE

COMPANY REPORT

23 MAY 2018

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Growing in a changing industry

Driving towards sustainable vehicles...

- The commercial automotive industry has been preparing itself for the challenge ahead driven by environmental issues. Disruptive technological developments, new engines and new players are awaited
- Although at a slower rate the truck business unit is benefiting from the overall positive outlook and high margins are expected to be maintained with Europe as the major company's market.
- The comeback of the Chinese construction sector will be the seed for an increase of Construction Equipment on the company's overall sales from 21% to 26% at 7,6% CAGR 2018-2023 supported by SDLG
- Asian joint-ventures are ready to overcome the problem of network service's coverage and capture value from the two largest truck markets in the world

Company description

AB Volvo is the parent company of the Volvo Group. The Volvo Group is one of the world's leading manufacturers of trucks, buses, construction equipment and marine and industrial engines. The Group also provides complete solutions for financing and service.

Recommendation: BUY

Price Target FY18: 202,78 SEK

Dividends Forecast FY18 4,25 SEK

Price (as of 23-May-18) 159,85 SEK

Bloomberg: VOLVB: SS

52-week range (SEK) 131,60-171,30

Market Cap (SEK M) 340 581

Outstanding Shares (m) 2 128

Source: Bloomberg



Source: Bloomberg

(Values in SEK millions)	2017	2018E	2019F
Revenues	334 748	374 396	381 138
EBIT	30 326	35 549	35 397
Net Profit	21 283	25 441	25 847
EPS	10,32	11,95	12,14

Source: Bloomberg and analyst's estimates

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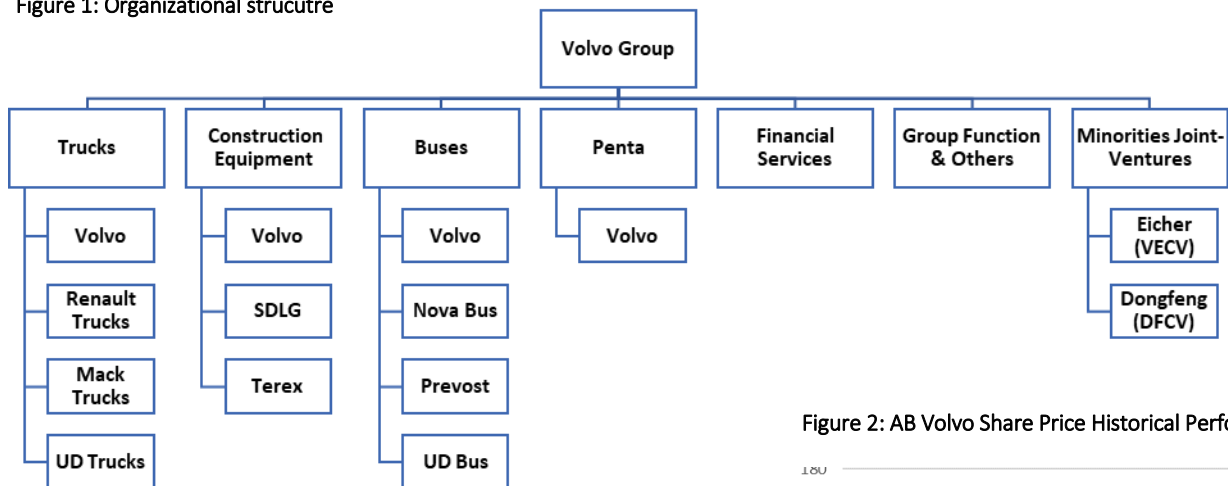
Company Overview

Volvo is a leading global high-end manufacturer of trucks, buses, construction equipment and marine and industrial drive systems, headquartered in Gothenburg, Sweden. The company was created in 1927 as a subsidiary of the Svenska Kullagerfabriken AB group, a Swedish ball bearing manufacturer. The idea arose from SKF sales manager Assar Gabrielsson and from the mechanical engineer Gustaf Larsson with the propose of building outstanding vehicles capable of performing under the Swedish climate and terrain. The production of the first lines of cars and trucks began in 1927 and 1928 respectively. In 1935, AB Volvo went public in the Stockholm Stock Exchange with SKF divesting completely its position in the company. In the same year, AB Volvo acquired AB Pentaverken one of its car engine suppliers which enabled the company to secure the supply of engines and to enter in the marine engine market whose division would be later named as Volvo Penta. The company also achieved an important milestone in its history which was the production of its first bus series which later it would become the Volvo Buses. The following years were marked by several acquisitions that allowed the company to increase its capacity and product portfolio to new lines of businesses. In the early 1950's, AB Volvo acquired the tractor and machinery manufacturer AB Bolinder-Munktell as a first step towards the creation of Volvo Construction Equipment division. Later in that decade, the company created one of the most important solutions for car industry safety, the three-point seat belt. Following this, the company launched its own accident research department that has been responsible for developing technologies such as the side collision airbag or the impact absorbing steering wheel for trucks. The period from 1960's until late 1980's was dedicated to growing organically through several openings of manufacturing and assembly plants in Europe, Asia, and Oceania. These plants guaranteed AB Volvo enough capacity to position itself as a truly global manufacturer. The company's research and development capabilities did not end in safety, it was also pioneer in the environmental field by creating a three-way catalytic converter as an effective solution to control exhaust emissions on vehicles which later became widely used across the auto industry. The 1990's decade was marked by the failed alliance with Renault whose propose was seeking for synergies to improve both companies' performance in the car segment. The inability to compete against the entrance of new players in the car industry affected significantly the Volvo Cars performance which led AB Volvo to redefine its strategy by focusing on the commercial automotive industry. This strategic shift resulted in the sale of the Volvo Cars to the Ford Motor Company for SEK 50 billion in 1999. Following this deal, the company created a new group named the Volvo Group, as a subsidiary of AB Volvo which comprised the remaining commercial vehicle businesses which already included two north American bus manufacturers, Prevost and Nova Bus, acquired in 1995 and 1998, respectively. The following decade registered a high level of acquisitions activity driven by the aim of expanding geographically while benefiting from potential synergies and economies of scale regarding product development, production, and purchasing. During this period the company strengthened its truck business by acquiring Renault Vehicules Industrials that had a strong presence in Europe and North America with the Renault Trucks and Mack Trucks brands, respectively. The acquisition of UD Trucks, former Nissan Trucks, enabled the company to enter the Japanese market. AB Volvo also holds minority stakes in two joint-ventures in partnership with the light and medium truck manufacturers Eicher Motors (VECV, India) and Dongfeng Commercial Vehicles

(DCFV, China) of 45,6% and 45% respectively. In the Construction Equipment business, the company acquired a 70% of the Chinese wheel loader manufacturer Shandong Lingong Construction Machinery (SDLG) and expanded its operation to the U.S market, throughout the acquisition of the road equipment division from the Industrial manufacturer Ingersoll-Rand, and the hauler equipment division from Terex. During the same period, the company also divested some of the non-core operations such as Volvo Aero, Volvo Rents, and IT business.

Currently, the Volvo Group has the structure shown in Figure 1.

Figure 1: Organizational structure



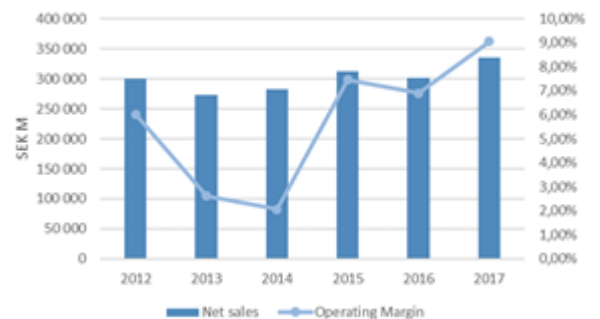
Company Performance

The company reports its performance in six segments: Trucks, Construction Equipment, Buses, Penta, Financial Services and Group Function & Others. The first four segments compose the group of the Industrial Operations. Under each segment, the company holds a brand portfolio which varies according to the demand specifications of each business and region. The company Financial Services' segment the company provides financial solutions regarding the vehicles sold from the remaining business units. The minorities joint-venture are strategic partnerships where the company holds a minorities stakes and for that reason are recognized in accordance with the equity method, its goals and objectives will be explained further in this report.

Figure 2: AB Volvo Share Price Historical Performance



Figure 3: AB Volvo Revenue and Operating Margin



Source: Company's Report

In April 2015, Martin Lundstedt was appointed CEO after a three-year period where the company went through a restructuring plan based on the reduction of structural costs and a product renewal to improve its efficiency after the acquisition-driven growth period. From that moment, AB Volvo Group's new strategy would be focused on organic growth and to improve profitability through continuous improvements and innovation.

In the following three annual reporting periods, 2015, 2016 and 2017, the company registered operating margin increase to 7,46%, 6,90% and 9,06%, respectively. In August 2017, the Board of Directors announced that under normal conditions the Industrial Operations segment shall have no financial indebtedness excluding the pension liabilities. As it can be observed in the Figure 4, the current financial position as percentage of the shareholders' equity illustrates a net cash position of 25,16%. However, this situation does not represent a positive Net Financial Debt position once that for this calculation the management has considered the Internal Funding used to finance the Financial Services segment as a Cash Equivalent. Without considering the Internal Funding and assuming book values the Net Financial Debt as percentage of shareholders' equity would be a net debt position of 77%.

In 2017, the company had SEK 335 billion consolidated in revenues, of which approximately 65% was in trucks, 20% was construction equipment, 8% in buses, and 3% from marine engines. The Volvo Group sells its products in more than 190 markets, and in 2017 having realized 43% of its revenue in Europe, 25% in North America, 21% in Asia and the remaining in South America, Africa & Oceania¹. In order to answer the global demand, the company set up a structure with more than 84.000 employees and a production infrastructure spread across the five continents and in most of the cases the facilities are shared between divisions within the Industrial Operations². The current organizational structure of diversified business segments and a strong presence across the globe guarantee the company two important aspects for its overall performance. The fact of being competing in different commercial vehicles segments, the company benefits from economies of scope through sharing a common architecture and technology on engines, electronics, and transmissions among its products. Additionally, this business diversification combined with its global presence will also help the company to manage

Figure 4: Financial Position in Industrial Operations as % of Shareholders' Equity

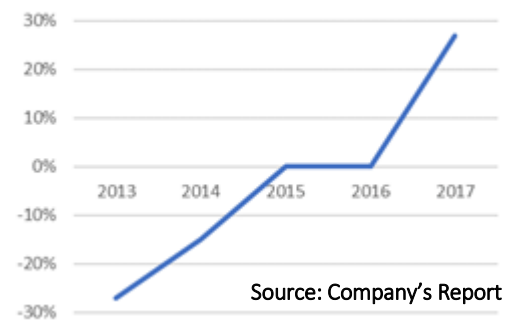


Figure 5: AB Volvo Revenue by Region

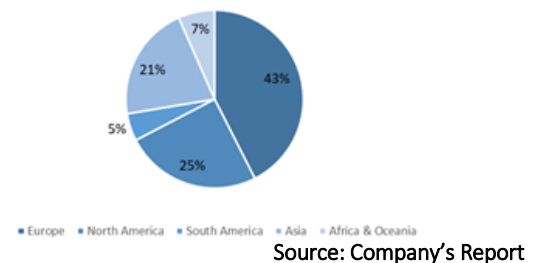


Figure 6: AB Volvo Revenue by Business

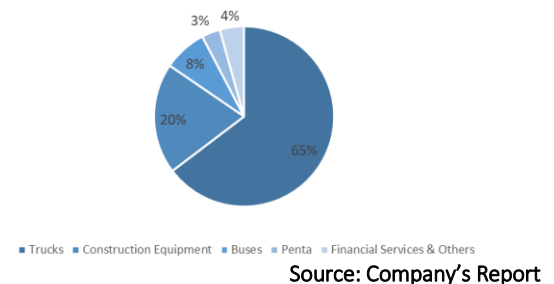


Figure 7: Investment in Research and Development



¹ Company Report 2017

² Company Report 2017

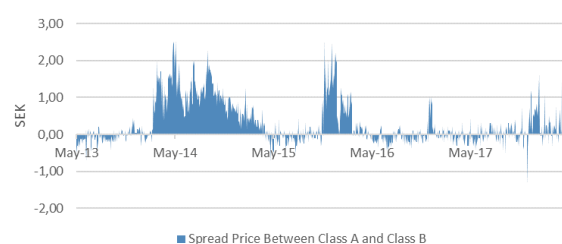
effectively a possible market slowdown from a specific region or business. Regarding its global presence, the company's strategy of maintaining the regional brands³ after the acquisitions in respective home markets also mitigates the risk of "one-brand-fits-all", thus ensuring a smoother entrance in each market while guaranteeing a sufficient service network coverage. AB Volvo has been consistent regarding to what concern investing in research and development capabilities presenting steady levels of investment in research and development⁴ of around 5% of the its Sales. By maintaining this focus and investment in innovation and R&D capabilities it is expected the AB Volvo to be prepared to address the upcoming challenges in the commercial automotive industry which will be discussed later in this report.

Shareholder Structure

As mentioned above, AB Volvo is the parent company of the Volvo Group, is listed in the NASDAQ Stockholm, Sweden stock exchange since 1935, and is currently included in a large number of indexes compiled by Dow Jones, FTSE, S&P and Nasdaq Nordic.

The company's share capital is divided into two classes A and B. Both classes have the same rights except for voting at Annual General Meetings. the shareholder to one vote whereas one class-B share carries one-tenth of a vote. As of 31 March 2018th the company has 2,021 billion shares outstanding with a high level of free-float representing 95% of the registered shares. According to the historical performance of both class of shares the investors' opinion seems to converge to a consensus that the price of the control premium likely to be paid for a class A is almost offset for a potential lower liquidity from the same class of shares. The overall share capital structure presents a low-level of ownership concentration and at the end of last year the investment manager Cevian Capital, the largest shareholder in terms of ownership, sold its stake of 8,3% to Zhejiang Geely Holding Group for approximately SEK 33,37 billion⁵. The deal assumed an implied valuation of SEK 402,05 billion representing a 21,41% premium when compared to market value verified at 27th December of 2017. Under the terms of the agreement Nomura Holdings Inc and Barclays Plc have committed to hold the shares while the regulatory approvals are concluded. At the date of the announcement the Chinese group, who also owns Volvo Cars, stated that aims to contribute positively to the long-term development of A.B. Volvo mainly through its Chinese market expertise and leading capabilities in the fields of electrification, autonomous driving and connectivity. However, in the last February, the potential of this partnership it seems to be vanished having AB Volvo's election committee not proposed the Geely-linked board member to re-election, after the Chinese group acquired a 10% stake on A.B. Volvo's major competitor, Daimler AG. The company has paid a fixed dividend of SEK 3,00 during the period 2011-2015 share having increase it in the following two periods to SEK 3,25 and SEK 4,25 in 2016 and 2017,

Figure 8: Class A and Class B Historical Share Price



Source: Bloomberg

Figure 8A: AB Volvo Ownership Structure

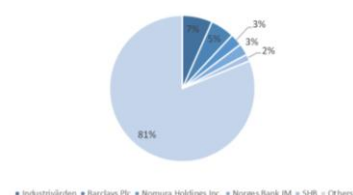
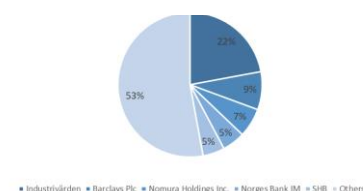


Figure 8B: AB Volvo Voting Structure



³ Renault Trucks, Mack Trucks, UD Trucks & Buses, Nova Buses, Prevost and the joint-ventures VECV and DFCV

⁴ Part of this investment might not be recognized as "Capitalized R&D" due to insufficient "criteria meeting" required by the IFRS standards.

⁵ Richard Milne. "China's Geely takes €3.25bn stake in truckmaker Volvo Group", Financial Times, 27 December 2017, Web 13 May 2018

respectively. These increases are aligned with the success of the restructuring program, profitability improvements and positive financial net position, mentioned above.

Commercial Automotive Industry

The commercial automotive industry is a strategic pivot for economic growth and development. The fact of being responsible for transporting people and goods or even to build roads and cities call itself the concerns from governments and local authorities about what should be the best practices to take in order to provide the best service for economy, people and to the environment.

External context

- Environmental global context

In 2015, the Paris Agreement brought all countries into a consensus to tackle climate change threat through a commitment to hold the global average temperature rise between 1.5-2° Celsius above pre-industrial levels during this century. It was the first time in history a deal brought together all the world's nations into an agreement to cut greenhouse gas emissions (GHG).

The transport sector plays an impact role in this matter representing approximately one-quarter of the CO₂ emissions globally, according to the International Energy Agency⁶ in 2015. The volume of emissions produced by this sector grew more than in any other sector between 1990-2013, around 60%⁷. The road sector accounted for three quarters of the transport emissions registered in 2015⁸. The medium and heavy-duty vehicles position, behind the light-passenger vehicles, as the second largest contributor of road sector emissions. For instance, in European Union, the medium and heavy-duty vehicles, which includes buses and trucks, represent near one quarter of the road sector emissions and 6% of the overall emissions having other regions like North America and Asia registered similar weights. This trend is projected to continue growing propelled by the expected increase in the global economic trade. Given these circumstances governments across the world have set strategies and implemented measures to define a clear path targeting the decarbonization of the transport sector either for passenger and commercial vehicles.

In 2011, the European Commission announced a long-term vision until 2050 to build a competitive and resource efficient transport system to increase mobility, to reduce CO₂ emissions and oil dependence while promoting growth and employment. The strategic plan "Roadmap to a single European transport area" established ten goals that were set as a guidance to achieve a 60% reduction of GHG emissions from transport sector by 2050 with respect to 1990 levels. Part of the strategy consists in an optimization of the performance of the current logistic chain which includes a greater use of more energy-efficiency mode with priority given to railway. The European emission standards are another measure that European Union have been implementing progressively through EU directives since 1992, representing a quicker tool to reduce emissions and improve air quality. These standards require every new model to undergo a controlled emissions test procedure before it can be commercialized.

⁶ IEA (2017), "CO₂ Emissions from fuel combustion Highlights", IEA Publications, p.12

⁷ OECD/ITF (2017), ITF Transport Outlook 2017, OCED Publishing, p.42

⁸ IEA (2017), "CO₂ Emissions from fuel combustion Highlights", IEA Publications, p.14

In the United States, there is still a high level of uncertainty regarding the impact of the Trump's Administration decision to pull out the Paris Agreement once it will be only effective in the end of the current mandate and how it will allocate the Infrastructure Plan announced by the President in the beginning of the year to understand which type of transport modes will take the priority regard transportation's strategy. However, like the European case, the North American agencies Environmental Protection Agency and National Highway Traffic Safety Administration have been ruling emission limits requiring engines manufacturers an ongoing emission improvement process in their products to comply in legislation over the past three decades. Some states like California are setting stricter levels when compared with federal legislations⁹.

This kind of restrictions has been progressively adopted across the world having other regions of world that either adopted European and North American regulation or creating their own regulations like China and Japan. In some cases, we are witnessing countries and cities taking the first steps to go beyond emissions as it can be seen by the ban of diesel cars from cities from the German local authorities¹⁰. Although this decision does not affect directly the heavy-duty truck vehicle sector, it is revealing about the governments' plans regarding the future of the transportation sector which certainly will have the public transportation sector, mainly city-buses, as their first target.

- Road safety

Demographic trends are also affecting commercial automotive industry, population growth along with the increasing urbanization rates across the world mean higher levels of traffic in large cities and respective outskirts resulting in higher road and highway's congestion. Traffic congestion is a transport network condition that affects the normal operation of the road transport network. More than passengers' delays, fuel consumption and GHG emission raises, this phenomenon makes the road more conducive for car accidents, less safe for road's users/agents and therefore a public safety problem. According to Volvo's Accident Research department¹¹ on average per year 1.2 million are killed in road traffic accident worldwide making them a global concern for the society. Behind this figure there is an infinite of factors to explain each accident that are usually caused by more than one factor. Volvo's Accident Research team reported that 90% of the accidents involving truck has origin in human error, having environmental conditions responsible for 30% and just 10% occurred due to mechanical failures. To prevent this phenomenon Government and local authorities might focus on policies to promote best practices awareness among the most vulnerable road users, increase their action's radius on tackling speed and drink driving and to invest in safer infrastructures. However, these efforts will always fall short in being effective on those situations where the driver is distracted, tired or having an improper steering. Over the years, manufacturers have been introducing several automation processes to assist drivers to prevent accidents with high potential crash situations such as the Assisted Brake System that improved the vehicles' reaction in situations where the wheels blocked. In the next decades it is expected manufacturers to improve vehicle's safety by increasing the automation processes that take the lead to prevent high potential crash situation rather than react to them.

⁹ Hiroko Tabuchi. "Calling Car Pollution Standards "Too High", EPA Sets Up Fight With California", Washington Post, 2 April 2018, Web 13 May 2018

¹⁰ Grace Donnelly, "German Cities Can Ban Now Ban Diesel Cars" Fortune, 27 February 2018, Web 27 Mar 2018

¹¹ Volvo Trucks Accident Research Team "Volvo Trucks Safety Report 2017" (2017)

Industry trends

- Driver shortage

Another trend affecting the commercial automotive industry, mainly the truck industry, is the current driver shortage which has been verified across the globe in the past two decades. According to the World Road Transport Organization¹², this problem is affecting either developed and emerging countries. Whereas the United States has an average age of 47 years old and it is projected the need to hire more one million new drivers in the next 15 years. European countries like Germany will have around 40% of their current driver force retired within a 10 to 15 years period. In India near 10% of the truck fleet is currently not operating due to the lack of drivers. The current situation is expected to worsen in the following years considering the likeliness of the global trade in goods and services to rise in the long-run. The lack of skilled drivers will put pressure on the road freight industry to increase drivers' salaries, which currently represents near 30-40% of the total operating costs, with an expected increase in the price which might final customer to seek for alternative modes of transportations. Automation and connectivity might be also an answer for this problem, currently we have assisting to developments in these two fields regarding autonomous driving and truck platooning that will allow freight companies to do not depend so much on the drivers

Next stop for the commercial automotive industry

Having highlighted the external and internal drivers of the industry, there are evidences to consider that the industry has no chance to deflect from alternative fuel engines and from technological development respecting to autonomous driving systems. However, a long and tough path has to be done from manufacturers, suppliers, customers and government to create an appropriate ecosystem for alternative autonomous commercial automotive vehicle prevail.

- What it will take to the transition for alternative fuel engines?

Having the emissions regulations progressively becoming stricter, and in some situations with diesel bans scheduled and ready to take place, it is expected the commercial automotive industry to follow the steps towards alternative fuels like the passenger automotive industry. Nevertheless, it is important to point out the distinctive driving patterns present across the different segments of commercial vehicles and how this transition will affect them. In order understand these implications, two major categories driving patterns were set¹³:

- **Long-haul:** This category includes all the routes that run over a 300 km to complete its full journey. As an example, it might be considered an international freight which will need to do

¹² World Road Transport Organization "Driver Shortage Problem", IRU, Web 02 April 2018

¹³ Short-haul routes were not considered once are mainly operated by light-duty trucks.

- multiple stops until reaches its final destination. In general, these routes are operated by heavy-duty trucks which combines a tractor and one or more semi-trailer to carry freight.
- **Regional and urban-haul:** These routes require a distance below 300 km to complete its full journey and present a high level of predictability and repeatability. For instance, depot-to-depot delivery, urban distribution and delivery, and city buses route. For this type of assignment operators usually prefer to use medium-duty trucks which the payload body cannot be remove from the cabin.

Currently the solution towards the decarbonization for regional and urban hauls operated by the medium-duty truck segment seems to have been found by the main truck manufacturers. Daimler¹⁴ and Volvo¹⁵ already announced additions of full electric-powered trucks with a range near 250-350 km to their portfolios to be commercialize in the following years. In the meanwhile, Volkswagen announced an investment of \$1.7 billion to develop electric powertrains for its trucks and buses¹⁶.

For the long-haul segment, manufacturers are still struggling with a range of different solutions to tackle the decarbonization problem. When building a truck is important to bear in mind they are limited to payload and space available to transport freight which varies depending on their class. As mentioned before, heavy-duty trucks class operates in distance ranges between 300 km to 700 km which will require a high energy level. When analysing electric battery vehicles is also important to understand that current marketed Li-on battery provide lower energy density when compare with diesel engine, so for this reason they would become less competitive as the expected distance range for the vehicle increases. For the specific case of long-haul journey, the truck would require a volume of battery to comply with its range needs that will jeopardize the payload capacity making it non-competitive¹⁷. Lithium batteries have been improving its energy density over the years achieving a 100% improve between 1990-2010 and some scholars argue there is still room to improve it¹⁸. In case of this limitation being successful overcome it will be necessary to build an appropriate infrastructure to recharge and support trucks on their long-haul journey. According to an article published in the *Energies Journal* from MDPI¹⁹ where the scenario of heavy-duty battery trucks in Germany was evaluated, it was estimated that would be need to provide the 2113 resting area on German highway with charging places with two types of chargers: 6 “fast chargers” to use during the drivers resting times²⁰ and 26 “slow chargers” to be used over the night period²¹. Based on the cost of chargers for public buses, once there are no heavy-duty truck chargers available in the market, each charging place was estimated to cost near 3.5 million. From a practical point of view and ignoring the technological limitations associated with the heavy-duty battery trucks, the success of the electrification of this class would be far more dependent from external factors (e.g. governmental investment) to guarantee an appropriate charging infrastructure than medium-duty trucks which would only need a charging station on their depot/base. Additionally, it is also important to bear in mind that for longer inland distances, rail transportation is considered to be more competitive than road in

¹⁴ Press Release. “Premiere for Volvo Trucks’ first all-electric truck”, Volvo, 12 April 2018, Web 21 April 2018

¹⁵ Fred Lambert. “Daimler starts delivering all-electric trucks in Europe”, Electrek, 14 December 2017, Web 21 April 2018

¹⁶ Fred Lambert. “VW plans large \$1.7 billion investment to bring electric trucks and buses to market”, Electrek, 12 October 2017, Web 21 April 2018

¹⁷ Viswanathan, V. (2017, June), “Performance metrics required of next-generation batteries to make practical electric semi-trucks”, *ACS Energy Letters*

¹⁸ Tetsuo Nozawma. “New battery technologies still years away”, *Nikkei Asian Review*. 2 April 2017. Web 06 May 2018

¹⁹ Mareev, I.; Becker, J.; Sauer, D.U. Battery Dimensioning and Life Cycle Costs Analysis for a Heavy-Duty Truck Considering the Requirements of Long-Haul Transportation. *Energies* 2018, 11, 55

²⁰ According to European Union legislation, truck drivers have a compulsory resting time of 45 minutes after a 4,5 hours driving.

²¹ 14 hours period that follows the two daily shift of 4,5 hours

terms of cost and payload, while having a better impact concerning to GHG emissions and road's congestions issues. For these reasons, is expected from a government's perspective to give higher investment priority to a transport mode that addresses a higher amount of transport network. In those regions where the railway network presents some limitations concerning network coverage or operational issues, in other words an investment gap situation, the heavy-duty trucks will have their opportunity at least until the investment need is fulfilled. Considering, for instance that "Roadmap to a single European transport area" is still in work-in-progress situation, this represents a short-to-medium term opportunity to manufacturers to keep developing and improving the current ICE engines of their heavy-duty trucks or even moving toward a hybrid engine combining electric battery and improved ICE engines.

The technology behind these two alternatives, full electric and hybrid powertrains, is the same that have been used for passenger cars, lithium-ion batteries. Currently, due to its unique characteristics of high energy density and light weight, lithium remains as the only option in the market to supply electric-vehicle's batteries. Unlikely other commodities, lithium cannot be stored more than 9 months otherwise it would be start reacting and degrading, not enabling the commodity to be traded on any major exchange. For this reason, there are no public prices leaving each contract negotiation to settle its own price. For this transition will be important to understand if there would be enough supply to match the expected growing demand which have been pushed not only by trucks but mainly by passenger cars. According to the U.S Department of the Interior²², the current global lithium resources²³ are estimated to be around 53 million tons which 16 million tons reserves²⁴ where lithium could be already extracted.

This could represent a challenge for Volvo once its major competitors, Daimler and Volkswagen, own a passenger car business with higher demand for lithium giving them higher bargaining power and priority when dealing with lithium suppliers or batteries makers. However, in the long-run this challenge is expected to be diluted considering the high price of lithium and the abundance of lithium available to be extracted.

As mentioned above AB Volvo has already positioned itself in the regional and urban haul segment, with the announcement²⁵ that will start selling medium-duty electric trucks in 2019 under its Volvo and Renault Trucks brands. The successful in this segment will depend on AB Volvo's capacity to understand its customer individual needs regarding driving cycles and load capacity and together with charging equipment suppliers provide a suited solution to make the transition smooth and secure.

- What it will take to the transition to autonomous trucks?

The current expectation on the transition to connected and automated driving systems suggests that it can be one of the largest industry's disruptors being capable to reduce and mitigate industry's challenges and risks such as road safety, driver shortage and fuel efficiency. Being self-driving trucks the ultimate goal of full

²² U.S Department of Interior. (2018, January). "Mineral Commodity Summaries 2018". U.S Geological Survey, pp.99-100

²³ A concentration of naturally occurring solid, liquid, or gaseous material in or on the Earth's crust in such form and amount that economic extraction of a commodity from the concentration is currently or potentially feasible

²⁴ That part of the reserve base which could be economically extracted or produced at the time of determination. The term reserves need not signify that extraction facilities are in place and operative.

²⁵ Renault Trucks (2018, January), Press Release "Renault Trucks will start selling electric trucks in 2019"

automation, there is still a long way to run and many small steps that have to be taken whose are depending on several aspects such as customers acceptance, technological developments, legislation and operating

Table 1: Society of Automotive Engineers International – Automation Levels

Stage 0	No Automation	Driver is fully engaged, and warning signals might be displayed
Stage 1	Driver Assistance	Driver is fully engaged and may be “hands off” or “feet off” ²⁶
Stage 2	Partial Automation	Driver is fully engaged and may be both “hands off” and “feet off” but eyes must stay on the road
Stage 3	Conditional Automation	Driver responds to a request to intervene, may be “hands off”, “feet off” and “eyes off” but must be able to resume control quickly
Stage 4	High Automation	Driver is not expected to monitor the road and has no responsibility during the automated mode
Stage 5	Full Automation	Driver has no responsibility during the entire driving

By analysing the different levels of automation driving for on-road vehicles on the Table 1 and the portfolio offered by the major manufacturers, the current equipped technologies on trucks can be positioned on the stage 1 regarding automation level having the Adaptive Cruise Control and Lane Keep Assist systems as the most impactful ones. Truck platooning is a technology under development which is considered by the industry's practitioners as the state of art technology with the potential to change the current landscape completely. This technology is a connected driving system that enables two or more trucks in convoy to automatically maintain and set a close distance between each other. The truck in the lead of the platoon defines the route and the remaining vehicles react and adjust to change in its movements with little or almost no action from the respective drivers. In a more advanced stage, is anticipated that technology requires just one driver on the leading truck being the remaining ones driverless. This technology projects trucks to be more efficient on saving fuel, reducing emissions and traffic congestion, and enhanced safety due to the lower human intervention on the driving. Additionally, in a later stage this technology might also be useful to address driver's shortage problem outlined before.

In order to achieve the later stages of automation it would be necessary to develop critical software and hardware technologies such as sensors, communicators, and vehicles' controls to collect spatial imaging data, to interact M2H and to define and control the route. Whereas these advancements will require a new supply chain, new players will try to step in this market having Uber²⁷, Tesla²⁸ and Google²⁹ already announced their intentions and the outcomes of their initial experiments.

It is important to highlighted that for autonomous driving be possible it will be need a completely new legal driving framework to clarify issues about liability or even to define testing areas where manufacturers could enhance their products. The responsibility to draw this legislation is entrusted to governments and local authorities. Another important issue that must be solve before autonomous driving being approved is the ethical consideration behind the machine decision-making, considering it is a highly sensitive subject its feasibility might have be jeopardy in case of low level of comfort with machine's decision-making from the

²⁶ “Hands off” when using Lane Keep Assist and “feet off” when using Adaptive Cruise Control

²⁷ Daisuke Wakabayashi. “Uber’s Self-Driving Trucks Hit the Highway, but Not Local Roads”, NY Times, 6 March 2018. Web 13 May 2018

²⁸ Julia Wong. “Elon Musk unveils Tesla Electric truck – and a surprise new sports car”, The Guardian, 17 November 2017, Web 13 May 2018

²⁹ Fred Lambert. “Waymo officially expands self-driving effort into trucks”, Electrek, 9 March 2018, Web 13 May 2018

public. The time taken to solve these questions will be critical to define the speed of the adoption rate of this technology. According to the consulting firm Roland Berger³⁰, the stage 5 of autonomous driving systems will result an increase of USD 20.000 on truck's price mainly driven from the incremental software and hardware. On the other hand, it will represent a saving of almost 1.2 USD/mile which means that driver would need only 16.000 driven to drive down the total cost of ownership.

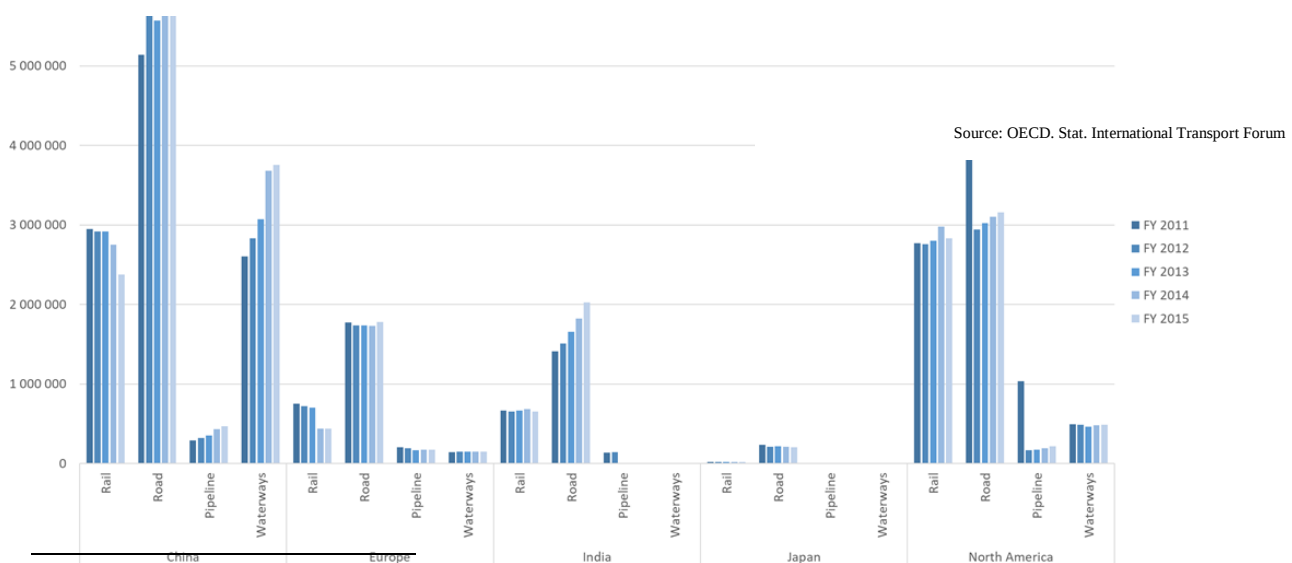
AB Volvo have been taking steps towards autonomous driving system in past couple of years. Since 2016, the company have been testing a self-driving truck which operates in the Kristineberg Mine³¹. By manufacturing and developing autonomous trucks to operate in controlled environments such a construction site or a mine, allows the company to target a segment where legal driving framework or ethical issues related with machine decision-process might be bridged more easily and for that reason experienced a higher speed to be marketed.

Business units

Trucks

The company's truck segment manufactures and sells medium to heavy premium truck for long-haul, regional transport and construction operations. The ability of trucks to move goods quickly and safely to markets make them essential for international trade, national distribution trade, and economic development. Trucks' flexibility enables connections between producers, businesses, and customers from almost everywhere. The fact of being one of the most popular transportation mode within the freight industry as can be observed in Figure 9³², positions the road transportation industry as one of the main sources of greenhouse gases and air pollutants as it was mentioned before. For this reason, in the short-term manufacturers are also required to have an agile approach to develop engines in compliance with the new emissions standards otherwise their business operation might be at stake.

Figure 9: Inland Freight Transportation by transport mode and region in million ton-kilometer



³⁰ Roland Burger Study (2018, February). "Automated Trucks – The next big disruptor in the automotive industry?"

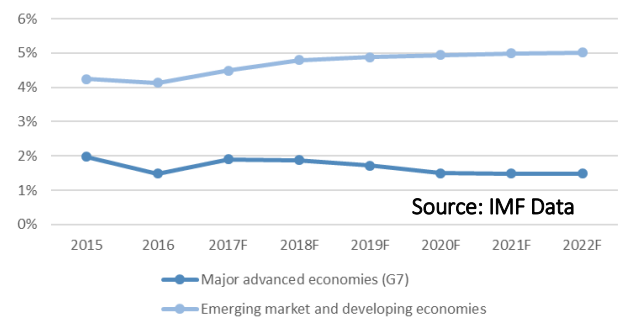
³² Due to lack of data available for China, Japan and India for the year of 2016. It was only considered the values until 2016

The oil prices affect manufacturers' performance considering they represent a major role in customers' margins. After 2014, oil prices have registered values near half of those registered in the four years before. This decrease was related with the oversupply verified in the market, however in November 2016 OPEC producers agreed in cut the production³³ levels for the first time eight years in effort to boost the oil prices which will be extend at least until end of 2018. If in one hand the road freight companies benefit from the low oil prices allowing them to reduce costs and to be more competitive against other transport modes such as rail freight, in the other hand a slowdown from Oil & Gas activity would also affect the level of activity in the road freight transportation.

• Customer's preferences

The industry's customer preferences start all on the same ground despite being a diversified base composed by small and fragmented customers. Customers are looking for vehicles easy to operate and on which they can rely on, regarding its uptime-downtime ratio. Beyond this, preferences will change mainly on the region of the world the customer operates:

Figure 10: IMF's Forecast GDP growth



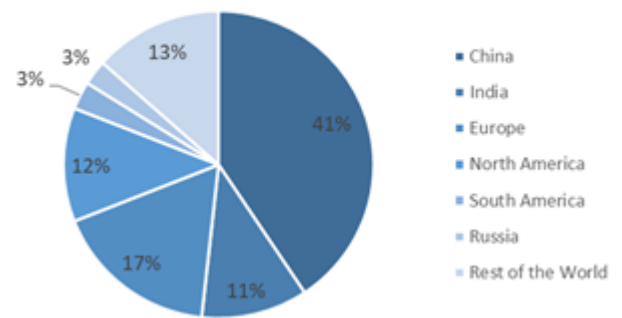
- **Premium:** From one side there are the premium customers who have high expectations on the product, seeking for premium features that enable them to connect trucks to data networks, taking advantage from telematics-based fleet management services, to improve performance consumption and reducing truck's downtime. These features will also help customers to optimize routes and maximizing their utilized capacity. Despite the fact of the manufactures could charge a higher price for these premium features, they will also be reducing the demand once they are providing customers conditions to have a better maintenance and higher uptime period. This type of customer is presented in the Triad region which is composed by North America, Europe, and Japan. Even though the International Monetary Fund's expectations for the GDP growth are positive they are still low when compared to other regions of the world. The competition in this market is dominated by European and North American players.
- **Low cost and value:** On the other hand, there is low cost and value customers who share the same preference for the reliability and uptime-downtime ratio with the premium customers but with a completely different price sensitiveness. Here the customers are looking for a truck that costs 2 or 3 times less than a premium one. This type of customer is mainly located in emerging countries, which led them to opt for trucks with low features adapted to their countries' imperfect infrastructure. Although this type of truck presents a lower breakdown

³³ Reuters Staff. "OPEC reaches first deal to cut oil output since 2008", Reuters, 26 November 2016, Web 30 Dec 2017

reliability when compared with premium ones, the current service network coverage from “Triad” manufacturers in these countries does not answer quick enough to trucks’ breakdowns to compensate for a lower downtime period when compared with local manufacturers.

As it can be observed in Figure 11, China positions itself as the largest market in the world accounting for more than 40% and together with India they represent more than half of the global demand for heavy-duty trucks. Considering these two countries belong to the group that IMF’s expects to growth at a higher rate for following years, they become strategic markets where every manufacturer wants to be. The Chinese market, historically, has been almost entirely composed by low and value trucks supplied by local manufacturers with only 3% of the sales regarding premium sales³⁴. Another issue from the Chinese market is its current overcapacity which is creating pressure to drive trucks’ prices down. Between 2007 and 2014 the average utilized capacity was 43% which is conducting Chinese manufacturers to consider alternatives such as adopting an internationalization strategy.

Figure 11: Global Demand for HD Trucks 2016

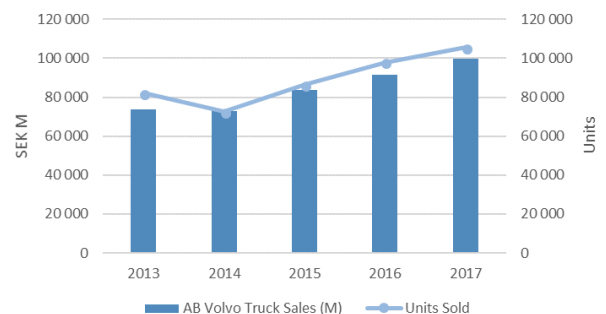


Source: Frost & Sullivan, McKinsey&Company, Analyst's estimates

Europe

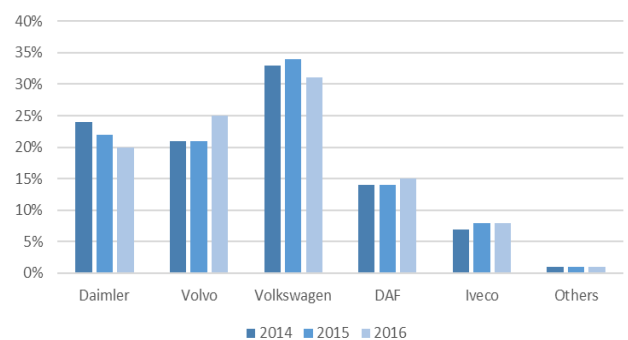
The European truck segment has been the company’s main revenue driver, representing 30% of the overall revenue. The company’s strategy for the region involves marketing trucks under two different brands: Volvo Trucks and Renault Trucks. As can be seen on the Figure 12, the segment’s performance has been stable over the years with a moderate growth trend from 2015 to 2017.

Figure 12: AB Volvo Trucks Sales in Europe



As the main market of the “Triad” region, the European market has been disputed between five manufacturers which includes AB Volvo, Daimler, Volkswagen, Iveco and DAF as illustrated in the Figure 13. The European market of heavy trucks have been led by Volkswagen which operates under Scania and MAN brands and was responsible for more than 30% of new registrations over the last three years. In 2016, Volvo saw its market share increase from 21% to 25% overcoming Daimler as the second largest. The fact of being a premium customer region, E

Figure 13: European HD Trucks by Manufacturer



Source: International Council on Clean Transportation

³⁴ McKinsey & Company, (2016, May) “Gearing up for growth: Futures perspectives on the global truck market”

opportunities for foreign manufactures to step in, with the exception to the American Paccar who throughout the acquisition of the Dutch DAF in 1996, now holds a 15% stake of the market.

The Figure 14 gives an overview of European market demand for freight transportation in the recent years which has presented a stable trend having the Retail sector as the largest one, and the Manufacturing sector responsible for 28% and 18% of the demand, respectively. The transport dependent sectors have contributed in different ways towards the GDP growth over the same period. As expected only after the stagnation period in 2012-2013 where the GDP fell by 0,3%, these sectors were able to contribute positively to the GDP growth having the Manufacturing and Retail sector as those that benefit the most from the economic recovery. Europe has been showing strong signals of economic recovery having registered, in 2017, its fourth consecutive year of GDP growth. The road freight transportation industry has been enjoying from these favorable conditions hitting an all-time high of ton-kilometer transported³⁵ and the number of the new trucks registrations in the European has followed this trend showing a moderate growth in 2015 and 2016.

Figure 14 EU Road Freight Transportation by Sector

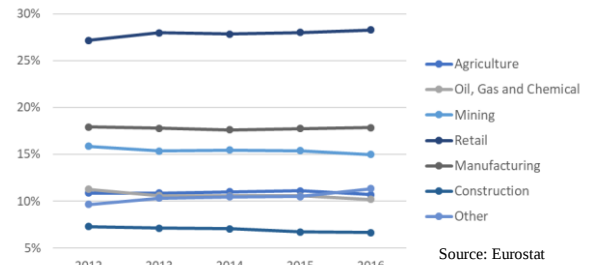


Figure 15 EU Road Freight and Trucks Registrations

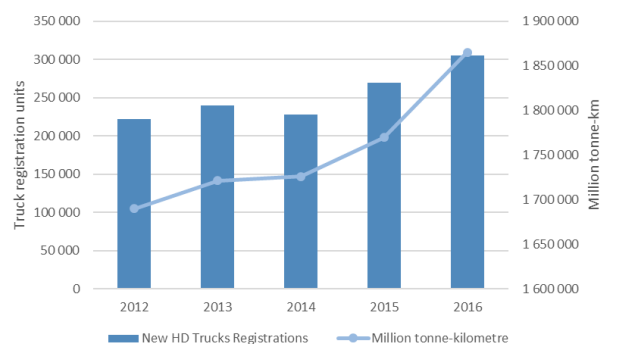
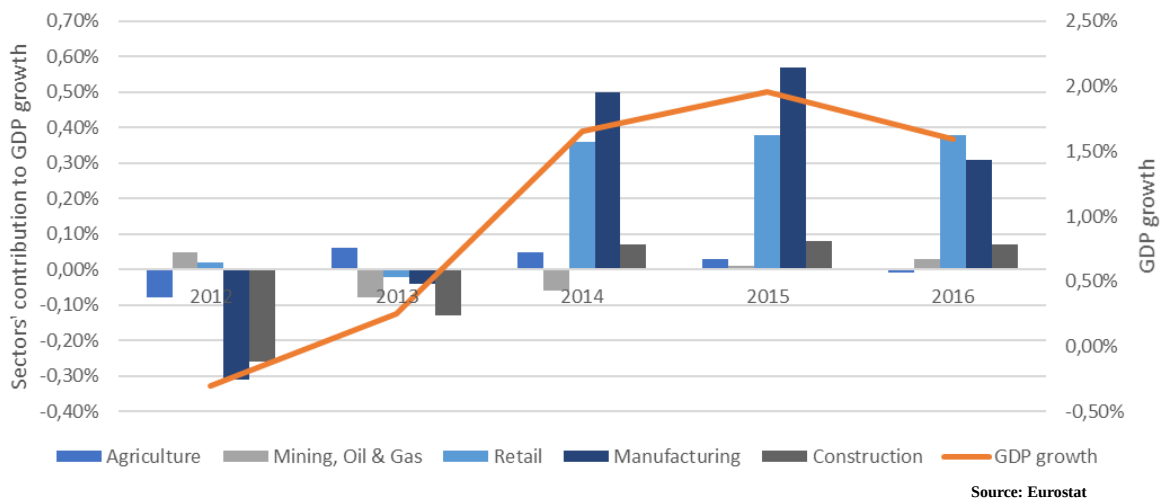


Figure 16: EU GDP growth and respective segregation by sector



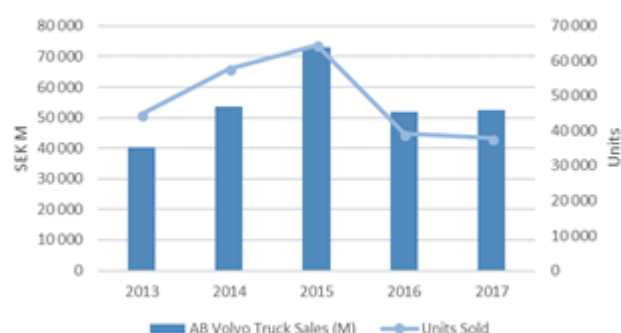
³⁵ A tonne-kilometre (or tonne-mile) is the standard unit of measure for freight activity and is the transport of 1 t of cargo (which typically includes pallets and packaging as well as products) over 1 km.

Besides the overall economy's health, the sectors of Agriculture and Mining, Oil & Gas are also dependent on the price of the commodities they produce and sell, which as tradable commodities are determined by the supply and demand. Agriculture and Mining sectors whose prices have been decreasing trend since 2011³⁶, like the Oil prices mentioned above. For the next 5 years, the IMF expects the European Union to grow at a rate higher of 2.1 percentage points in 2018 and decreasing to 1.8 in 2019 and 2020 and then to 1.7 in 2021 and 2022³⁷. It is expected Manufacturing and Retail sectors to keep their moderate grow aligned with the GDP growth while the Construction sector is expected to grow its contribution boosted by the investment in the European Union strategy to expand its transportation network.

North America

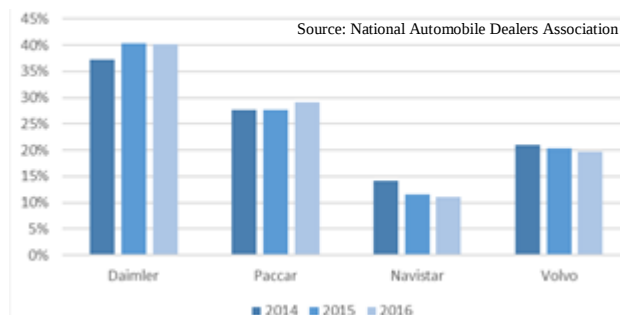
The North American region is predominantly defined by the performance in the United States market. The company's strategy for this market of operating under to brands, Volvo and Mack Trucks which have resulted in a stable performance over the course of the last five years with the exception for the year of 2015, where the company achieved more than SEK 73 billion in sales. The combination of historical low fuel prices, with the Fed Fund Rate almost near zero, 0,25%, and the GDP growing a rate higher than 2% for the fourth time in six years, have impacted positively the number of new trucks registrations in the country.

Figure 17: AB Volvo Trucks Sales in North America



The U.S heavy-duty truck market for its turn is composed by European and American manufacturers. In 2016, Daimler, maintained its position as the largest manufacturer marketing its trucks under the Freightliner and Western Star brands summing up 40% of the market, followed by the American manufacturer Paccar with 29% with the market. AB Volvo comes in the third place achieving 18% market share with its two brands and it is

Figure 18: U.S. HD Trucks by Manufacturer



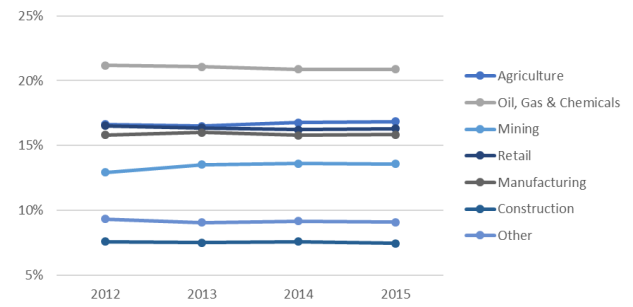
followed by Navistar which comes in the fourth place having registered a decline of 3% in the last three years. As the European case, the Asian manufacturers have low presence in the American heavy-duty market which is dominated by American and European manufacturers. The largest manufacturer in Europe, Volkswagen Group, unlikely its European peers had no commercial presence in the U.S market until 2017 when acquired a 16,6% stake in the American Navistar which might indicate a first step of a possible full merger in the future however it is not expected to affect significantly the market share in the short-term period.

³⁷ IMF Data Mapper: World Economic Outlook (2017, October);

The cargo transported within the U.S soil has presented a constant distribution among the different transport dependent sectors being the Oil, Gas & Chemical sector the one responsible for the largest portion with 21% of the overall freight, as it can be concluded from Figure 19. The U.S economy had a slowdown in its growth from 2,9% in 2015 to 1,5% in 2016 mainly driven by the poor performance from the Oil & Gas and Mining sector justified by the low prices mentioned above on these industries.

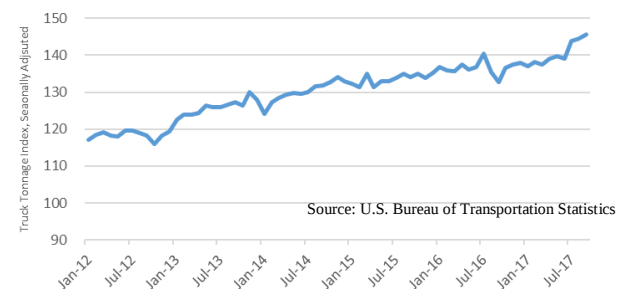
However, in 2017 the economy expanded to 2,6% growth rate having the U.S road freight transportation activity benefited from that, growing at a higher rate than 2015-2016 period as can be observed through the Truck Tonnage Index, which represents the gross tonnage of freight transported by truck in a given month, on Figure 20.

Figure 19: U.S. Road Freight Transportation/Sector



Source: U.S. Bureau of Transportation Statistics

Figure 20: U.S. Truck Tonnage Index Sector

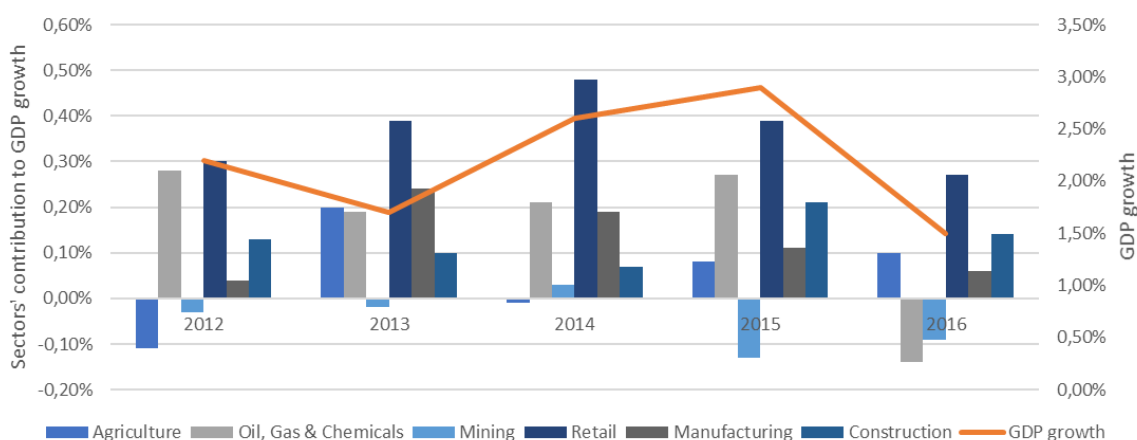


Source: U.S. Bureau of Transportation Statistics

Across the last five years, the two sectors that have contributed the most to the GDP growth were the Retail and the Oil, Gas & Chemical sectors having experienced a contraction in 2016 driven by the decline in oil prices. During this period with a smaller impact, Manufacturing and Construction sectors registered positive contribution over the period. The IMF expects the U.S economy to grow 2,3% in 2018 maintaining a growth rate above the 1,7% in the following year until 2023. The Manufacturing and Retail sectors are expected to continue benefiting from these favorable conditions the Oil & Gas is also expected to recover aligned with the positive trend the oil prices have been following in 2018. The announced infrastructure plan by the President Donald Trump earlier this year is expected to contribute positively to the construction sector

Figure 21: U.S. GDP growth and respective segregation by sector

Source: IMF, U.S Bureau of Economic Analysis



Asia

The Asian region represents the third largest market within the Truck segment and has Japan as its main market. Unlike the previous regions the company operates only under the one brand, UD Truck. The company's performance has been following a positive behavior, since a fall in 2013. The Japanese market completes the "Triad" market and it has the particularity of not being led by a European manufacturer.

The medium and heavy truck segment has not changed significantly over the last three years. Toyota Group comes as the largest manufacturer in the country through its subsidiary Hino Motors who holds 56% of the market followed by the joint venture Mitsubishi FUSO which is 90% owned by Daimler AG and the remaining by Mitsubishi. In the third place comes Volvo under its Asian brand UD trucks with 12% of the market.

The Japanese economy has shown moderate growth rates of 1% in 2016 and 1,6% in 2017 after the stagnation in 2014 which occurred two years after the 2011 recession³⁸. The Industrial Production index has been falling since 2014 however it seems to maintain the positive trend initiated in the beginning of 2016. The Japan road freight activity has been showing a positive trend, expanding over the past four years and the New Truck Registration volume seemed to stabilize over last three years after having verified an increase of approximately 15.000 new truck registrations in 2014. The IMF expects the Japanese economy to slow down its growth to 1.2 and 0.9 in 2018 and 2019, respectively.

Figure 22: AB Volvo Trucks Sales in Asia

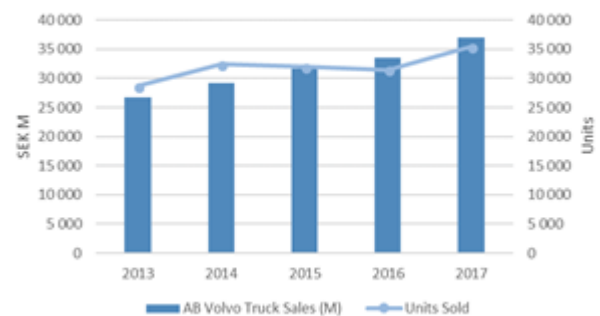


Figure 23: Japan MD & HD Trucks by Manufacturer

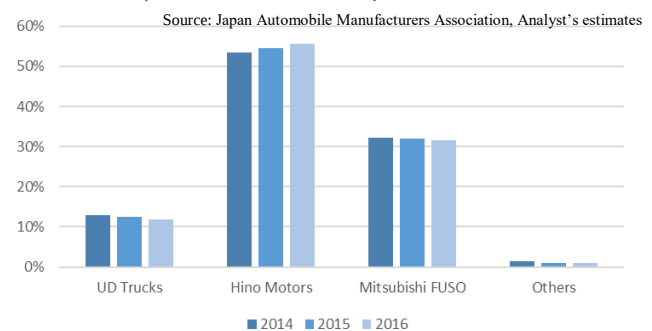
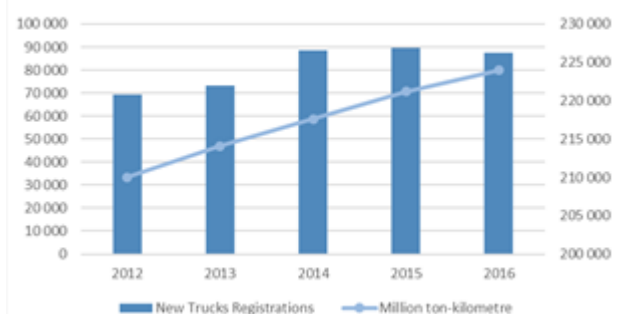


Figure 24: Japan Road Freight and Trucks Registrations



Source: AB Volvo Report, Euromonitor

³⁸ IMF Data Mapper Data Set: World Economic Outlook (October 2017)

Construction Equipment

The company construction equipment segment manufactures and sells equipment for construction, mining, agriculture under three different brands: Volvo, Terex, and SDLG. SDLG is a joint-venture created in 2006 and 70% owned by the Volvo Group and follows the accounting principle of consolidation method. This strategic partnership arose to complement Volvo CE's strategy of selling high-end products with low to medium-end equipment aiming to target the Chinese market.

As it can be observed in the Figure 25, the performance of this division has been through a stagnated period between 2013 to 2016 along with the tough market conditions verified worldwide as illustrated by the KHL Group³⁹ in the Figure 26. The year of 2017 was marked by a global recovery verified in all regions of the world having Europe expanded its growth to 16% and Asia increased its sales in more than 60%. Together, these two regions have been historically division's main markets representing together near 70% of its sales, as it will be described later in this chapter.

The construction equipment segment is primarily driven by demographic trends such as population growth and urbanization rates which will require from cities an adequate response in terms of public infrastructures and real estate. The World Bank expects urbanization rates to grow across the globe having China and India as the countries where largest growth will be

registered with increases of 19 and 17 percentage points, respectively, until 2050⁴⁰. Following these demographic trends, in the long-run it is expected the demand for the construction sector in emerging markets to be constant and high to accommodate and answer all the needs from countries with a poor infrastructure and high growing population. Whereas, in developed markets the demand will be more linked to governments assessment of the existing infrastructure gap and its priority in their political strategy, thus is expected the demand to be low with sporadic increases. The construction equipment market is a highly fragmented, see Figure 27, where 50% of the global sales is concentrated in a group of eight manufacturers who have their operations spread over the world. Volvo Construction Equipment, encompassing its own three brands was able to maintain an average of market share of 4,7% over the last three years, positioning itself as the fifth largest manufacturer in the world in 2016.

Figure 25: AB Volvo Construction Equipment Sales

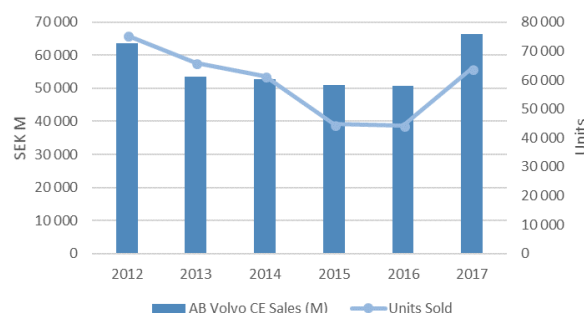
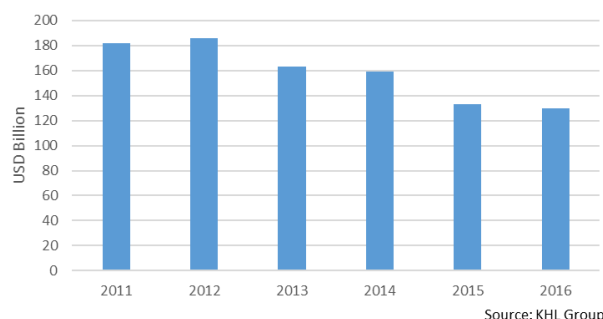


Figure 26: Global Construction Equipment Market



Source: KHL Group

Figure 27: Largest Players Global CE Market

Company	2014	2015	2016	Country
Caterpillar	17,80%	18,10%	16,50%	United States
Komatsu	10,60%	10,50%	10,90%	Japan
Hitachi	4,90%	4,90%	5,10%	Japan
Liebherr	4,50%	4,70%	4,80%	Germany
Volvo CE	4,90%	4,50%	4,60%	Sweden
Doosan Infracore	3,40%	3,60%	3,80%	South Korea
John Deere	4,10%	4,50%	3,80%	United States
XCMG	3,90%	3,40%	3,70%	China

Source: KHL Group

³⁹ Hayes, Mike (2017, April). Yellow Table. *International Construction Vol.56* 23-27

⁴⁰ World Bank Data

Europe

A strategy based on a multi-brand strategy, with Volvo and Terex, enable the company to experience a four-year growing period after a stagnation year in 2013. During 2015 and 2016,

the region was the main market within the segment. The European construction equipment industry, along with the real estate sector, found its historical high in 2007 achieving 210.000 units sold.

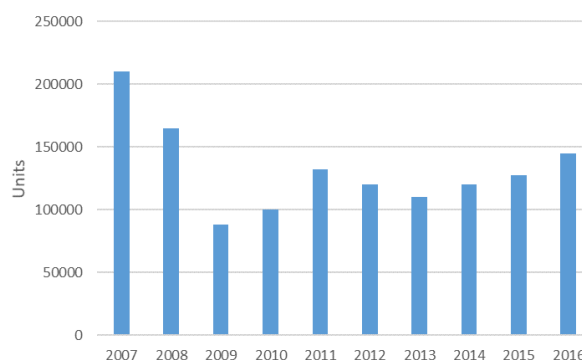
The following two years the construction equipment sales decreased more than 60% representing in this case a 10-year low. Since 2011 the industry has remained stable with sales approximately 120.000 units, almost half of the value from 2007. According to the Committee for European Construction Equipment⁴¹, the construction sector in Europe shown a modest growth of 2% in 2016 following a 1,8% verified in 2015. The residential construction rose in all countries driven by the new building activity

which summed up a 3,9% overall. The non-residential construction had a positive variation of 1,5% after a series of 7 years with negative or null grow. The civil engineering sector suffered a 1% decline mainly driven by the reduction of EU funding to the Eastern countries whose activity decrease 9%. These indicators were reflected positively in the construction equipment sector that experienced a double-digit growth of 12% and reaching a 5-year high of 145.000 unit sold. The largest contributors to the construction equipment sales were Germany, United Kingdom, and France with a market share of 25%, 14%, and 14% respectively⁴². The CECE's expectations on the construction sector for the period 2018 and 2019 are positive with a slowdown in the residential and non-residential construction. Large infrastructure projects which are taking place in Europe such as the €270 billion German "2030 Federal Transport Infrastructure Plan" to renew and expand country's existing transport network are expected to drive the civil engineering sector to an accelerated growth of 1,8%, 2,9% and 3,2% in the next three years.

Table 2: AB Volvo Construction Equipment Europe Sales

Construction Equipment	2012	2013	2014	2015	2016	2017
Europe Sales						
SEK M	16 518	16 356	17 215	17 732	19 739	22 977
% of CE Sales	26%	31%	33%	35%	39%	35%
Units Sold	12 545	13 522	14 174	12 539	14 700	17 519

Figure 28: Construction Equipment European Market



Source World Highways, Global Report Construction Equipment 2017

^{41,19} CECE Annual Economic Report 2017, Committee for European Construction Equipment

Asia

After experiencing a downturn period between 2013 to 2016 where the sales drop 42%, the region was able to recovery and increase more than 63% its sales, achieving a 5-year high of SEK 25.1 billion. The segment's performance was mainly affected by the contraction registered in China.

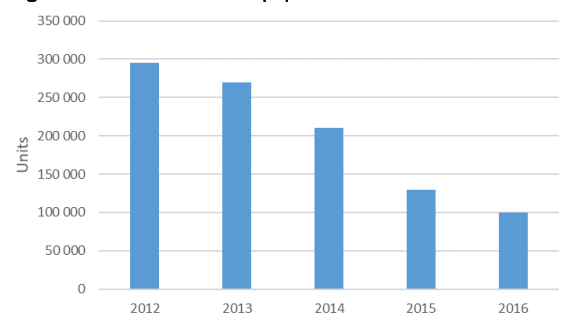
Table 3: AB Volvo Construction Equipment Asia Sales

Construction Equipment	2012	2013	2014	2015	2016	2017
Asia Sales						
SEK M	27 033	21 911	18 458	16 424	15 765	25 058
% of CE Sales	43%	41%	35%	32%	31%	38%
Units Sold	49 263	44 892	33 648	22 339	21 072	36 254

The Chinese construction sector has been slowing down since 2011 as result of an excess of supply on the residential sector which experienced a contraction in 2014, bringing the whole sector to growth below a double-digit growth rate in the following two years. This deacceleration was reflected on the construction equipment market which registered a decrease in the total units sold from 295.000 to 100.000 between 2012 to 2016.

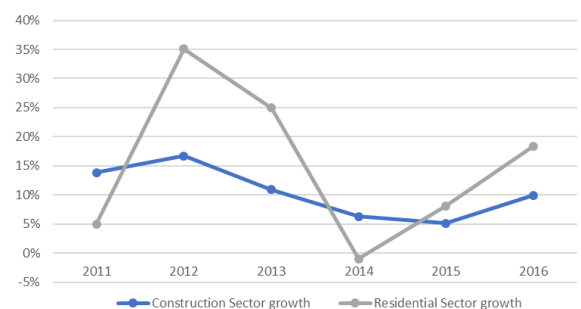
However, the Chinese construction sector has been showing positive signals of recovery since 2015 having the Residential and Construction sector experiencing a 7,7% growth, in 2016, and it is expected to expand over the next year, and boosted the investment in public infrastructure and improvements in customer and investor confidence resulting from the governmental investment plans such as 13th Five-year, which expected to totalize a RMB 15 trillion spending for transportation and infrastructure projects until 2020.

Figure 29: Construction Equipment Chinese Market



Source World Highways, Global Report Construction Equipment 2017

Figure 30: China Construction Sector Growth



Minority Joint Ventures

In order to capture value from the Asian growth driven by Chinese and Indian economies, Volvo set a strategy based on holding minorities stakes in joint ventures to grow its Truck business in both countries. The strategy behind of holding minority stake in JV is related with the fact of Volvo's expertise and product portfolio being not oriented to low-end markets. The following partnerships are expected, on one hand, to enable Volvo to skip stages concerning acquiring experience in emerging markets, knowledge of frugal engineering and access to a wide service network service, and on the other hand to allow partners to take advantages from Volvo global distribution network and its advanced technology which will help them to anticipate issues regarding standard emissions limits which normally are behind European and North American markets.

• VE Commercial Vehicles (VECV)

Created in 2008, Volvo Group paid a total of SEK 1,8 billion for a 45,6% stake in the partnership made with the Indian manufacturer Eicher Motors, one of the country's leaders in medium-duty trucks⁴³. The primarily goal of this partnership were to consolidate Eicher position within the medium-duty market, to gain market share in the heavy-duty market with a portfolio renewal and to expand the production capacity from by 50% of units produced per year.

Across the last five years the VECV has registered a growth trajectory which allowed to increase its units sold by 21% resulting from its investing in production capacity. The joint-venture intends to keep investing in capex with an investment plan of INR 4.25 billion per year, SEK 552 million⁴⁴, in the following years. Representing near 11% of the trucks sold globally, the Indian market is concentrated in three major manufacturers Tata Motors, Ashok Leyland and VECV that hold more than 95%⁴⁵ of the total market. Volvo positions as the only foreign manufacturer with significant presence although jointly. Expecting a GDP growth of 7,0% 2018 accordingly to the World Bank, India's economy expects a further push from the construction sector after the approval of the Bharatmala project⁴⁶ which consists in building 83,000 km in road and a total spending of SEK 912 billion⁴⁷ until 2022. This improvement in country's infrastructure shows a clear strategy towards road transportation from the Indian

Figure 31: VECV Sales

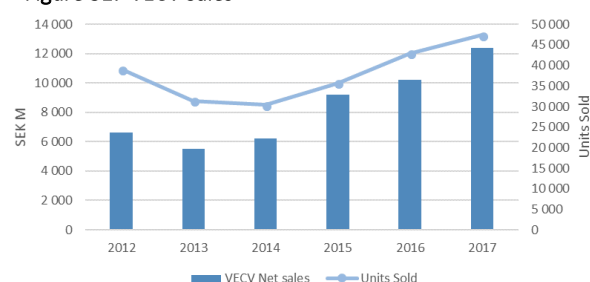
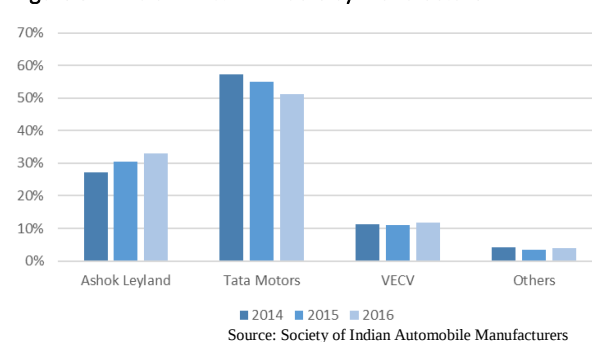


Figure 32: India MD & HD Trucks by Manufacturer



⁴³ AB Volvo's Press Release. "Volvo signs final agreement with Indian vehicle manufacturer Eicher." Volvo. 26 May 2008. Web 30 Dec 17

⁴⁴ Converted as at 30 December 2017 rate according to OANDA.com

⁴⁵ Society Indian Automobile Manufacturers based on CV News "2016-2017, Heavy Commercial Vehicle Sales – A round up" CV News 16 April 2017. Web 30 Dec 17

⁴⁶ ET Bureau. "Modi govt approves mega Rs 7-lakh crore project to develop 83,000 km highways in 5 years." The Economics Times. 25 Oct 2017. Web 30 Dec 17

⁴⁷ Converted as at 30 December 2017 rate according to OANDA.com

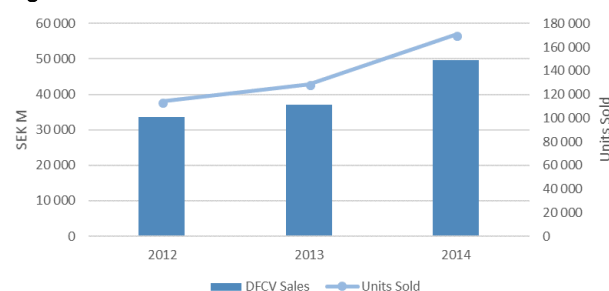
government. The first impact of this strategy is expected to be reflected as an increase in the construction activity demanding more from the road freight transportation. Then with a more extensive road network it is expected an increase in trade between the different regions of the country promoting in this way a larger use of heavy-trucks. Finally, this infrastructure improvement might represent an opportunity for higher value trucks once the level of the country's infrastructure will improve resulting in different needs from the clients. Despite this effect could take some time to be verified, VECV is well positioned to take advantage from it.

• Dongfeng Commercial Vehicles (DFCV)

In 2015, AB Volvo completed the acquisition of 45% of the commercial vehicles subsidiary of Dongfeng Motor Group which kept the remaining 55%⁴⁸ by paying SEK 5,6 billion. The initial priorities were to strengthen Chinese market presence and technological leadership, accelerating the process of exportation and improve its aftermarket services and solution. Nevertheless, the financial data available regarding this joint-venture is scarce and with low-level of detail, it is possible to understand the

potential of this partnership. In the first three years the joint-venture registered an interesting sales levels of SEK 34 billion, 37 billion and 50 billion in 2015, 2016 and 2017, respectively. The year of 2017 was the first year where the venture was profitable achieving positive operating margin of 3% recovering from two consecutive reporting periods of negative operating margins of -3% and -1% in 2015 and 2016. This might indicate the break-even point lies between a level of sales between SEK 37 billion and 50 billion. Although, the Chinese market is still dominated by low-value segment as it was described earlier, the consulting firm Bain Company⁴⁹ identified a trend for an increasing number of customers, one in five, who are considering upgrading to higher-value segment truck. The consulting firms calculates the trend will drive the premium segment to double until 2022. Another factor to bear in mind regarding the Chinese market is the "One Belt One Road" plan proposed by the President Xi Jinping in 2013 to create a network of railways, roads, pipelines to link China to the remaining parts of the Asian continent. One of the initiatives encompassed in the plan is the "Silk Road Economic Belt"⁵⁰ which envisioned three road routes connecting China to Europe, to Persian Gulf and to West Asia. Combined these two factors represent a significant opportunity for DFCV, which is well positioned to capture more value by being capable of mixing both firms' know-how to supply the existent customer-base as the potential trend for higher-value trucks.

Figure 33: DFCV Sales



⁴⁸ AB Volvo's Press Release. "Volvo completes the acquisition of 45% of Dongfeng Commercial Vehicles." Volvo. 1 May 2015. Web 30 Dec 17

⁴⁹ Gnam, Jorg et others (2017, June), "China's Truck Market: New Opportunities for Europeans" *Bain & Company Insights*

⁵⁰ Jinchun, Tian (2017, July), "One Belt One Road: Connecting China around the World" *McKinsey & Company Our Insight*

Competitors' Margins

As it has been described across this report, company's competition will vary across regions but in most of the cases will remain the same across in each business unit. In order to do a proper comparison, the competitors were segregated into two groups "Truck and Buses"⁵¹ and "Construction Equipment" whose have a similar geographical reach with AB Volvo. The first group of competitors, "Trucks and Buses" competitors, is composed by Daimler, Volkswagen, CHN Industrials, and Paccar. Players like Hino Motors and Navistar were left out this group due to their exclusive presence in Japan and North America, respectively.

Additionally, it was only considered the data regarding the commercial vehicles divisions to purge the effect of passenger car divisions. Hence, for Daimler would be only consider the reporting regarding Daimler Trucks & Buses division, Scania's for Volkswagen⁵² and Iveco's for CHN Industrials. Paccar would be fully considered due not having other activities besides trucks and buses. The following Sales figures are stated in SEK M to facilitate the understanding of the scale of each player.

The Figure 34 allows an understanding regarding the last 5 years of sales of each player. Daimler and AB Volvo registered a volume of sales which positions themselves as the industry leaders mainly because of their wider geographically reach. The difference in Sales observed

between both can be explained in some part by the fact of Daimler also competes in the light-duty truck segment whereas AB Volvo only competes in the heavier classes. AB Volvo's margin went down between 2012 and 2014 as a consequence of the restructuring plan that was going through and far from the margin registered in the Volkswagen's subsidiary, Scania. In 2015, Volvo saw its

operating margin rocketed to the second-best margin in industry with 8,67% but still behind 9,32% from Scania. The year of 2016 was marked by the EU price fixing penalty applied to the European truck companies Daimler, DAF (Paccar), Scania, Iveco and Volvo summing up SEK 30 billion which lead to a general declined among all the players. In 2017 AB Volvo have positioned second best among its competitors registering an 8,8% margin behind Scania with 9,3%.

The second group of competitors, "Construction Equipment" ones, is composed by Hitachi, Doosan, Deere and XCMG. By recalling the figure 27, where it was possible to understand the global volume by player, it was decided to exclude from this benchmarking players like Caterpillar and Komatsu due to their significant difference in terms of the scale of their businesses when compared with the remaining peers. By including

Figure 34: Truck and Buses - Sales

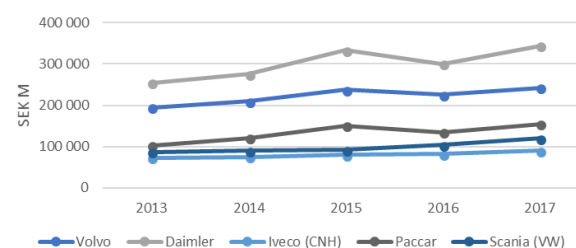
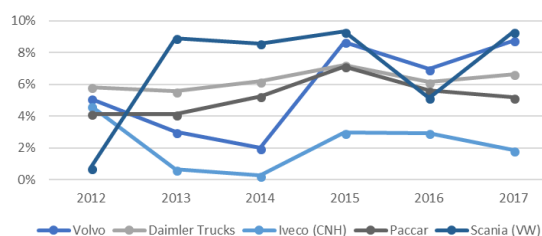


Figure 35: Truck and Buses – Operating Margin



⁵¹ Some competitors report does not segregate the data regarding Trucks and Buses divisions and for that reason the comparison will take into account the Buses division.

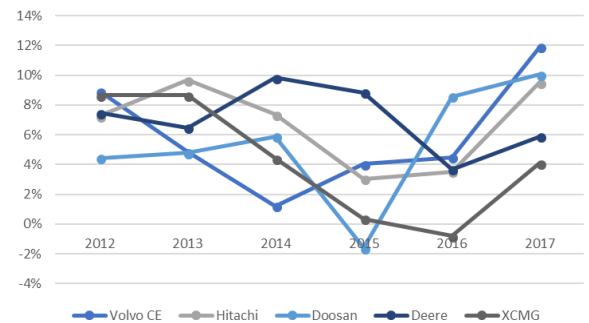
⁵² Due to the lack of segregation from the Volkswagen Group reporting it was not possible to access the MAN reporting

them, it could lead to unfair comparison between operating margins with their peers. Liebherr was also remove from this comparison for the fact of being a private-owned company and having limited data.

As it can be observed in Figure 47, Volvo CE's operational margin has been improving since 2014 achieving the best margin among the peer group last year. The management team stated that this improvement derived from a higher focus on core products, reduced breakeven and a tight control over costs which combined with higher volume of sales allow the division to achieve its best-ever margin.

In an overall perspective is not expected the AB Volvo to increase its operating margin in its different divisions considering they already place as top-2 best margins in both divisions.

Figure 36: Construction Equipment – Operating Margin



Valuation

Given AB Volvo's operational structure and financial data reporting segregation a sum of the parts approach will be used to get the overall equity value of the company. The valuation will follow the company's financial reporting and it will be divided according to the following way:

- **Industrial Operations:** To value this division, it will be used a DCF-APV method in order to properly forecast the future cash-flow by business unit and by region while respecting the management strategy to maintain a level of no financial indebtedness excluding the pension liabilities as mentioned before.
- **Financial Services:** This division is responsible to complement the commercial vehicle vehicles sales providing customer financing solutions in order to leverage the Industrial Operational segment. Due to the financial nature of this business unit and the reported data available, it will be used a Flow-to-Equity method.
- **Joint-Ventures:** The VECV joint-venture will follow a simplified DCF-WACC approach. The DFCV will be valued according to its acquisition price.

Industrial Operations:

Sales: The Industrial Operations segment is forecasted to maintain the positive trend verified in the recent years experiencing a CAGR of 4,4% until 2023.

Table 4:

Industrial Operations - Revenue Estimation		2017	2018E	2019F	2020F	2021F	2022F	2023F	CAGR
Industrials - Sales (SEK M)		322 936	361 185	367 689	381 104	398 267	416 666	436 072	4,4%
Trucks		216 480	245 886	244 229	249 024	257 045	265 567	274 373	3,4%
Construction Equipment		66 497	76 024	82 105	88 597	95 453	103 107	111 375	7,6%
Buses		26 078	27 414	28 861	30 220	31 692	33 076	34 521	4,1%
Penta		11 119	11 861	12 494	13 263	14 077	14 916	15 803	5,2%

The Trucks and Construction Equipment division are expected to remain as the largest divisions among the Industrial Operations segment. Considering the historical stability of the market shares experienced in both divisions in the recent years, combined with the no expectation of new entrants with significant impact to come in during the forecasted period, it was assumed the company would be able to maintain its current market on its main divisions and regions. Within the Trucks division the sales were forecasted based on the expectation of the number of new truck registrations in each market. This input was obtained by the understanding the historical relationship between the number of new truck registrations and the value added by the transport depended sectors and adjusting it according to the expected macro-economic trends. Having this in mind and considering the positive outlook for the three major market describe above, the performance of the overall division is expected to follow the growing trend of the last 5 years. The Construction Equipment division is forecasted to experience the higher CAGR, 7.6%, among Industrials segment relying on the expected good performance from the Asian region. The positive expectations on the Chinese construction sector combined with the tailored features of the SDLG brand for the same market positions the firm to capture a higher amount and weight of Sales from this region of the world. According to the predictions made, the Construction Equipment division will increase its weight on the Industrial Operations Sales to 25% whereas the Truck division is expected to experience a decrease of 4 basis points.

EBIT/EBITDA Margin: Recalling that Industrial Operations segment sells high-premium products across the different divisions and regions and the company already have finalized its operational restructuring program it was assumed the company would be able to maintain its current EBITDA margin with exception for the Construction Equipment division. In this case is expected the SDLG brand to increase its weight on division overall sales from 38% to 52% and considering is a low to medium-end brand, the margins were projected to shrink once the competitors like XCMG Construction Machinery and Hitachi who has higher exposure to the Asian markets 83% and 60%⁵³ have lower margins. By maintaining the projected EBIT margin, it also assumed the company will maintain the same investment strategy concerning in research and development to address the challenges the firm will face in the future.

Industrial Operations - EBIT Estimation		2017	2018E	2019F	2020F	2021F	2022F	2023F
Industrials - EBIT (SEK M)		39 324	49 246	49 207	50 926	53 171	55 590	58 140
Trucks		20 383	22 711	22 558	23 001	23 742	24 529	25 343
Construction Equipment		7 917	7 690	7 484	8 076	8 701	9 398	10 152
Buses		928	973	1 025	1 073	1 125	1 174	1 226
Penta		1 429	1 489	1 569	1 665	1 768	1 873	1 984
EBIT Margin		12,2%	13,6%	13,4%	13,4%	13,4%	13,3%	13,3%

⁵³ According to Company's Reports

CAPEX and Capitalized R&D: The transition highlighted in the beginning of this report towards autonomous driving systems and alternative powertrains will require the company

to increase its current CAPEX levels to fulfill the requirements of producing full-electric and hybrid engines as well as to assure the reposition of the existing fixed assets once the situation in 2017 represented a negative CAPEX reposition level. The level of investment in fixed assets will depend on the company's strategy concerning how to supply the batteries of the new vehicles, if the decision is in-house developing or a partnership with a supplier to outsource the production. The level of capitalized R&D will always be dependent if the R&D expenses filled the accounting criteria to be capitalized.

Table 6:

Industrial Operations - CAPEX	2017	2018F	2019F	2020F	2021F	2022F	2023F
CAPEX (% Sales)	2,1%	3,4%	3,4%	3,5%	3,7%	3,9%	4,2%
<i>Reposition</i>	2,9%	3,3%	3,3%	3,3%	3,3%	3,3%	3,3%
<i>Expansion</i>	-0,8%	0,1%	0,1%	0,2%	0,4%	0,6%	0,9%

Table 7:

Industrial Operations - APV Valuation	2012	2013	2014	2015	2016	2017	2018E	2019F	2020F	2021F	2022F	2023F
EBIT	16 473	5 520	4 065	21 455	18 584	26 727	32 864	32 636	33 815	35 335	36 975	38 704
Operating Taxes (Marginal Tax Rate: 25%)	-4 777	-1 546	-1 220	-5 364	-4 646	-6 682	-8 216	-8 159	-8 454	-8 834	-9 244	-9 676
NOPLAT	11 696	3 974	2 846	16 091	13 938	20 045	24 648	24 477	25 361	26 502	27 731	29 028
Amortization and Impairment	3 168	5 021	3 502	3 313	3 398	3 212	4 177	4 225	4 363	4 548	4 747	4 956
Depreciation and Impairment	8 692	9 452	9 171	9 261	9 235	9 385	11 924	12 210	12 711	13 258	13 796	14 480
Gross Cashflow	23 556	18 447	15 519	28 665	26 571	32 642	40 749	40 912	42 435	44 307	46 273	48 464
-Δ Operating Working Capital	-10 353	8 007	-3 057	5 193	-8 629	4 735	-1 717	18	-215	-529	-346	-268
Capitalized R&D	-4 181	-5 047	-2 493	-2 023	-3 573	-1 745	-3 962	-4 033	-4 180	-4 368	-4 570	-4 783
Net CAPEX	-8 330	-7 514	-12 112	-7 728	-11 492	-6 882	-12 431	-12 672	-13 528	-14 755	-16 290	-18 218
Assets Under Operating Leasing	-4 082	4 521	-1 388	-932	-859	-954	-839	-305	-629	-804	-862	-910
-Δ Other Non-Current Assets	3 975	394	-4 722	4 836	968	456	3 014	318	656	839	900	949
Δ Operating Other Provisions	1 546	774	7 653	-1 475	-2 629	-1 014	5 753	1 154	974	1 246	1 336	1 409
-Δ Net Deferred Taxes	-4 161	64	-2 107	2 785	546	3 567	-938	-160	-329	-421	-451	-476
Unlevered Operating CF	-224	21 785	-4 248	28 728	-375	31 390	29 629	25 233	25 185	25 514	25 990	26 168
Ru							7,00%					
Perpetual Growth Rate												2,02%
Discounted Unlevered Operating CF at 12/2018								23 583	21 998	20 827	19 827	18 657
Value of Unlevered Industrials Operations Enterprise								487 091				

Table 8:

Cost of Unlevered Capital and Perpetual Growth Rate: Considering the method used to value this business segment was the DCF-APV, it was used the following formula to calculate the appropriate discount rate: " $Ru = \text{risk-free rate} + \text{Market Risk Premium} \times \text{Company Unlevered Beta}$ ", to discount either the Unlevered Cash Flow from the Operations as well as the Present Value of the Tax Shield. As a proxy for risk-free it was considered the "U.S Generic Govt 10-Y Yield" converted into SEK by using the ratio between Inflation Rate of both countries. For the calculation of the Unlevered Beta it was not consider the average of the industry, because as it could be observed in the "Competitors' Analysis", there are no peers with similar or approximate business and region mix with AB Volvo. That way, company's Unlevered Beta was obtained by running 5-year regression

Cost of Unlevered Capital - APV Valuation	
US Generic Govt 10 Year Yield	3,06%
Inflation Rate Sweden	1,70%
Inflation Rate USD	2,50%
US Generic Govt 10 Year Yield in SEK	2,26%
Beta vs MSCI World Industrials	1,13
Unlevered Beta	0,86
Market Risk Premium [4-6%]	5,50%
Cost of Unlevered Capital [Ru]	7,00%
Perpetual Growth Rate	2,02%
Unlevered Operating Cash Flow 2023F	26 168
Terminal Value	536 057
Discounted Terminal Value 12/2018	382 199
<i>as percentage of Industrial Ops. EV</i>	78%

with MSCI World Industrial Index⁵⁴. The Perpetual Growth Rate was computed by assuming a weighted GDP growth rate based on company's regional sales and IMF's expectations.

Industrial Operations Enterprise Value: By combining the 5-year forecasting period Discounted Unlevered Cash-flows with the Discounted Terminal Value with respect to December 2018, it was obtained a SEK M 487.091 value for Industrial Operations Enterprise Value.

Table 9:

Debt: Regarding that one of the management's targets is to maintain a no financial indebtedness position excluding the pension liabilities on this business segment. It was assumed the company will repay its debt according to with its debt schedule maturity provided in the company's report and it will also maintain the current dividend of SEK 4,5 per share.	Industrial Operations - Financial Position	2017	2018E	2019F	2020F	2021F	2022F	2023F
	Excess Cash [beginning of the year]	12 961	24 741	521	-12 625	-5 443	11 352	27 739
	Unlevered Operating CF	31 390	29 629	25 233	25 185	25 514	25 990	26 168
	Current Debt	44 459	31 071	10 897	1 819	2 786	103	0
	Non Current Debt	61 087	30 016	19 119	17 300	14 514	14 411	14 411
	Debt Repayment	-14 050	-44 459	-31 071	-10 897	-1 819	-2 786	-103
	Debt Interest	-1 687	-1 628	-934	-658	-379	-267	-224
	Tax Shield	422	407	234	164	95	67	56
	Debt Interest After Tax	-1 265	-1 221	-701	-493	-284	-200	-168
	Dividends	-6 603	-6 603	-6 603	-6 603	-6 603	-6 603	-6 603
	Non-Operating Cashflow	2 898	-1 566	-5	-10	-13	-14	-14
	Excess Cash [end of the year]	25 330	521	-12 625	-5 443	11 352	27 739	47 018
	Net Debt Position	47 934	60 566	42 641	24 562	17 300	14 514	14 411

For those periods, where according to the predictions made it would be need additional funding to comply with these two assumptions, it was assumed the company would use its granted Swedish Commercial Paper credit facility at the cost of company's current average interest rate. This funding line is currently not utilized and has a total amount of SEK 20.000 M. According to our calculation this credit line would be used in 2019 and 2020 with the respective reimbursement in the following year. The value of Net Debt at 31 December 2018 is forecasted to be SEK 60.556 million.

Present Value of Interest Tax Shield: The Terminal Value was calculated on basis the basis of a non-growing perpetuity once there is no specific information regarding the maturity of the amount of the "Non-Current Debt" in 2023 (SEK 14.441 million) and thus it was assumed as perpetual debt. The Present Value of Interested Tax Shield is expected to be SEK 1.100 at the end of the current year.

Table 10:

Debt Interest Tax Shield - APV Valuation	2017	2018E	2019F	2020F	2021F	2022F	2023F
Debt Interest Tax Shield	422	407	234	164	95	67	56
Ru		7,00%					
Perpetual Growth Rate							0,00%
Discounted Tax Shield at 12/2018			218	144	77	51	40
Discounted Tax Shield Terminal Value 12/2018		800					
Present Value of Tax Shield		1 100					

⁵⁴ The Index is designed to capture the large and midcap segments across 23 Developed Markets (DM) countries* around the world.

Non-Operating Assets and Pension Funds Liabilities:

The Non-Operating Assets, which represents Interest and Non-Interest Assets/Liabilities held for Sales and Market Securities, and the Pension Funds Liabilities were valued at its carrying book value of December 2017 having a negative value of SEK 15.436 million.

Table 11:

Industrial Operations - Non Operating		2017
Net Other Current Assets/Liabilities		-1 298
Provision for post-employment benefits, net		-14 138
Non Operating Assets		-15 436

Equity Value Industrials Operations and Sensitivity

Analysis: By doing the sum of the parts of the Industrial Operations components we reached an Equity Value of Industrials of SEK 435.592 million. In the Figure 37 can be observed how each part have contributed to it and conclude the Unlevered Value of Industrials Operations represents the significant part of this Equity Value.

In turn, the Unlevered Value of Industrial Operations is composed in 78% by the Terminal Value calculated above which value is sensitive to its inputs: cost of unlevered capital and growth rate. In fact, the cost of unlevered capital by itself is also dependent on analyst's judgment to define the value of unlevered beta and market risk premium. Therefore, it was first computed a sensitive analysis on the cost of unlevered capital to understand the range this cost might take. By analyzing the extreme scenarios, it was assumed as acceptable for Terminal Value sensitive analysis purposes, the range between 5,31% and 8,03%. The range of the Growth Rate selected to perform the Terminal Value sensitivity analysis was 1,27% to 2,52%

Figure 37: Industrial Operations Equity Value

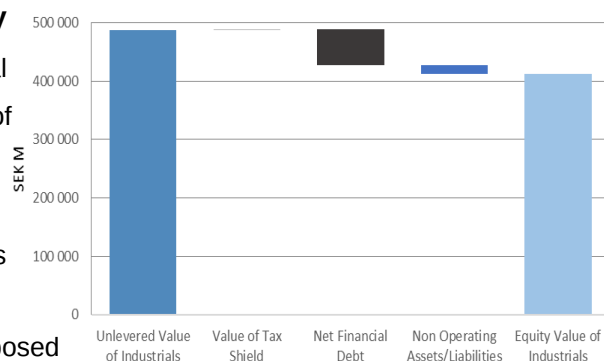


Table 12:

Industrial Operations - Sensitivity Analysis

Industrial Operations - Cost of Unlevered Capital

		Market Risk Premium				
		4,00%	4,50%	5,00%	5,50%	6,00%
Unlevered Beta	0,76	5,31%	5,69%	6,07%	6,45%	6,83%
	0,81	5,51%	5,91%	6,32%	6,73%	7,13%
	0,86	5,71%	6,14%	6,57%	7,00%	7,43%
	0,91	5,91%	6,36%	6,82%	7,28%	7,73%
	0,96	6,11%	6,59%	7,07%	7,55%	8,03%

Industrial Operations - Discounted Terminal Value

		Cost of Unlevered Capital				
		5,31%	5,61%	7,00%	7,50%	8,03%
Growth Rate	1,27%	507 000	464 763	329 732	296 289	266 352
	1,77%	581 545	527 872	363 038	323 734	289 042
	2,02%	627 324	566 019	382 199	339 334	301 802
	2,27%	680 643	609 877	403 386	356 426	315 669
	2,52%	743 529	660 831	426 937	375 234	330 795

Financial Services: In order to value this segment and considering this is a balance-sheet driven business, it was assumed the Customer-Financing Receivables will depend on the Industrial Operations Sales according to its current ratio⁵⁵, it was also assumed this segment will follow the same Net Operating Margin⁵⁶ verified in 2017. Additionally, the level of Debt will adjust accordingly with the Customer-Financing Receivables, an approximate ratio of 20%. As it can be seen from the table 13, the business is generating negative cashflow which are explained by the recognition of vehicles in the "Assets under Op. Leasing" financial caption. Additionally, the change in Customer Receivables is also affecting negatively the cashflow, once the total amount of the vehicle has to be recognized upfront. In order to properly reflect the risk of this

⁵⁵ In 2017 the Customer-Financing Receivables / Industrial Operations Sales = 17%

⁵⁶ Net Operating Margin = Net Interest Margin – Depreciation of Asset Under Operating Leasing

segment, the cost of equity was calculated not having into account the AB Volvo Beta but the Beta from the Sixt Leasing SE, whose business focus on providing full services leasing for commercial and passenger vehicles. The Equity Value from the Financial Services is a negative value of SEK 3.134 million.

Table 13:

Financial Services - FTE Valuation	2017	2018E	2019F	2020F	2021F	2022F	2023F
Net Operating Income	2 192	2 452	2 496	2 587	2 703	2 828	2 959
Income Taxes (Marginal Tax Rate: 25%)	248	-613	-624	-647	-676	-707	-740
Net Income	2 440	1 839	1 872	1 940	2 027	2 121	2 219
Depreciation	4 272	4 778	4 864	5 041	5 269	5 512	5 767
-Δ Customer Receivables	2 807	-12 518	-2 129	-4 391	-5 617	-6 022	-6 353
-Δ Asset under Op. Leasing <i>excluding Dep.</i>	-5 767	-7 279	-5 289	-5 919	-6 391	-6 715	-7 035
-Δ Other Assets	-2 949	951	84	16	5	-7	2
Δ External Debt	1 601	2 621	446	919	1 176	1 261	1 330
Free Cash Flow to Equity	2 404	-9 608	-153	-2 392	-3 531	-3 850	-4 071
Cost of Equity [Re]		6,25%					
Perpetual Growth Rate							2,02%
Discounted Financial Services CF at 12/2018			-93	-877	-783	-517	-331
Discounted Tax Shield Terminal Value 12/2018		-534					
Equity Value Financial Services		-3 134					

Joint-Ventures:

DFCV: The method choosen to value this joint-venture was the purchase price paid by A.B.Volvo in 2015. The rational behind this choice derives from the lack of information about the company as well as the lack of information about competitors once in a market which is dominated by private joint-ventures⁵⁷ held by Chinese and Triad manufacturers. The price paid by AB Volvo for 55% was SEK 5.600 million.

VECV: In order to compute the equity value of the Indian joint-venture, it was used a simplified DCF model based on the limited information reported in the AB Volvo's annual reports. The projections assume the joint venture will be able to maintain its current market-share which have been stable over the past three years and the maintain its investment plan in fixed assets described above. In order to compute the Weighted Average Cost of Capital, it was assume the same risk-free as the Industrial Operation once the projection was made in SEK, the Beta resulted from a Industry's⁵⁸ weighted average Beta against the SPBIMIP Index⁵⁹. For this case, it was also add to the Market Risk Premium a Country's Risk Premium in order to reflect the full exposure

Table 14:

VECV -DCF Valuation - WACC	
US Generic Govt 10 Year Yield	3,06%
Inflation Rate Sweden	1,70%
Inflation Rate USD	2,50%
US Generic Govt 10 Year Yield in SEK	2,26%
Industry's Weighted Average Beta vs SPBIMIP Index	0,79
VECV Relevered Beta	1,15
Market Risk Premium [4-6%]	5,50%
Country's Risk Premium	2,19%
Cost of Capital [Re]	11,10%
Cost of Debt [Industry's Proxy]	5,56%
D/E [Book Value]	64,49%
Corporate Tax Rate	30,00%
WACC	6,92%
Growth Rate	6,00%

⁵⁷ Li, Jia (2016, October), "Overview of China's Heavy Commercial Vehicle Market" *IHS Market*

⁵⁸ As competitors were considered: Tata Motors LTD, Ashok Leyland LTD, SML Isuzu LTD, Force Motors LTD and Mahindra & Mahindra Ltd

⁵⁹ S&P BSE India Manufacturing

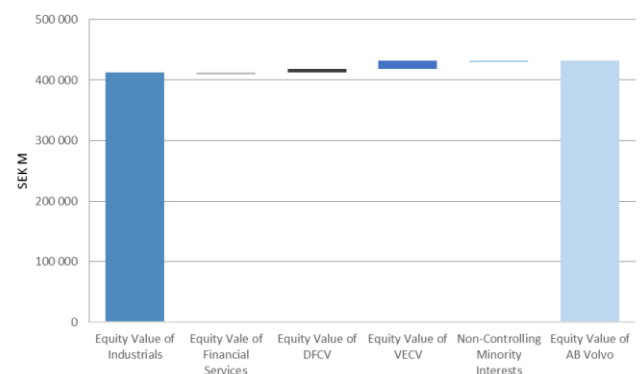
to the Indian Market of 2,19% and a proxy for the industry average cost of debt since there is no information available regarding company's cost of debt⁶⁰. The Equity Value attributable to AB Volvo is SEK 13.793 million.

Table 15:

VECV - DCF-WACC Valuation	2013	2014	2015	2016	2017	2018E	2019F	2020F	2021F	2022F	2023F
Sales	5 516	6 208	9 212	10 204	12 370	13 716	15 217	16 878	18 722	20 767	23 035
Operating Costs	-5 148	-5 823	-8 529	-9 424	-11 489	-12 668	-14 054	-15 588	-17 291	-19 179	-21 275
Depreciation	-138	-303	-372	-356	-363	-349	-363	-377	-389	-401	-412
EBIT	230	82	311	424	518	700	800	913	1 042	1 186	1 349
Operating Taxes (Marginal Tax Rate: 30%)	-69	-25	-93	-127	-155	-210	-240	-274	-313	-356	-405
NOPLAT	161	57	218	297	363	490	560	639	729	830	944
Depreciation	138	303	372	356	363	349	363	377	389	401	412
Gross Cashflow	299	360	590	653	726	839	923	1 016	1 119	1 232	1 356
-Δ NWC	48	-267	-545	-270	-958	335	-266	-295	-327	-363	-402
Net CAPEX	-2 597	-1 050	155	-780	-263	-553	-553	-553	-553	-553	-553
Δ Other Non Current Liabilities	291	147	-450	49	-11	0	0	0	0	0	0
Operating FCF to the Firm	-1 959	-810	-250	-348	-506	621	105	169	239	316	401
WACC						6,92%					
Perpetual Growth Rate											6,00%
Discounted Operating FCF at 12/2018							98	148	196	242	287
Discounted Tax Shield Terminal Value 12/2018						33 149					
VECV Equity Value						34 119					
Net Debt	841	1 122	1 703	1 861	3 542	3 872	4 246	4 672	2 795	3 091	3 428
VECV Equity Value						30 248					
VECV Equity Value attributable to AB Volvo (45,6%)						13 793					

AB Volvo Equity Value: The value of the company's equity value is computed by adding to the Equity Value of the Industrials Operations the estimated equity value from the remaining and by subtracting the value of Non-Controlling Minority Interest (SEK 1.942 million). By doing this calculation we achieved a final Equity Value of SEK 431.591 million. Recalling that we are assuming both classes of AB Volvo's share have the same value, we reach a share price of SEK 202,75, which represents a target capital gain of 26,85 from the date of this report until 31 December 2018.

Figure 38: AB Volvo Equity Value



Relative Valuation

Relative valuation methodologies are useful to have a better understanding of a company's position relatively to its competitors. These methodologies will give a valuation based on current and market-based information. The core of these analysis involves selecting a universe of comparable companies which share the same core business profile characteristics, in other words, companies competing in the same sector,

⁶⁰ Damodaran, Aswath. "Damodaran Online" New York University Stern School of Business, January 2018. Web. 22 May 2018

marketing the same type of services and products and operating in the same regions. By not assuring these criteria are met, the relative valuation may be considered meaningless or not appropriate. There are two type of relative valuations: Comparable Companies Analysis and Precedent Transaction Analysis.

Comparable Companies Analysis: Following the same rational for the calculation of the Industrial Operations' Beta, it was assumed that valuing AB Volvo's equity against the competitors who share similar market-shares over the main geographies the company operates, Daimler AG and Volkswagen AG, would resulted in a skewed valuation due to the weight of the passenger car business divisions represents on their sales mix, 63% and 72%, respectively⁶¹. For that reason, it was considered that only an analysis at an operational level would make sense as evaluated at Competitors' Margins.

Precedent Transaction Analysis: Like AB Volvo, the players in this industry are a result from a past M&A activity verified on the first decade of this century that enable them to expand geographically and consolidate market shares. The most recent transactions of the industry were made by Volkswagen when acquired MAN and Scania in 2011 and 2014, respectively. Valuing AB Volvo's equity value based on transactions of European operations that occurred during the period where the region's economy was going through a stagnation period, would lead to a valuation that may not reflect the current market conditions. However it could also be used as proxy the valuation given by new shareholder Zhejiang Geely Holding Group when bought its 8,3% stake at the end of last year. As mentioned before the premium paid by the new shareholder was 21,41% which can be considered aligned with our estimates.

Recommendation

Considering the Relative Valuation analysis would not change or adjust the expected recommendation from the Sum of the Parts Valuation, the recommendation given is to buy shares of AB Volvo considering the potential return of 26,85% they could generate from the date of this report until the end of 2018.

Table 16:

Sum of the Parts - Target Share Price	
Share Price VOLVA (SEK)	160,10
Share Price VOLVB (SEK)	159,85
No of A-shares	479 974 391
No of B-shares	1 648 445 829
AB Volvo Market Cap	340 347 965 765
Estimated Equity Value	431 591 752 984
Target Share Price	202,78
Potential Capital Gain	26,85%

⁶¹ Source: Daimler AG and Volkswagen AG Annual Report

Appendix

Financial Statements

P&L SEK M	2012	2013	2014	2015	2016	2017	2018E	2019F	2020F	2021F	2022F	2023F
Sales	299 814	272 622	282 948	312 515	301 914	334 748	374 396	381 138	395 044	412 834	431 906	452 016
Operating Costs	-267 217	-248 158	-261 241	-272 247	-264 478	-288 960	-317 920	-324 571	-336 489	-351 692	-367 976	-385 151
Depreciation, Amortization & Impairment	-14 628	-17 422	-15 930	-16 807	-16 766	-16 869	-21 160	-21 435	-22 153	-23 104	-24 127	-25 203
Income from investments in joint ventures	99	96	46	-143	156	1 407	234	266	302	343	389	441
Operating Income	18 068	7 138	5 823	23 318	20 826	30 326	35 549	35 397	36 704	38 382	40 192	42 104
Net Interest expenses and similar charges	-2 496	-2 429	-1 666	-2 109	-1 607	-1 687	-1 628	-934	-658	-379	-267	-224
Other financial income and expenses	-78	11	931	-792	11	-385	0	0	0	0	0	0
Income after financial items	15 494	4 720	5 088	20 417	19 230	28 254	33 921	34 463	36 046	38 003	39 925	41 880
Income taxes	-4 116	-919	-2 854	-5 320	-6 008	-6 971	-8 480	-8 616	-9 012	-9 501	-9 981	-10 470
Income for the period	11 378	3 801	2 234	15 097	13 222	21 283	25 441	25 847	27 035	28 502	29 944	31 410
Balance Sheet SEK M	2012	2013	2014	2015	2016	2017	2018E	2019F	2020F	2021F	2022F	2023F
Non Current Assets												
Capitalized R&D	16 605	16 634	15 621	14 328	14 550	13 112	12 917	12 729	12 553	12 383	12 217	12 054
Goodwill	22 093	19 954	21 494	22 088	23 366	22 781	22 781	22 781	22 781	22 781	22 781	22 781
Property, plant and equipment	54 189	52 233	55 181	53 618	55 875	53 348	53 815	54 276	55 093	56 590	59 085	62 823
Assets under operating leases	29 022	25 672	31 218	32 531	34 693	37 166	40 546	41 276	42 782	44 708	46 774	48 952
Participations	6 143	6 327	9 838	12 050	12 419	11 224	11 458	11 491	11 527	11 568	11 614	11 666
Other Non Current Assets	-7 289	-8 060	-8 778	-12 120	-14 916	-15 693	-17 666	-17 984	-18 640	-19 479	-20 379	-21 328
Non-current Customer-Financing Receivables	41 156	43 792	51 331	50 962	57 827	57 173	62 780	63 911	66 243	69 226	72 424	75 797
Total Non Current Assets	161 919	156 552	175 905	173 457	183 814	179 111	186 632	188 479	192 338	197 778	204 515	212 745
Current Assets												
Other Current Assets	3 130	10 363	7 470	6 085	1 600	229	1 795	1 800	1 810	1 823	1 836	1 851
Net Deferred Taxes	11 026	10 760	13 035	9 955	9 129	6 429	6 500	6 660	6 989	7 410	7 862	8 338
Inventory	40 093	41 153	45 533	44 390	48 287	52 701	57 973	59 188	61 361	64 134	67 103	70 236
Customer-financing receivables	39 833	40 069	47 836	51 621	52 994	52 205	59 683	60 758	62 975	65 811	68 851	72 058
Tax Assets	1 013	1 749	3 414	2 161	1 359	1 567	1 848	1 816	1 816	1 816	1 816	1 816
Trade Receivables	41 380	42 978	46 677	44 809	51 964	56 245	61 612	62 721	65 009	67 937	71 076	74 386
Cash and Cash Equivalents	25 207	26 968	26 242	21 048	23 949	36 092	6 991	7 088	7 320	7 622	35 580	55 298
Total Current Assets	161 682	174 040	190 207	180 069	189 282	205 468	196 403	200 031	207 281	216 553	254 124	283 982
Total Assets	323 601	330 592	366 112	353 526	373 096	384 579	383 035	388 510	399 619	414 331	458 639	496 727
Non Current Liabilities												
Operating Other Provisions	16 716	17 494	25 213	23 712	21 137	20 124	25 898	27 059	28 046	29 309	30 663	32 091
Provision for post-employment benefits, net	18 835	12 300	16 557	13 639	14 590	14 223	14 223	14 223	14 223	14 223	14 223	14 223
Long Term Debt	81 520	83 449	108 031	75 276	84 551	73 904	44 351	33 713	32 426	30 321	30 948	31 718
Total Non Current Liabilities	117 071	113 243	149 801	112 627	120 278	108 251	84 472	74 994	74 694	73 853	75 834	78 032
Current Liabilities												
Trade Payables	46 471	53 901	56 647	55 649	55 264	65 346	71 881	73 398	76 093	79 531	83 214	87 098
Tax Liabilities	460	1 120	2 693	1 322	685	1 699	1 319	1 462	1 519	1 323	1 323	1 429
Other Liabilities	32 535	33 393	36 970	40 986	42 608	46 501	52 009	52 945	54 877	57 348	59 998	62 790
Short Term Debt	50 013	51 552	39 953	57 331	56 497	53 771	45 681	38 993	25 513	13 710	26 656	31 287
Total Current Liabilities	129 479	139 966	136 263	155 288	155 054	167 317	170 889	166 798	158 001	151 912	171 191	182 604
Equity attributable to the Parent Company	75 785	76 032	78 325	83 810	96 061	107 069	125 731	144 776	164 981	186 623	209 672	234 149
Minority Interest	1 266	1 333	1 723	1 801	1 703	1 942	1 942	1 942	1 942	1 942	1 942	1 942
Total Equity	77 051	77 365	80 048	85 611	97 764	109 011	127 673	146 718	166 923	188 565	211 614	236 091
Total Liabilities and Equity	323 601	330 574	366 112	353 526	373 096	384 579	383 035	388 510	399 619	414 331	458 639	496 727

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Report Recommendations

Buy	Expected total return (including expected capital gains and expected dividend yield) of more than 10% over a 12-month period.
Hold	Expected total return (including expected capital gains and expected dividend yield) between 0% and 10% over a 12-month period.
Sell	Expected negative total return (including expected capital gains and expected dividend yield) over a 12-month period.

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