

Threatening Factors to the German Car Manufacturers and Levers to Counteract

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Abstract

All industries are driven by changes in technologies, business models and processes. An appropriate response to counteract is a mandatory requirement to survive. Strong signals can be detected for the German car manufacturers, which indicate a radical technological and structural change. These changes represent a bunch of threatening impacts for the existing business model. The Covid-19 pandemic accelerated the visibility of threatening factors. This is remarkable, because the car manufacturing industry contributes about 12 percent to German GDP and thus it is one of the most considerable industries. The thesis of this paper assumes that the existing business model is endangered. The question of research examines the influencing factors on the current business eco systems (BES) in this industry. The strategic analysis will disclose the various and complex impact factors. Methodologically, theoretical, analytical and empirical approaches are used. Research on selected literature aligned at current national and international guidelines leads to a stable basis for the research. Statistical data, topical literature, surveys, and logical conclusions will lead to justified arguments. The scientific purpose of this paper is to analyze the threats to the business system and interrelated BES in order to reveal and direct the imperative transformation process.

Keywords: business model; car manufacturer; threats; eco system; technology

1. Introduction

The business model of producing and selling cars was a stable and profitable business for a long time. In the first stage this business was executed on a national level. In the following period the international business was driven by the opening of foreign markets. The current phase, which is coming to its end now, is driven by globalization with shared value chains allocated where they can be executed in the best way. The latest phase, where we are currently starting with, is pushed by digitalization and electrification of cars and factories.

The underlying working theses is that there are more complex and overlaying impact factors than mentioned before. This bundle of impact factors represents a big threat for the BES and the business model as a whole.

For many decades the business eco systems (BES) worked very well and they have balanced each other for the benefit of all. The BES were balanced in all directions between all the

car manufacturers, suppliers and related activities along the value chain. Well established brands covered different segments and divided the worldwide market among themselves. The existing competitive advantages especially for German brands provided high margins and concomitant a remarkably increasing market capitalization. High growth rates and high rates of return attracted more competitors to enter this business. Upcoming new competitors in particular from China took up the global competition. The rivalry of the different competitors worldwide as well as the capability of the global suppliers generated more and more innovations and thus competitive products worldwide.

The automotive industry and in particular the car manufacturing industry has a significant impact on German economy, employment, income for employees, tax generation and wealth of nation (Hofbauer 2020). The share of this industry of the German GDP is 12,6%. There are more than 820.000 people employed in this industry with a turnover of 436 bn EUR in 2019 and 58 bn Euro less in 2020, which totaled to 378 bn (VDA 2021a). The domestic production volume in Germany was about 5.120.000 units in 2019 and decreased by 24,7% in 2020 (VDA 2021b). The VAT generation of this industry totaled to 82 billion EUR. The portion to the budget of the federal Government is about 12 percent (Janson 2021).

2. Initial Situation and problem formulation

New technologies have a huge impact on existing business models, because a radical change is accompanied with innovations, new supply, changing utilization and use habits (Hofbauer & Sangl 2017). These new technologies come along with structural changes and heavy impacts on existing business relations and accustomed eco systems. These changes cause disturbances in the whole economy, not only within the relevant eco systems. The consequences can be proved in aggregate demand, production figures, employment, wages, workforce participation, inflation, interest rates, monetary and fiscal policy, innovation and productivity.

Kondratieff cycles (Hofbauer & Sangl 2018) are the big waves and shorter technology life cycles are included, which initiate alternating intervals of high sectoral growth and intervals of relatively slow growth. These cycles arise from the combination of basic innovations that launch technological revolutions and in turn create leading industrial sectors and long-term benefits. The car manufacturing industry is challenged by digitalization and electrification, which push into the car manufacturing industry accelerated by restrictive legal regulations.

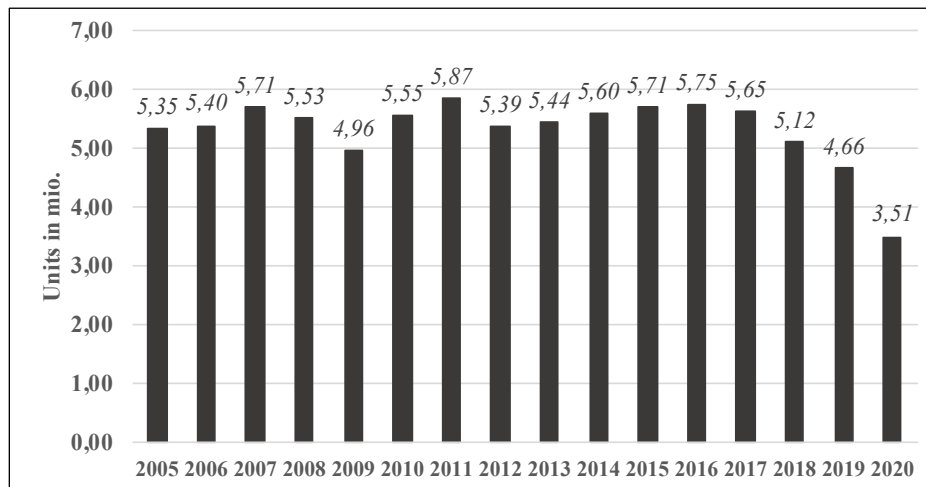
More problems will arise, when technological change is combined with structural change from different origins and directions. It can be stated that besides the technological and structural change there are trade wars initiated by big players on governmental level, economic downturns in several industries in various countries, which affect purchasing power.

There is also to be noticed that customers are uncertain about what technology to buy and in addition to that there is a broad skepticism about e-mobility, because the charging infrastructure is far behind demand. New technologies and radical change also attract new competitors.

The change is clearly noticeable. Worldwide sales volume decreased by 5 percent in 2019, in Germany however it fell by 8.9 percent in 2019 after 9.3 percent in 2018. A dramatic fall had

to be noticed in 2020. The domestic production volume dropped 24,7 percent on average in Germany due to covid-19 pandemic. The pandemic accelerated the change and clearly shows the problems of this particular industry. Figure 1 shows the domestic car production units from 2005 until 2020 (VDA 2021b).

Figure 1: Domestic car production units in Germany (2005 – 2020)



Source: VDA 2021b, own graph.

3. Empirical research on statistical data

The underlying working hypothesis for this article can be formulated as: The German car production industry is in severe trouble and this fact puts the traditional business model and related business eco systems in great danger.

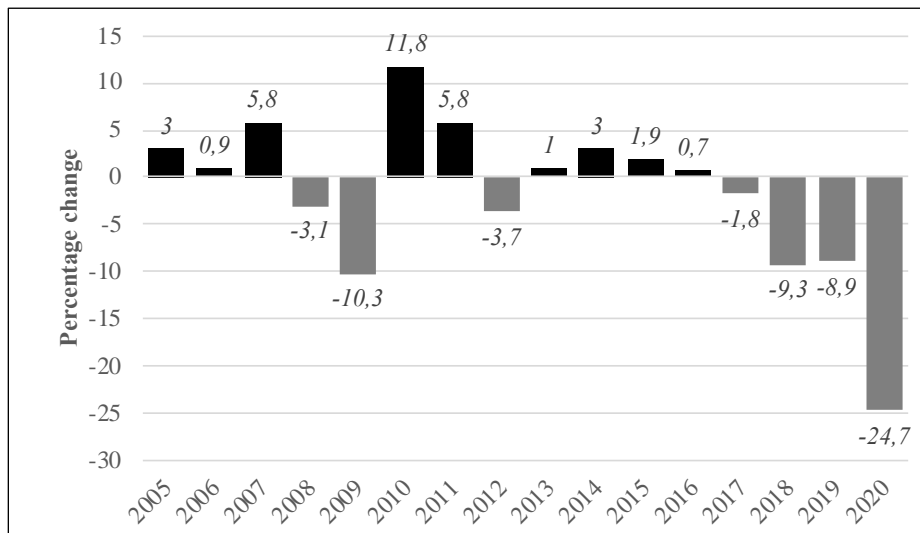
The empirical research is the starting point of the analysis in order to detect the impact factors. This leads to the question of research: What are the impact factors causing the change and threats for the business model?

To start with, the current situation of the German car production industry has to be examined. As a strong and adequate indicator, the domestic production volume of cars is used. This indicator represents economic factors like demand, employment, income for workers and employees, but also financial aspects like cash flows, liquidity, profitability and sustainable finance for the auto makers (Hofbauer, Klimontowicz & Nocoń 2017).

The gains and losses of the German car production from 2005 until 2020 are shown in figure 2, each year in comparison the previous year. It also points out that the big decline began in 2017 with a reduction of 1.8 percent, which was followed by a drop of 9.3 percent in 2018 and 8.9 percent in 2019 until finally the pandemic caused a big slump of 24.7 percent in 2020 (VDA 2021b).

It can be derived that the production volume was at a high level throughout the years 2005 to 2017. Due to the worldwide financial crisis there was a slump in the figures in 2009. After the crisis the figures recovered and levelled off at a profitable level until the year 2017. After that in 2019 the production volume was on a lower level than in 2009.

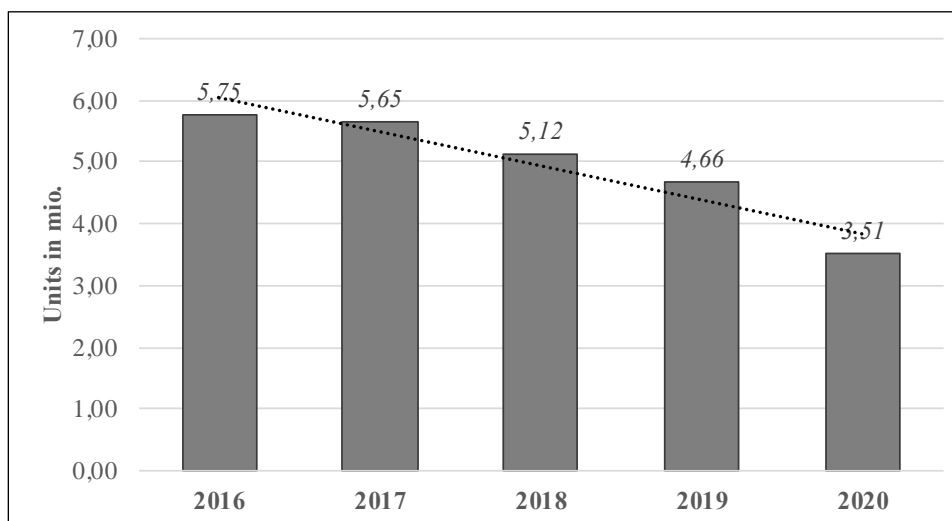
Figure 2: Gains and losses of car production units in Germany (2005 – 2020)



Source: VDA 2021b, own graph.

Figure 3 displays a more precisely focus on the five-year trend of the production volumes from 2016 until 2020 as well as the corresponding statistical trend line.

Figure 3: Focus on car production units with trend line (2016 – 2020)



Source: VDA 2021b, own graph.

To sum up the empirical analysis one can find that the difficulties and problems are evident and not just temporary. The trend line of the chosen indicator significantly points downwards. A very crucial consequence thereof is the financial aspect for car manufacturers. Less production volumes mean less cars to be sold and this means less turnover and correspondingly less cash flow, shrinking investment budgets for necessary innovation projects and less potential for sustainable finance. This should be an alarm signal to all stake holders, because the business model is endangered. One of the stakeholders is the government, which should be aware that the generation of income tax, corporate taxes and value added tax will decrease the income for the state. But there are many more stakeholders in the business system and involved business eco systems.

A business eco system is defined as a network of companies working together in a coordinated way in order to generate value in common value chains. The total value created by a BES is expected to be higher than the sum of values of companies on a stand-alone basis (Jacobides, Cennamo & Gawer 2018). In the case of this research, the company orchestrating the entire process of value creation is the car manufacturer. Problems for car manufacturers indicate immediate problems for related BES.

Under the assumption that the applied indicator is well chosen, the working hypothesis can be confirmed. It can be stated that the German car production industry is in severe trouble and thus the traditional business model is endangered. With regard to the entire business model all related business eco systems will be affected, too.

4. Analysis of threatening impact factors

In this chapter the competitive forces will be analyzed according to Porter's 'competitive forces that shape strategy' (Porter 2008). This conceptual model is a very useful method to analyze a business model and to identify the threats of business eco systems as well. The business eco systems in terms of this study include suppliers, distributors, customers, competitors and other parties involved in sourcing, production and providing a car through cooperation and competition as well. Each entity in an eco system affects and is affected by the actions or reactions of the other members of the system (Williamson & De Meyer 2020).

The applied analysis is ought to identify the influencing forces. These forces determine the intensity of competition and therefor the attractiveness of an industry with regard to profitability. There are five sections from 3.1 to 3.5, in which the different forces will be explained and analyzed. These forces can be divided into two forces of vertical impact, namely the suppliers and the customers and three forces of horizontal competition, namely substitutes, established competitors, and new entrants (Dobbs 2014). All these forces together affect the ability of a company to serve its customers and make a profit. A change in any of these impact factors makes it necessary for a company to rethink and rearrange the business model and related activities.

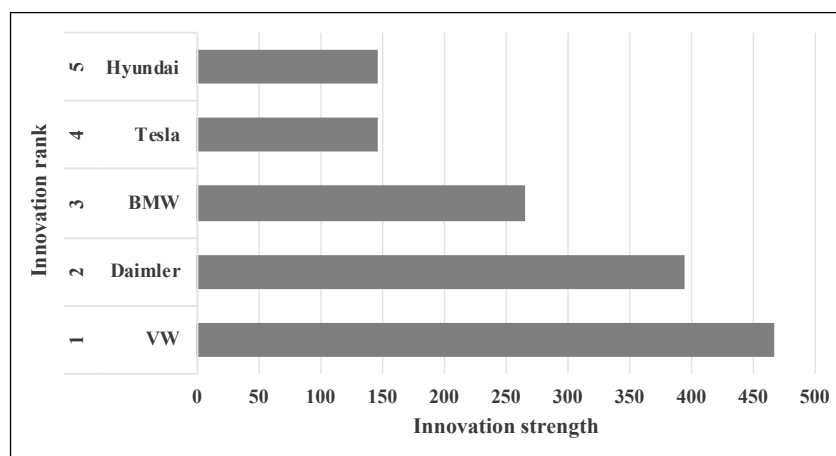
The industry profitability on average does not imply that all companies in this industry necessarily have the same profitability. Some companies have a smarter, better and faster approach, others wonder what is going on. Companies have to combine and apply their core competencies, business model, and network in a unique and value generating way to achieve a

profit level above industry average. The different dimensions of impact factors are described below in subchapters 4.1 – 4.5.

4.1 Competition within car manufacturing industry

Competition is mandatory for developed markets and competitiveness is the predominant indicator for successful companies. The intensity of competitive rivalry is the most important determinant for most industries. In doing successful business it is inevitable to understand competitors and their strategic movements. Strategies should be subject to response to any changes made by competitors. Products and services must be differentiated from competitive offers. One of the most important factors to achieve high profitability is innovativeness (Hofbauer & Sangl 2019a). Innovativeness can be measured for countries, industries and companies. For this analysis it is useful to measure innovativeness on the level of companies. Figure 4 shows an indication of the innovativeness of the German automotive industry (CAM 2020). Derived from this study about car manufacturers, one can state that the three worldwide leading companies are German companies.

Figure 4: Innovation strength worldwide ranked 1 - 5



Source: CAM 2020, own graph.

There is a high innovativeness to be stated, also with other measures like patent applications or innovative features per new car line etc. But nevertheless, the car manufacturing industry in Germany and related business eco systems are threatened. Currently there are many well established brands operating, but the cost pressure on the one side and decreasing demand on the other side force the companies to reduce cost.

One of the recent strategic moves was executed by Fiat Chrysler Automobiles (FCA) with PSA Group in January 16th, 2021. The new agglomerate was named Stellantis and is ranked fourth worldwide with 14 brands, sales volume of 134,4 bn EUR, and 5,95 million cars in 2020 (Kords 2021a). One of the reasons was the necessity to reduce cost, because the cash flows as well as cash

equivalents are decreasing. But at the same time a high investment in innovation and new technologies for cars and plants is required. This leads to decreasing market capitalization whereas barriers to exit this industry are very high (KPMG 2020).

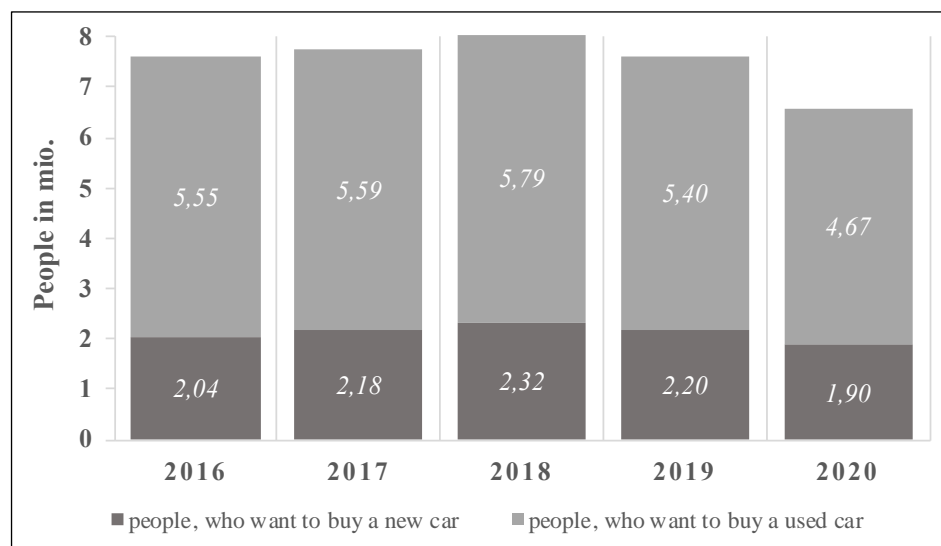
4.2 Behavior and segments of customers

Customer behavior nowadays is ambiguous. Many different segments have to be targeted and served. Customers have the ability to put the companies under pressure as long as demand and offer are not balanced. Customers are sensitive to price changes and strive for new, valuable and sustainable products. The focus is not only on product core and generic product. A product has to fulfill expected, expanded and maximum dimensions, too (Hofbauer & Sangl 2018). The switching costs from one brand to another brand are close to zero in a market with similar products. The car manufactures can only counteract if they differentiate and individualize the products, and try to increase brand loyalty. But all these activities need budgets.

On the other side, customers are uncertain and reluctant to buy cars. The uncertainty is derived from the doubtful electromobility with low reach, unclear subsidies for buyers, and still missing infrastructure with unstandardized charging stations. The reluctance is intensified by different attitudes towards cars and mobility. One reason is that 37 percent of the so-called millennials do not need, do not want or cannot afford an own car. This means 37 percent out of 1.7 million people and accounts to 629.000 unsold cars. For this segment it is more important to have access to mobility than to own a car. Under the philosophy of the we-mobility, 38 percent of the millennials without a car ask somebody to take them and 30 percent ask relatives to lend their car. The rate of using car sharing in this group with 10 percent is twice as high as in the group of 35 to 54 years old people (Zukunftsinstitut 2015).

Figures 5 and 6 show typical indicators of customers' behavior. Fig. 5 displays the number of people planning to buy a new car or a used one in the next two years in Germany, as of January 1st of each year (IfD Allensbach 2020). The survey is based on $n = 23.191$ interviewed people, representing typical car buyers. The proportions were projected to 70,64 million potential buyers.

Figure 5: Number of people planning to buy a new or used car (2016 – 2020)

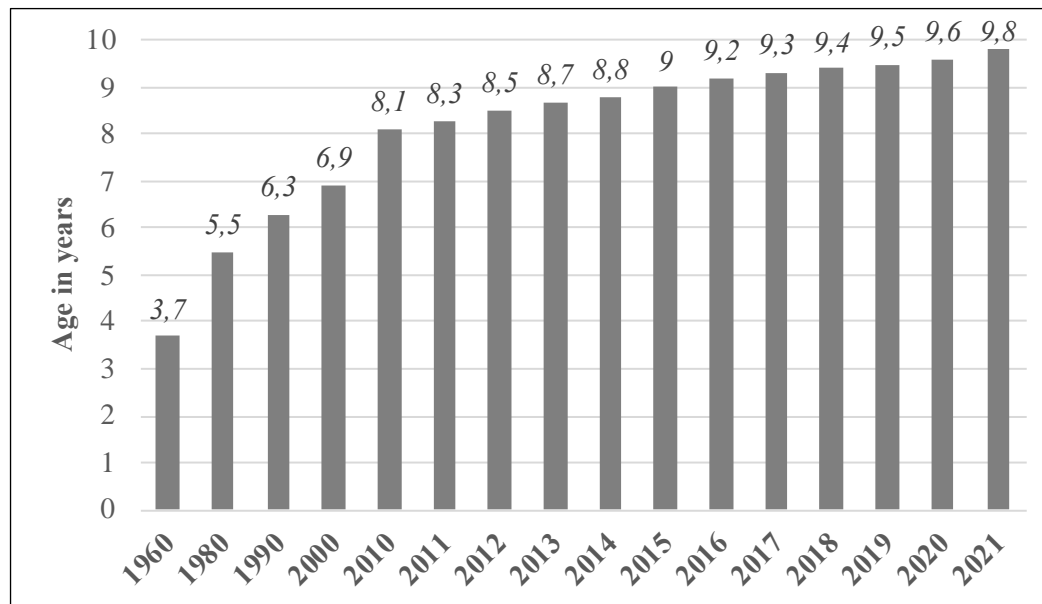


Source: IfD Allensbach 2020, own graph.

After the peak in 2018 with 8.11 million people in total planning to buy a new or used car the numbers were decreasing to 7.6 million in 2019 (-6%) and to 6.57 million in the year 2020 (-13,5%). This was a decrease in absolute figures of 1.03 million cars in 2020, thereof 300.000 new cars less than in 2019. One reason for this is the uncertainty of the prospective buyers and the concurrent reluctance to buy. This uncertainty is caused by driving bans, diesel scandal, legal regulations, ideologically driven discussion about cars with combustion drives, risk about e-mobility and missing infrastructure of charging stations.

Another suitable indicator is the duration of use, which is shown in figure 6. Here the average age of cars for the years 1960, 1980, 1990 and 2000 – 2021 in Germany is depicted, as of January 1st of each year (Kords 2021b). From figure 6 can be derived that the age on average was steadily increasing in the German market. This means that the market for new cars in total is shrinking. From the companies' perspective this implies that a battle for customers will arise in the shape of a price war and along with it, the bargaining power of customers is put into effect. In consequence this means lower prices for customers and correspondingly lower revenues for the companies, but higher spendings for advertising activities to attract customers. Thus, bargaining power gives buyers the ability to squeeze industry margins.

Figure 6: Average age of cars in Germany



Source: Kords 2021b, own graph

Summing up, a shrinking market due to buying reluctance and no need to buy due to longer period of usage combined with price wars and higher efforts for marketing and sales means at the end lower margins and less profitability in this industry.

4.3 Alignment and new structure of supply chains

The performance of suppliers defines the market of inputs and the performance of the end products. High performing suppliers delivering materials, parts, components, modules, labor, services and know-how are of strategic importance and represent competitive advantages to the company. Value driven processes all over the value chain provide market power to eco systems within the network of suppliers and OEM (Original Equipment Manufacturer) (Hofbauer & Sangl 2019b).

In the course of time during the last decades a multiplicity of finely adjusted relations with interconnected value and supply chains has been established. That system has worked, because the bargaining power within the BES was balanced between the sourcing partners. Effective tier structures have been installed and the division of labor worked efficiently (Hofbauer, Mashhour & Fischer 2016). The tier structures transfer responsibility, value creation and also risk to different supplier levels and the labor and processes are executed at that level where it can be executed in the best way.

Problems will arise as soon as radical and structural breaks appear. With upcoming new technologies in digitalization and electrification the existing tier structures will be obsolete and

useless. New supplier relationships have to be established, coordinated and supervised. This process is time consuming and cost intensive (Hofbauer, Mashhour & Fischer 2016). The bargaining power of suppliers will increase and in consequence, prices for input factors will go up and the overall cost position of the company will worsen. At the end, this means lower margins and less profitability in this industry, too.

4.4 Competition and replacement through substitutes

A substitute, or substitute good, in consumer theory and in economics, refers to a good, which is seen essentially the same or similar-enough to another good to fulfil the same purpose. A substitute is a product that can be used in place of another. In the course of this, the substitute may use the same technology or a different technology to serve the same need.

In the case of automobiles a substitute for mobility could be a taxi, car sharing or ride sharing using the same technology, namely cars. In the end it makes no difference for the user, who just needs mobility. But for the car manufacturing industry it matters in terms of production volume. There are also different modes of public transport, which is becoming more and more competitive with individual car traffic. Driving bans, restricted areas, restrictive traffic management and high toll and parking fees raise the attractiveness of public transport additionally (BMVI 2021).

The switching costs of the customer are an important determinant for the use of substitutes. It is a matter of fact that switching costs in general are a reason for rejection. The best example in the mobility industry is Uber, because it is very easy for customers to switch from regular taxi to Uber. No switching costs and in addition more comfortable, the entire process digitized, which is very user friendly, and even cheaper than a normal taxi ride.

Another important requirement for the use of substitutes is that enough equivalent offers of substitutes are available in the market. The availability of close substitutes and the ease of substitution relieve and accelerate the utilization. The relative price difference of a substitute makes it acceptable. Whereas the perceived level of product differentiation is decisive, either it is at the lowest price or there is a tailored differentiation, which allows to take a price premium for this mode (Hofbauer & Sangl 2018). Such a price premium could be easily accepted for a transfer by drones, because a ride by drone is more individual, fast and exclusive.

All these reasons from high availability, ease of use as well as cost efficiency of the substitutes in the mobility market generate a highly competitive and easily exchangeable environment for the status of having an own car. This upcoming situation of free choice in abundance is good for the customers, but very disadvantageous for the car manufacturing industry and threatening for related business eco systems.

4.5 Competition and displacement through new entrants

In order to protect the own business and the corresponding business eco system, it is important to keep barriers to entry high for competitors. The strategic reasoning is to protect survival and profitability. If the barriers are high, the threat of new entrants is low. If the barriers are low, the risk of new competitors venturing into a profitable market or business eco system is high. Barriers to entry are competitive advantages that established companies have and should protect.

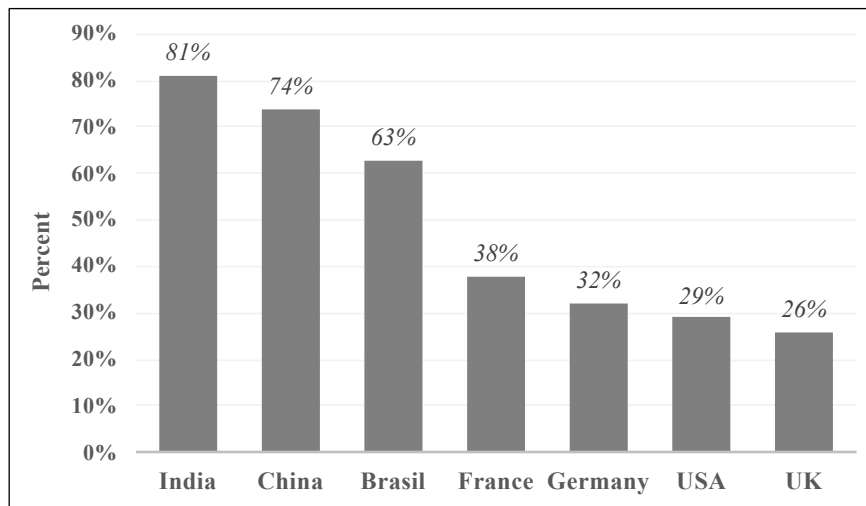
In the case of structural and technological disruptions strategic windows will be opened, because current competitive advantages are wiped away and new competitive advantages will be decisive. In the car manufacturing industry, the advantages around combustion engines will be pushed back and new barriers around electric drives will be established. In such a change, new entrants put pressure on existing business eco systems and organizations within a running industry. Game changers strive to kick out established players and to gain market share as well as to participate in profitable markets. In consequence the new entrants put pressure on prices, costs and investment rates needed to sustain established business within the industry. The threat of new entrants is extremely intense if they diversify from another profitable market as they can leverage existing know-how, budgets and brand identity.

Customers and capital are the two crucial issues to be mentioned in the context of entering the German car manufacturing eco system. Customers can decide between traditional products like cars, substitutes like public transport or sharing models. In the near future they can also decide about the offers of new entrants, because switching costs will be close to zero. As customers transfer perception and brand identity (Hofbauer & Hofbauer 2020) a remarkable share of potential customers is willing to buy an i-car from Apple. This new offer is made possible, because companies like Apple, Google and Amazon have earned a lot of money in completely different businesses. Now they are looking for diversification possibilities. The strategic window to enter the car and mobility market is opened due to the upcoming digital and electrical revolution. These entrants have large amounts of capital at their disposal to enter and develop new markets like the mobility market, where high growth rates and high profitability are expected.

Figure 7 shows the percentage of customers indicating the willingness to buy a car from Apple. This survey was executed in seven countries with n=7.553 people interviewed in total. A high share of 65 percent among the group of 18-34 years old people answered positively (Capgemini 2015).

The results are astonishing, because nobody has seen or even driven a car from Apple so far. Nevertheless, in India 81 percent expressed their willingness, in Germany this study indicates 32 percent after all.

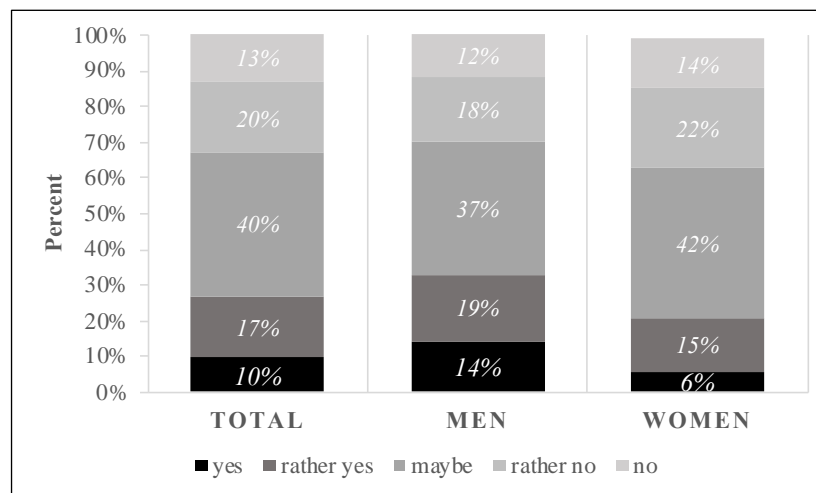
Figure 7: International comparison of willingness to buy a car from Apple



Source: Capgemini 2015, own graph.

Figure 8 provides a closer view on the German auto market (Autoscout24 2021). In this study n=1000 respondents were asked about their intention to buy a car from Apple. The answers were divided into five categories: yes, rather yes, maybe, rather no and no.

Figure 8: Intention to buy a car from Apple in Germany



Source: Autoscout24 2021, own graph.

Women answered with 6 percent yes and 15 percent rather yes, this makes 21 percent in total. Men answered with 14 percent yes and 19 percent rather yes, which makes 33 percent in total. The weighted average for both groups totals 27 percent. These are very positive results, especially when considering that about 40 percent do not particularly exclude this option answering with maybe.

From the strategic point of view, the most attractive market for established BES is one in which entry barriers are high and exit barriers are low. The entry barriers into the car manufacturing industry were kept very high, because of well working eco systems so far mainly based in particular on know-how of combustion drives and dominance in the market. Due to digitalization and electrification of the car manufacturing industry the entry barriers shrunk to an acceptable level for new entrants. These entrants have huge budgets on hold, which they earned in other industries.

It is quite remarkable that customers indicate a high willingness to buy from new entrants in advance. It is a pre-indication, because this car does not even exist. The purchase intention is purely based on brand awareness and positive attitude. In this case it is a disadvantage when exit barriers for current players are high.

5. Conclusion and Recommendations

To sum up, the underlying working hypothesis can be confirmed that the German car production industry is in severe trouble and correspondingly, the traditional business model and related business eco systems are endangered. The success and sustainability of this industry is in trouble, because pressure is on this system. The question of research ‘What are the impact factors causing the change and threats for the business model?’ can be answered accordingly: there are various, complex, and overlaying forces which have an impact on the current business model and corresponding business eco systems of the car manufacturing industry in Germany.

The competitive pressure in the auto industry in general is increasing, because of a shrinking market volume, increasing rivalry, continuing price wars, decreasing cash and cash equivalents and on the other side a necessity for high investment budgets to carry out and complete technological transformation for electrification and digitalization. In addition, there are no switching cost between the brands.

The customers’ behavior and reluctance to buy leads to a shrinking market, because customers refuse or postpone to buy a new car. There is an uncertainty to observe about the proper technology of drives. Some portions of customers do not need a private car due to the availability of substitutes. Others do not want or cannot afford. In total this means lower sales volume and less profit.

Substitutes in the mobility market are more and more closely available and easy to use. There are no switching costs to change the mode of transport. The usage fee is without fixed costs and customers have only to pay per use, they can share cars or rides.

New suppliers have to be aligned for the up-stream process. New technologies have to be built up and this means new cost structures and a new beginning on the experience curves. It is a matter of fact that about 80 percent total cost of a car have to be sourced and in the end this means that these 80 percent will become more expensive.

New entrants come from other industries or business systems, where they made a lot of money and they are seeking for new investment opportunities with higher returns in promising

markets as the mobility market seems to be. Their advantage is that they can get started with the new technology straight way and have no legacy with old technology.

All these forces together will lead to a shrinking market. This market is not only getting smaller, also the structure of the offers will be composed differently with regard to the change in demand. With a view to the new entrants the rivalry will increase leading to a cut-throat competition ending up with a market adjustment of the players and corresponding business eco systems. It is foreseeable that current car manufacturers will suffer market share losses. A consolidation process is approaching.

The forecasts for the financial side don't look promising. Less demand means less production output and this means less sales and in consequence there will be less turnover. Price erosions reduce cash flows additionally. Higher cost positions on the supply side worsen the margin on top of that. In total, this shows that the liquidity situation deteriorates and with it the market capitalization worsens.

With regard to the working hypothesis it can be stated that the German car production industry is in severe trouble and with it the traditional business model, too. As pointed out, there is no doubt that the car manufacturing industry has an outstanding importance for German economy. Therefore, it is urgently necessary to support this industry.

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