The Value of Intelligent Vehicles for Marketers and Consumers

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ABSTRACT

This research aims at reducing the discrepancy between average consumer and industry relating vehicle development. It identifies consumer and automotive manufacturer specifications for Intelligent Vehicles and combines them to desired vehicle attributes enabling value co-creation. Consumers profit from a simpler driving task and assistance, whereas manufacturers benefit from enriched marketing data and market intelligence. To collect information, qualitative interviews with experts from the industry and average consumers have been conducted. The obtained insights were used to apply and modify the 'Drivability model', which can contribute to product quality and satisfaction as static benchmark in a dynamic environment. The results point out, that manufacturers need to increase customer trust in Artificial Intelligence and must be transparent in their operations. Managers can combine web-visitor data and Intelligent Vehicle data towards valuable targeting information, which is likely to increase sales and profit. Automotive value chain actors should prepare to invest in augmented analytics, because otherwise human resources needed for repetitive analysis might jeopardize the benefits gained by big data. Automotive marketers need to think about proper value communication strategies for intelligent vehicles, if consumers should be convinced that their product is useful and easy to use. The dynamic automotive environment will enable innovative business models and pricing strategies to attract new customer groups and thus, fuel for market share expansion. Consumers actively appreciate connected vehicles with a trustworthy AI as assistant and streaming-based entertainment opportunities. Passively they desire maximized drivability and a technology that is easy to use and easy to learn. They are concerned about whether the cars decisions are ethical and whether their data is secure and confidentially handled.

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Keywords

Artificial Intelligence, Automotive, Mobility, Data-driven Marketing, Intelligent Vehicles, Smart Vehicles.

12th IBA Bachelor Thesis Conference, July 9th, 2019, Enschede, The Netherlands

1. INTRODUCTION

New technologies are continuously changing and disrupting not only industries, but also our daily lives.
Currently emerging technology trends are artificial intelligence (AI), autonomous things, augmented
analytics and even AI-driven development (Panetta, 2019).
All these technologies have the potential to change daily tasks significantly: Artificial Intelligence can be employed to relieve humans from repetitive work, to do things faster or more reliable. It can even reach an intelligence level that it is able to teach itself, with the ultimate aim to be as efficient as possible. Autonomous things will be able to execute tasks without human involvement. Augmented Analytics can be used if data, especially big amounts of data need to be processed independently.

These four technologies are also likely to change human mobility. Vehicles, especially road cars, but also commercial used trucks or publicly used buses and trains do follow the four technology trends. These new technologies elevate conventional cars to so called 'Intelligent Vehicles' (IV).

1.1 Research Questions

Regarding those new technologies and intelligent vehicles, this research tries to answer the following research questions:

RQ1. How can AI be used in intelligent vehicles (passenger cars and trucks) to increase perceived customer value?

RQ2. How can AI be used in intelligent vehicles (passenger cars and trucks) to enrich available marketing information for targeting, market analysis and customer behaviour?

RQ3. How is an intelligent vehicle designed, that supports ethical value co-creation of consumer and manufacturer?

1.2 Research Aim

Intelligent Vehicles will majorly disrupt mobility and the automotive industry (Valerio, 2018). Disruptive innovations are always guarded by uncertainties as side effects. Automotive consumers must fear, that the design of new automotive products does not satisfy their needs and specifications for mobility. However, it is not the consumers that are facing the greatest uncertainties, since they are not forced to change their car immediately. It is the industry that must cope with side effects of new technologies invading our vehicles.

Manufacturers seem to push increasingly more new technology into the market, while the consumer reaction is still unclear. New assistants and a digitalized cockpit are beginning to get diffused, but have not reached the average customer yet, as will be explained below in section 1.3.

On the other hand, consumers are the greatest beneficiaries from the recent development. They will potentially experience a more secure, relaxing and maybe even entertaining driving process than ever before.

However, there is a clear gap in the 'race towards future' (Figure 1). The red car shows the industry, which is leading the race and has already researched, introduced and even partly implemented such technologies. The average consumer is in the white car on the second place. He cannot buy new cars as fast as new technologies are implemented and has no chance to keep up with recent developments. For consumers that are open to new technologies, no problems would occur, but the majority of users might reject intelligent vehicles for various reasons, e.g. missing trust, missing technology education or they perceive it difficult to use (Manning, Bearden and Madden, 1995).

This research aims to overcome the gap in Figure 1 by bringing industry and consumer closer together. It reduces uncertainty for the industry and helps consumers to have their demands regarded. By interviewing marketers and managers for the industry side, and consumers as representatives of the market, both sides reveal implications for potential intelligent vehicle designs. Those inputs will be analysed and combined.

The result of this research will be managerial implications for the automotive industry, containing design solutions and valuable guidelines for intelligent vehicles. It will contribute to a successful design of automotive vehicles.

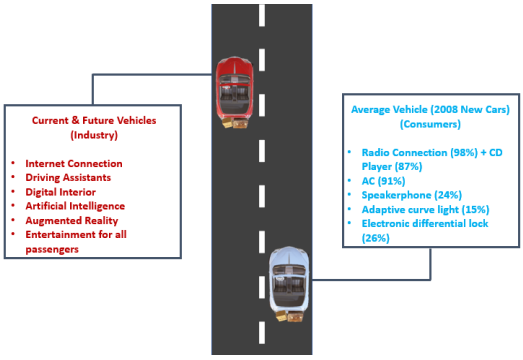

Figure 1. Race towards future
(„Deutsche Automobil Treuhand", 2008)

1.3 Research Relevance

The previously highlighted benefits for consumers and marketers seem to be easy to obtain. Technically, it is already practice and possible to integrate voice assistants in vehicles. It is also technically possible to connect vehicles constantly to the internet. New cars nowadays already possess interfaces to insert a mobile SIM-card. If the user decides to book internet from a mobile provider and integrates it into that interface, vehicles are able to be connected.

However, these benefits appear too profitable to be easy to obtain. Indeed, some issues and constraints must be faced when designing intelligent vehicles.

Currently, automotive manufacturers do have many opportunities to involve new technical features. In fact, many of these new features are already available, such as braking assists, lane departure assistants, cruise control, distance radar etc. The industry is increasingly pushing technology in the market. In the meanwhile, the consumer seems to not yet have processed all the new things. That appears to be supported by the fact that the average (passenger) driver's car in Europe is 11 years old ("Average Vehicle Age | ACEA - European Automobile Manufacturers' Association", 2019), in the USA even 11.6 years old ("Average Age of Automobiles and Trucks in Operation in the United States | Bureau of Transportation Statistics", 2019) . It takes some time, until new technologies diffuse to the average consumer.

Implied by those issues comes the fact, that most of the drivers cannot get comfortable with new technologies as fast as the industry does. Vehicles have always been developing, but never majorly changed from their initial handling. With the new technologies emerging, vehicle development gets accelerated towards rapid innovation, bringing changes in the handling as well.

The average consumer cannot keep up with the rapid development. He does not buy a car as frequently as staying

updated would require. The average US-American citizen keeps a brand-new car for around six years, with increasing tendency (Gardner, 2019).

This development leads to a gap between current technology and its adaption by the average driver, that can be dangerous. Manufacturers must fear consumers could decline new technology, if it does not appear easy to use.

To react upon this development, this research is attempting to find attributes of automotive design, which satisfy the use of progressive technology and satisfy the consumer needs in the very same product/service-mix.

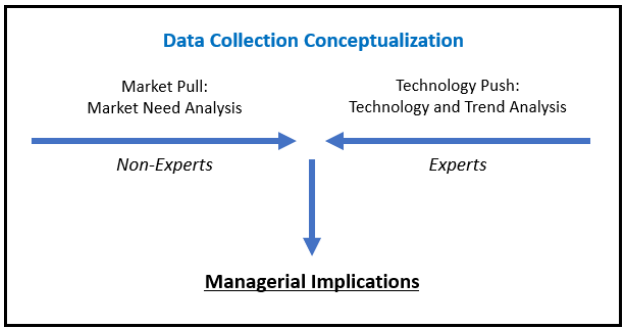

Figure 2. Technology Push and Market Pull

As visible in Figure 2, the point where requirements
from the industry and from consumers meet must be identified in order to retrieve usable information about intelligent vehicle design. If both parties are satisfied, there is potential for a profitable value co-creation.

2. LITERATURE REVIEW

2.1 Intelligent Vehicles: Value for Consumers

Intelligent vehicles will employ artificial intelligence as assistant to the driver. Like the already known and well-diffused AI-powered home voice assistants, AI in the intelligent vehicle will be able to process spoken word by the driver and other passengers. There is already early progress today, as voice assistants can be used to set a route in the navigation system or call somebody with the onboard telephone. In the US, According to Voicebot's Voice Assistant Consumer Adoption Report, 61% of smartphone users employ the (phone) voice assistant at least once a month, while 68% use it in the car (Sarnoff, 2018). The statistic shows that many people use voice assistants in cars, but these early stages of AI-employment still have their problems: They need certain wording and sentence structures to recognize speech, are not supporting many languages and have limited abilities, restricting the quality and reliability of task execution. Additionally, and most significant, is that population today is missing trust in AI (Liao, Vitak, Kumar, Zimmer & Kritikos, 2018 ; Armstrong, 2018).

Voice-assistants in the future will be more enhanced. They will have no problem to identify and process the drivers spoken words, even if it is natural wording and thus, will be able to work more reliably and with higher quality than early technology we already know today (Ellis, 2019). Hence, future AI-powered voice-assistants will develop more customer trust, making them also suitable for the use in crucial situations which require trust, such as driving a car does. (Abraham, Lee, Brady & Fitzgerald, 2017)

The big advantages drivers and passengers are experiencing from enhanced voice assistants are two-edged: On the one hand, the driving task will be less exhausting and more comfortable. On the other hand, the use of enter- and infotainment will be easier and more convenient, not mentioning that there will be more applications, more inter-device cooperation and continuous internet connection.

Especially today, where functions and abilities in the car are rising, the majority of participants in public traffic are threatened by unfocused and distracted drivers (Strayer and Drews, 2007). External devices brought into the car, such as phones and smart watches do distract the driver up to a dangerous level as well. ("Mobile phone use: A growing problem of driver distraction", 2011)
AI in the intelligent vehicle enables the driver to have a more comfortable and focused drive. Except of searching for a certain feature or function in the 'In-car entertainment' (ICE) or 'in-vehicle infotainment' (IVI), drivers can activate the voice assistant and ask for the specific function. An example can be searching for a radio channel: Instead of searching actively for the right frequency, which is majorly distracting the driver, he can just activate the voice assistant and ask it to set the right frequency.

The benefits for the driver can be understood in several dimensions: Firstly, the driver himself does not have the stress to find the desired function in a menu. As stress worsens the mental status of the driver (Summala, 2007), convenience and comfort while using the car's new functions and applications is improved. Secondly, the driver can execute the desired task faster and with less focus invested, meaning more efficient. This is very likely to increase the Perceived ease of use and perceived usefulness (Davis, 1989). Thirdly, having less driver focus invested in the task automatically leads to more safety, whether it is for the driver, passengers or other participants in traffic.

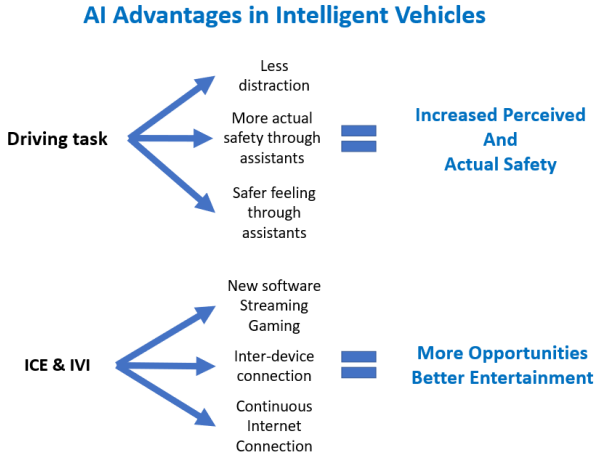

Figure 6. Advantages from In-Vehicle Voice Assistants

For passengers, the use of ICE and IVI will be easier and more convenient as well: They can use the voice assistant to steer entertaining functions, for example music. These entertaining functions themselves will be connected by their appearance in intelligent vehicles: Internet connection allows music and videos to be streamed and even gaming inside vehicles. Overall, the number of applications available for ICE and IVI will rise as soon as intelligent vehicles are getting diffused. This development can be found in the amount of skills available for 'Amazon Alexa' which has more than doubled in 2018 (Perez, 2019). The rising number of extension software available is a clear benefit for the consumer.

But there is not only gaming for passengers: Because of the rising number of assistants in the car and 'autonomous things' as future trends, the driving task itself gets increasingly automated. This might be perceived as a dangerous development due to the fact that the missing involvement and arousal might result in a lack of focus by the drivers (Meixner and Müller, 2016). 'Gamified' applications for the driver are considered to switch their focus back to driving. Meixner and Müller (2016) have recently developed a game for drivers, that is evaluating how smooth they brake towards a traffic light. Two curves are displayed for the driver: His brake performance curve and an optimal curve. The driver can collect points or other means of rewards the closer their own performance is to optimal performance.

Vehicle insurances have shown interest in employing such games to actively increase focus and security in vehicles. 'Games', that are increasing security and safety might be rewarded with less insurance costs or other benefits.

2.1.1 The DRIVABILITY Model

Figure 7 shows the DRIVABILITY model. It was developed by Bekiaris, Amditis and Panou in 2003 and aims to identify factors influencing the drivability of a vehicle.

The Authors define Drivability as "[…] a combination of permanent and temporary factors, that affect a driver's performance" (Bekiaris, Amditis & Panou, 2003). Factors which influence the drivability are summarized by the five domains of (I.) Individual Resources, (II.) Knowledge Skills, (III.) Environmental Factors, (IV.) Risk Awareness and (V.) Workload.

All of these factors are relevant to identify the drivability of a vehicle. However, when analysing the change from conventional to intelligent vehicles, not all factors are of importance. Later in this research, the model will be applied to the topic, representing a more precise version of it.

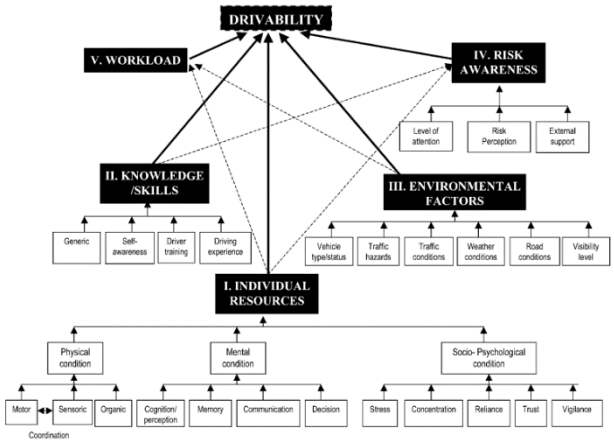

Figure 7. DRIVABILITY Model

(Bekiaris, Amditis & Panou, 2003)

The Technology Acceptance Model (TAM; Figure 8) was developed by Fred. D. Davis in 1985 with the aim to understand which certain factors influence the adoption and use of new technologies by consumers. Results were, that the perceived ease of use and the perceived usefulness of a technology decide which attitude consumers have towards using it.

Even though the TAM-Model is from 1985, it got continuously improved, elaborated and applied since then. Because it is very basic, it did not lose validity and was found to be applicable to a variety of areas.

One of these areas is the automotive industry. As previously mentioned, in the past cars have never majorly changed the way they worked e.g. pedals and steering wheel, clutch and transmission. Only very few cars have ever tried other approaches to steer a vehicle. With Intelligent Vehicles, those changes are close and more probable than they have been before. Gearboxes might be controlled by voice, to change transmission direction or setup. Already today, active steering assistants and cruise controls can take over control about steering and pedals. Those differences in automotive products are changing the way they could be used.

Since a car's function never changed, people learn how to drive a car once and are theoretically able to handle most other cars as well. Confronting those people with something new might change the perceived ease of use. It can be assumed, that the perceived ease of use of a normal medium sized passenger car is relatively high and thus, something new might appear harder, even if it is easier to use in reality.

As the perceived usefulness is likely to change as well, every actor in the Intelligent Vehicle value chain needs to be ambitious in analysing and predicting the direction of change, if they want to cope with it successfully.

Moreover, strategies to communicate perceived ease of use and perceived usefulness need to be developed by marketing managers and salespersons, if customers should understand both factors and should be influenced in their purchase decision.

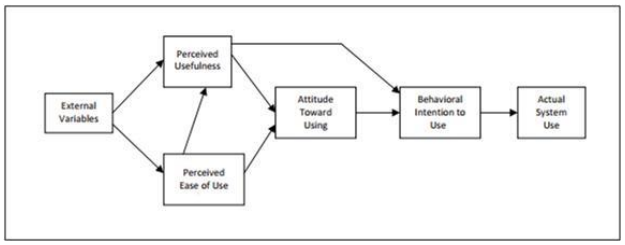

Figure 8. Technology Acceptance Model

("Technology Acceptance Model (TAM) Definition | IT & Systems Dictionary | MBA Skool-Study.Learn.Share.", n.d.; Davis, 1985)

2.2 Intelligent Vehicles: Value for Manufacturers and Marketers

Because Intelligent Vehicles are constantly connected ("Bosch Mobility Solutions - Connected car 2025", 2019) to the internet, automotive manufacturers soon will have similar opportunities than manufacturers of smart devices have. Companies such as Google, Apple and Samsung are established in the smartphone industry and do have capability to collect different kinds of data from their consumers.

It will be the same for intelligent vehicles: Marketers will be able to collect data from the driver and other passengers. There are two kinds of data that are likely to be collected and processed by manufacturers:

Firstly, mechanical and technical data can be obtained from several electronic control units (ECU's) in the car. This mechanical data includes simple information, such as maintenance intervals. It can also collect more sophisticated data from drivers, for example usage patterns of assistant systems or certain driving behaviour.

Secondly, usage and performance data can be obtained from AI-powered voice assistants inside the car. Here again usage patterns, usage frequencies and command types can be analysed. Furthermore, marketers have the exclusive option to combine big

data from several cars towards realistic consumer and market implications. This newly acquired knowledge gives potential for product improvement based on consumer and customer needs.

Overall, technical and usage data can be applied to profile the user. Similar to current marketing activities in other branches, such as database, interaction and network marketing, automotive marketers get the chance to profile and target their consumers based on big databases. (Brodie, Coviello, Brookes & Little, 1997)

For marketers, manufacturers and the involved value chain (collaborating distributors, wholesalers, local dealers, garages) targeting options create new benefits. Those benefits can be seen as financial, but also as enrichment of business intelligence. Financial benefits can be obtained, because targeting and profiling is likely to increase sales performance and success and hence, more profit can be made (Brown, 2014). The big datasets about customers will provide ability for enhancement of business and market intelligence (Fan, Lau & Zhao, 2015).

Augmented Analytics is a novelty in data analytics disrupting the areas of marketing and business intelligence. It "uses machine learning and natural language processing to automate data analysis and the presentation of insights" (Reilly, 2018). With Augmented Analytics, data collected can be analysed and evaluated digitally with the aim to create profiles and targeting information. It hides potential for automotive manufacturers as well. The process of evaluating big data gathered from intelligent vehicles contains very repetitive and partly simple activities for marketers. Marketing human resources and talent would be wasted on such tasks, not mentioning the increased costs to employ more marketers.
Without augmented analytics, benefits from big data collection would be jeopardized ("The Benefits of Augmented Analytics", 2016). Profit made by increased sales could be lost due to increased marketing overhead costs resulting from higher personnel investment.
Thus, augmented analytics are a major and crucial AI benefit which automotive manufacturers should prepare to invest in.

2.2.1 Marketing Mix

The Marketing Mix (Figure 9) is a set of actions, that companies use to promote and sell products. It consists of Product, Place, Price and Promotion. These 4P's need to be thought through and properly prepared, to design an offer that is attractive and reachable for potential consumers.

Automotive managers have optimized the marketing mix of their products over years. That was possible, because sales channels and promotions have been stable until the 'Digital Revolution' after 2010. The product and price did not change to a significant extent (Tudose, 2017) and thus, changes that come with intelligent vehicles together with other disruptive innovations will have high impact on the marketing mix.

Figure 9. 4P Marketing Mix

2.2.2 Targeting

Marketers and researchers currently divide different types of targeting: Behavioural Targeting, Contextual (Semantic) Targeting and Predictive Targeting.

Behavioural targeting means to target customers by evaluating their behaviour. An example is cookie collection in internet browsers. In vehicles, a behavioural Targeting activity would be to evaluate the most important places of a driver by evaluating his navigation history. Marketers here have the chance to learn more about behavioural patterns of their consumer. There is value to obtain: If for instance many drivers of a certain brand like to visit a certain restaurant, then there is potential for collaboration with that restaurant etc.

Contextual targeting means to target advertisements regarding the context of the consumer. In intelligent vehicles, one of the most interesting chances for contextual targeting is knowing the vehicles location. If a manufacturer knows the routes and regions the customer is driving, marketers can use this intelligence to offer the right vehicle for these routes. The manufacturer website might be able to identify the visitor's location from his IP address, but does not know where that visitor went with his car.
If the web page knows a visitor is from Vienna, it might advertise a model with benefits in urban areas. With cross-platform contextual targeting, the car could provide data showing that this driver often needs to drive in the Alps. With this information the advertisement can be adjusted towards a stronger vehicle which can cope with steep climbs.

Predictive targeting uses beforementioned targeting information to forecast a consumer's demand.
Artificial Intelligence evaluates the data and processes it towards a demand prediction. This targeting technique is especially efficient in combination with Augmented Analytics. If intelligent vehicles collect, at least enrich marketing data and artificial intelligence processes it automatically with useful results, no human is involved.

3. DATA COLLECTION

To understand the desired state of the industry and the specifications of consumers, qualitative interviews were conducted. The purpose of the interviews is to obtain information explaining which features and AI applications customers value, and which trends and expectations marketers have towards AI in Intelligent Vehicles.

To collect such ambivalent information, two interview groups were established: The first group contains of experts in the automotive industry. Not solely marketers are involved here, but

other automotive experts as well, which are interested in new business models that have potential to benefit manufacturers and enrich marketing data.
The second group consists of various average consumers, who will be asked for applications they wish and concerns they still have. Identifying concerns and interests of consumers is valuable to clarify the market demand for manufacturers and thus, gain more insight about desired intelligent vehicle designs.

The interviews conducted are different for both groups. Non-experts participate in semi-structured interviews, even though they are all asked the same structured questions. The semi-structured method is used because it allows follow-up questions if clarification is needed and loose questions if interviewees show potential for more useful information.
Expert interviews are more open in their course, due to the information to obtain from relevant knowledge in their field. Structured questions here would lead to a better comparability, but hinder information and knowledge flow during the interviews. The aim was to let experts disclose as much of their knowledge as possible, instead of tunneling their answers. Approximately 66% of the questions were designed upfront, regarding the field of expertise of the researcher. The other third of the questions were follow-up questions, for example from 'Grand Tour questions'. (Lindlof & Taylor, 2002)
Based on Literature, the interview setting was designed towards a referential purpose. It is a mixture of informant and respondent interviews. While setting up the situation, a consensual frame was established, in order to make the interviewee feel comfortable. To foster even more comfort, the interviews were planned to be held in 'protective circumstances', meaning that outside pressures and distractions on the participant were low (Lindlof & Taylor, 2002). Interviews were opened with agreeing about consent, confidentiality and freedom of participation. Afterwards the researcher tries to establish rapport through stating clarity and transparency of research on the one hand, and self-disclosure on the other hand. (Lindlof & Taylor, 2002)

3.1 Experts

Five experts with different knowledge have been interviewed. They were asked to describe the experience they have made with the recent vehicle development. Additionally, every expert has some unique knowledge, either about how to enrich marketing data, or how to approach and understand potential consumers. All of them were able to identify critical viewpoints and beneficial developments.

Expert number one has been approached, because she is currently researching on customer trust on AI applications and thus, provides very recent data. She shared her results and could disclose insights about how people perceive AI, what makes people use it (or not) and what people fear and like. Her knowledge is relevant, since social factors and the perceived ease of use of a technology are majorly influencing its adoption. (Davis, 1985)

Expert number two is an automotive manager. He has more than 30 years of experience in sales and marketing for leading automobile manufacturers. Since 20 years he has been leading teams and does not only speak for him, but for a whole team of marketers and as ambassador of a very affected brand. Hence, he provides an inside point of view and is working with concrete ideas mostly, as his context does not accept lots of speculation. In the interview, his answers were precise and clear, explaining the potential marketers expect from intelligent vehicles. Expert 2's ideas and statements are due to his position and experience especially useful to identify what marketers value in intelligent vehicles.

Expert 3 is a master mechanic, leading a liberal local garage. He has profound mechanical skills on various automotive brands and products and is very strongly interested in vehicle innovation and how those innovations affect the value chain. His value for this research is twofold: on the one hand, he is businessman, explaining how parts of the value chain, especially service-related ones which are close to the customer, such as garages and dealers will change. On the other hand, he is interacting with approximately 30 customers per day. His proximity and frequent dealings with consumers are giving Expert 3 a holistic picture of consumer acceptance and desire for specific vehicle innovations.

Expert 4 is an insurance branch leader who is involved in designing, implementing and executing innovative business models. He is expert in innovative value creation and insurance sales optimization, thus interested in value co-creation in intelligent vehicles. In the interview, he transferred knowledge about consumer concerns and acceptance, as well as about how intelligent vehicles affect the overall insurance industry and hence, safety in public traffic and on public roads. Furthermore, he has shown interest in a business model that can benefit manufacturers, consumers and insurances at the very same time: Active reward systems for safe driving, such as the 'brake game' developed by Meixner and Müller (2016). Drivers, whose performance is close to an ideal performance, set by the insurance industry, get rewards for safe driving. Such business models and their benefits obviously trigger beneficiaries, attracting high interest through potential.

The last expert (#5) rounds up the group. He has latest knowledge about ethical issues regarding AI, because he is currently elaborating a research project on that topic. Together with other experts and literature, he identifies up-to-date ethical issues marketers must cope with. The aim is, to develop guidelines for marketers, which ensure ethical behaviour. His knowledge is especially needed to answer RQ3 and to ensure that implications from this research are ethical to a contemporary extent.

Expert #	Description
1	Researching on Customer Trust in AI, provides recent data
2	Automotive Marketing Manager, 30+ Years experience for leading manufacturers
3	Master Mechanic leading a garage, has contact with 30 customers per day
4	Insurance branch leader, develops innovative business models and sales optimization, interested in value co-creation
5	Ethics expert for AI issues, develops guidelines for marketers

Figure 3. Expert Introduction

3.2 Non-Experts

To represent the market specifications on intelligent vehicle designs, four non-experts were interviewed. Non-experts are average consumers and have experience in driving a car, thus can give an insight about what consumers desire in intelligent vehicles. In semi-structured interviews, their overall impression of intelligent vehicles and their attitude was analysed first. Neutral worded, but relatively closed questions were used to initiate an opinion and provoke further thinking as explained later. "Do you think the driving experience will get easier or harder with intelligent vehicles?" is an example of such a question. Some of the interviewees already had an opinion and started to talk freely, not only answering the questions, but giving explanations for their thoughts. Other interviewees needed some short time to think to find a position. As soon as they developed one, they were asked to elaborate 'Why?' they decided for a position (or not).

In Figure 4, those questions are displayed that were asked to every interviewee.

Interview Questions Non-Experts
What do you think about Intelligent Vehicles?
Do you think the driving experience will get easier or harder with Intelligent Vehicles?
Do you prefer haptic or voice steering? (Cruise Control, Navigation, Ventilation + AC)
Do you think public traffic will get safer or less safer with Intelligent Vehicles?
Would you trust the AI? (data security; hazardous situation)
What do you think about new apps and features? Which are you interested in?
Would you like all your devices to be connected with the Intelligent Vehicle?

Figure 4. Structured Questions for Non-Experts

Towards the end of the interview, the interviewer has grasped some particular ideas, concerns and impressions the participant has. Based on these, unique questions were asked as well, mostly with the aim to gain specific design ideas and desires for automotive manufacturers. Such a question could be: "You mentioned concern X. What should/could an automotive manufacturer do to take that sorrow from you?".

Interviewees one and two are both pensioners in the age group of 60-90. They only differ in their gender, as one is male and one is female. They can be classified as open to new technologies, but do not use and understand those as much as younger participants do. Still, they are roughly informed and interested in upcoming innovations. Both do regularly drive with passengers, also with children, but only the male is driving long distances and different vehicles frequently.

Interviewees 3 and 4 are both male students. They are both driving a car less frequently but have clearer expectations according digital interior and intelligent vehicle designs.

Interviewee 3 is very interested in cars, motorsports and the latest automotive products. He has informed himself about intelligent vehicles, especially autonomous mobility before and has some ideas for smart, digital and connected vehicle design. He also knows some problems the industry is already coping with, for example the ethical question. Thus, he has the basic knowledge to develop more fastidious concerns and specifications. While driving, because of prior experience he is rather a safe driver. Still, he is searching for personal automotive fulfilment and has a strong affinity towards a sensing driving experience, including full car control.

Interviewee 4 is less interested in cars and is often comparing the current situation to his desired situation. He has less pre-knowledge and is hence thinking less 'out of the box'. Usually, he is a driver following the rules, but due to distraction e.g. from music he admits that he has been driving too fast in the past often. The information given by him is useful to analyse distraction patterns, which will increase with driving task automation. Furthermore, he is sceptical towards security of voice steering, especially if passengers have chance to command it.

Interviewee #	Description
1	Female pensioner, 60-90, often with family passengers
2	Male pensioner, 60-90, experienced driver, open to new technology
3	Male student, 17-30, Interested and Up-to-date, has fastidious concerns
4	Male student, 17-30, less interested in cars, often distracted while driving

Figure 5. Interviewee Introduction

4. FINDINGS AND DISCUSSION

4.1 Expert Interview Results

The following section analyses the table displayed in Appendix 1. Transcripts of the formerly introduced interviews were classified and summarized towards certain desires experts have for Intelligent Vehicles.

In the interviews, it got apparent that the average consumer is not educated and informed enough about Artificial Intelligence and its potential application in Intelligent Vehicles. A major desire by experts is to educate potential users about AI in general and IV's and thus, diffuse AI innovation. Expert 1 and 2 share the opinion, that AI applications currently face low adaptation. Expert 5 suggests, that the diffusion could be accelerated by using monetary incentives for early adopters. Legislative and even manufacturers have shown positive attitude to this approach for spreading innovations, when they established bonuses and rewards for drivers who trade-in their Diesel car in exchange of a 'greener' or even electric vehicle.

Because the trust in AI is in rather low (Liao, Vitak, Kumar, Zimmer & Kritikos, 2018) and many people are concerned about their data security, *transparency and brand reputation* are clarified to be crucial. Expert 1 identified, that transparency is the most important factor when it comes to trust in AI. Expert 5 strengthens that point several times, as transparency is important for ethical operations as well. Another important factor is brand management. Customers do and will trust brands more which they have already trusted in the past.

Regarding the Technology Acceptance Model, in order to support the diffusion and adoption of IV's, manufacturers should design vehicles, that appear useful and easy to learn (Expert 1). Expert 4 emphasizes, that especially older customer groups would appreciate a vehicle solution, that can be used like taxi's today.
One ultimate goal marketers should pursue in the future is collecting and enriching marketing data. Experts in the automotive industry aim to obtain data using their web page and IV's. Especially expert 2, an industry insider has fastidious opinions about data collection opportunities. Automotive manufacturers are already preparing for the digital age, through restructuring agencies and organizational structures. New agencies are chosen by their digital capabilities, to prearrange data powered processes.
Furthermore, marketers have found out that the conversion funnel begins with an orientation phase, that is primarily taking place online. Online orientation by potential consumers enables manufacturers to expand and optimize their web-appearance and data collection processes. Expert 2 is even confident, that predictive selling can be done, if all data is combined and market intelligence is maximized.

Currently, automotive manufacturers are not obtaining data from their cars. They are focusing on digital marketing but have not linked the data collection to cars yet. The industry seems to work on that issue because leading managers have understood the value to gain from a fleet. Expert 2 is sure that "there are lots of digital very capable people driving around in our products […]" and understands they should make use of them. He also knows, that connectivity is important for future vehicles.
Expert 3 has another claim for connectivity in IV's. He would like to expand the connectivity towards cross-connectivity between vehicles, instead of the multi-agent system that is

currently developed, even though manufacturers start to collaborate.

To survive, not only manufacturers, but the whole automotive value chain needs to adapt to the emerging trends. To do so, managers and executives need to pioneer and innovate business models. The biggest challenge seems to be for automotive dealers, as manager 2 discloses that direct selling will be an option, and the dealer margin and profit will suffer from that. Ideas for new business models are to equip every vehicle with the same functions and extras and sell them over time, or to develop financing options that include in-vehicle advertising for cheaper prices. Advertising might be interesting for commercial used vehicles, such as taxis and shared cars.

If actors in the value chain want to profit from the automotive industry getting disrupted, they need to be innovative themselves. A key factor might be *human resources*: While today the most experienced salespersons might the best, the game has changed. Millennials and digital natives bring years of digital experience before they even start their first job. With their positive attitude and digital mindset, they might be more suitable to communicate the value of new technologies.

The experts identify many crucial factors for intelligent vehicle design. Those factors are partly hard to integrate, and it takes huge investments (billions of €) spend into development, but there is a sense in doing that.
It is *profitability* that fuels the industry to tackle these issues. Expert 2 is decided, that the future will be more profitable and Expert 1 knows, that there is a high market share expected for 2020 for AI, and the automotive industry can get a big part from this cake, making investments worth.

4.2 Non-Expert Interview Results

Results from non-expert interviews have been analysed the same way as expert interviews and can be found in Appendix 2. Consumer desires are filtered, supported by direct quotations from the interviews.

Especially car enthusiasts like interviewee #3, fear that intelligent vehicles will take control from them. While they like being 'master' of vehicle, and love driving, the real problem seems to be uncertainty. Such car enthusiasts have never experienced intelligent vehicles in reality, but they love conventional cars and do not want the situation to be changed. In general, most of the users, even the experts interviewed would like to have option to steer the car completely as it is still done today. Other drivers like Interviewee #2 have understood the safety resulting from mandatory assistants and would even accept to give the car control completely to computers if necessary.

Indeed, safety seems to be most important to all interviewees. They do want to be safe and want to feel safe to have a comfortable driving experience. Interviewee 4 is decided, that he would feel safer in an IV. Others identify, that this might be the problem: Some might rely too much on technology, get distracted or their arousal level is low and loose ability to react if required. Others might just feel unsafe as soon as technology starts to steer the car, simply because they are not used to it. Consumers do also appreciate the actual safety on the road, brought by less distracted drivers and keeping speed limits. Interviewee 2, who is pensioner, acknowledges about the problems in his age group. He reports about very simple mistakes, this age group seems to be vulnerable for, for example estimating space around the car wrong, or being distracted by the car's functions, like the radio or navigation. He is convinced, that especially for elderly the accident risk shrinks, if IV's overtake tasks like parking or manoeuvring.

The voice-assistant itself can increase safety as well. Interviewee 4 discloses, that he is often very distracted while driving because he uses the radio, or his phone to search for a song. For him, a voice assistant would be of great value. Other interviewees appreciate voice steering and/or its functions as well.

A factor, that is already displayed by the technology acceptance model, but is also mentioned by interviewees, is that IV's need to be easy to use. During the interviews, every interviewee mentioned that older people, who have grown up without a computer, will have problems to use an IV, making an easy to learn and to use design also desired by consumers.

Especially Interviewee 2 and 3 were very sceptical when it comes to ethics of Intelligent Vehicles. They have heard, that research is struggling to find solutions for reaction patterns in dangerous situations. They fear, they might be unsatisfied with the car's decision in that moment and expect this issue to be solved, if they should be convinced.

AI Trust is also for consumers an important point. They are afraid the AI might not work properly or passes data on without consent. Interviewee 4 decides, that he would extensively inform himself before being interested in an IV regarding AI and driving assistant performance.

Furthermore, the interviewees set focus on their data security. While younger participants knew the meaning of the term, the older ones did not exactly. Still they had similar concerns but worded them less complex and sophisticated. Interviewee 3 decided to not trust manufacturers at all. He decided so, because he knows that automotive manufacturers underly regulations and obligations, and he trusts those instead. Interviewee 1 and 2 are more sceptical about disclosing data. Both are afraid, that their privacy might be invaded, either by marketers or by third parties, like hackers. Interviewee 2 moreover mentioned, that data thieves might manipulate the configuration of the IV up to a dangerous point.

According to entertainment and infotainment, as drivers the participants often appreciated music. Especially the younger interviewees are used to music streaming on several devices and would wish the same for Intelligent Vehicles. Other functions they wish are rather of practical nature, for example a memo/notebook for shopping lists or appointments. Additionally, they would like to receive e-mails in the car and see weather predictions.

For passengers, the older drivers appreciate entertainment systems a lot. They often carry relatives and children and value if they would be entertained, because the driver can drive more comfortable, less stressed and less distracted. Interviewee 3 is student and is already thinking about his future. He would like to have a computer integrated to work on projects and documents as passenger. He has the idea, that there could be a business interior option, which has a full workplace integrated on the passenger site. Also, business taxis might be equipped with such interior. For a long trip, participants would like to see movies, read books or even play computer games inside the car.

According to connectivity, participants would like to have devices communicating each other. Primarily, connection automation and its connection speed have been mentioned. Interviewee 1 does not like to have a connected environment. She is afraid that too many third parties might process sensible data from her devices.

4.3 Implications for Literature

4.3.1 Marketing Mix

Regarding the expert and non-expert interviews, the marketing mix changes substantially with Intelligent Vehicles. Of the 4P's involved in the marketing mix (Figure 9), three are affected: product, place and promotion.

Firstly, it is logical that the *product* changes as soon as conventional vehicles are elevated to intelligent vehicles. Important to see for managers is, that the product is not only changing, but adding new dimensions to itself. Voice assistants and a digital interior belong to those new dimensions, which require new thinking and new resources. Because of this product enrichment and enlargement, modern vehicles change from a traditional, market-known product towards a highly innovative digital product.

Secondly, the *places and channels* used to sell vehicles will reform as well. Experts have identified, that big datasets will drown unprepared dealerships in data. Only those of the dealerships, who develop proper strategies and invest in new structures, technologies and personnel can survive the shift. Automotive sales will split up in direct sales channels by manufacturers, like websites, and greater dealership centres, which have the means and resources to innovate.

Thirdly, *promotion* will be employer of newly gained data. Marketing options and marketing data will eventually enrich, if manufacturers start to obtain data from websites and AI in vehicles. Beginning with more precise targeting and personalization, conversion rates and sales can be improved. In the future, this progress might even continue with data-driven, smart marketing analysis in the direction of predictive marketing and sales.

The price of intelligent vehicles might be more expensive in the beginning but is not expected to change significantly. Instead, manufacturers and other involved parts of the value chain like insurances will develop innovative business models and dynamic pricing strategies to make Intelligent Vehicle offers more attractive.

4.3.2 Targeting

Targeting and personalization majorly develop success through preciseness. With a greater amount of data involved, there is potential to increase precision performance and ergo sales and profit.

Behavioural targeting in vehicles has never really been possible, because vehicles currently are not linked to organizational data collection. Furthermore, the customer contact by a manufacturer (garage) happens in a too low frequency to obtain valuable information. With connection in vehicles, the first time ever amounts of vehicles can be actively linked to databases in real-time.
Marketers will be able to use that information for precise and personalized behavioural targeting on the one hand, and for a holistic and structured portfolio of consumer behaviour patterns on the other.

Contextual targeting in the future might get more interesting on web pages and applications, than in intelligent vehicles themselves. As the orientation process of potential consumers starts online, web access data like cookies, IP Address and provided data can be set in the right context, to find the most valuable offer for potential consumers. Breaking it down to simple numbers, marketing activities will be more precise and have higher probability to convert an interested person into a lead.

Predictive targeting, which has not been precise enough for sophisticated products in the past, now has chance to be fed with enough data to get lucrative. Imprecise predictive targeting rather messes up planning than it is improving it. However, industries and technologies are getting closer to make predictive targeting work. Especially with vehicles, which are much affected by second-hand markets and get purchased in relatively low frequency, predictions can be useful for production scheduling and organizational planning.

4.3.3 Technology Acceptance Model

From the consumer site it is readable, that the two most important factors to make people accept and use a technology, namely perceived ease of use and perceived usefulness, are highly desired.

The interviewees are aware, that it will be hard to understand and use all the new functions in Intelligent Vehicles at first. However, this issue can be partly eliminated, by designing an IV as a product which is easy to learn and easy to use. Especially elderly people, who have not grown up with computers and are not experienced in using digital devices, should not be given the feeling that driving an IV will be complicated to do. On the contrary, because elderly gain lots of advantages and IV's and often have high purchase power, they need to be seen as one of the primary target groups.

In order to make Intelligent Vehicles perceived and actual easy to use, voice assistants can assist in the education process. In an optimal case, there is a highly personalized usage education based on digital knowledge and experience. A smart vehicle should be smart enough to find the right approach to its user. Users with low digital knowledge and experience might rather need slower and more comprehensive explanations than digital natives do. Even a 'simple mode' might be an option, if AI notices that the user is overwhelmed by its opportunities.

A positive side effect of educating users personalized is the rapport establishing between vehicle (AI) and consumer. In positive cases, it increases trust in the vehicle and builds a long-term relationship, which might be characterized and different from brand to brand.

4.3.4 DRIVABILITY Model for Mobility Transition to IV's

In order to analyse if customer value rises in Intelligent Vehicles, drivability changes in the switch from traditional vehicles will be displayed. Not all factors of the drivability model by Bekiaris, Amditis and Panou are needed to understand the transition, some factors do not change at all. Figure 10 shows a simpler and more relevant version of the drivability model, adjusted to the case of Intelligent Vehicles with the input from Interviews.

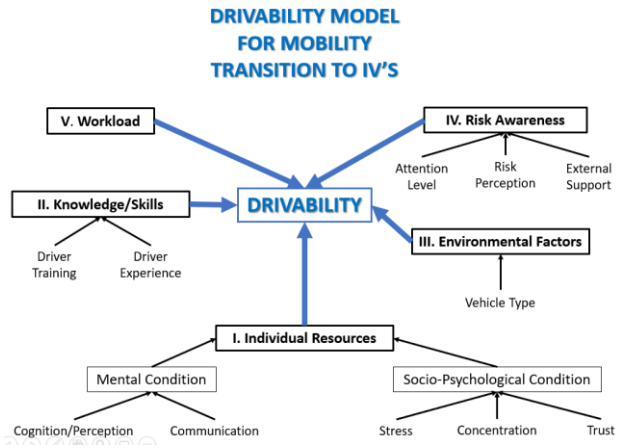

Figure 10. DRIVABILITY Model For Mobility Transition to IV's

Figure 11 displays the same model than Figure 10 but shows, whether certain factors will improve or worsen based on the interviews. Factors in green are changing with a positive impact on the group they represent, whereas red factors have bad impact on the drivability. Factors which have no colour (black) appear to be important in Intelligent Vehicles but are different with every driver and thus their contribution to drivability depends more on the situation. The boxes representing groups of factors follow a similar scheme: Green boxes have positive impact, yellow boxes rather neutral impact which is strongly depending on the user. Red boxes have not been found.

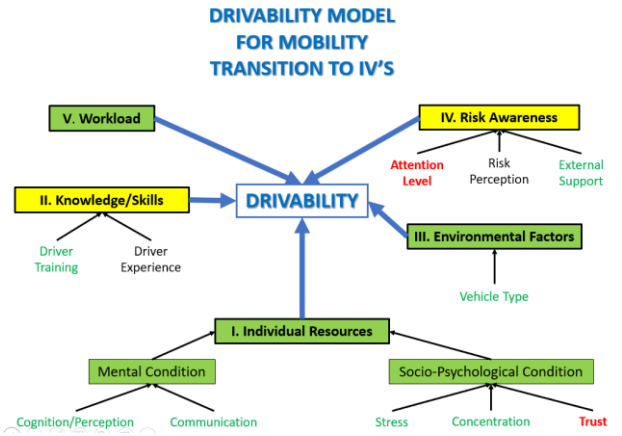

Figure 11. DRIVABILITY Model For Mobility Transition to IV's + Effects

Individual resources are divided in two sub-groups, namely mental condition and socio-psychological condition. The mental condition is influenced by the perception of the vehicle, which should improve with highly innovative and new technology. Even though interviewees have never mentioned that the novelty of an IV would be a factor that makes them use it, they have often mentioned that they would feel safer and better. Furthermore, communication can have positive and negative influence on the mental condition. As communication with a voice assistant is linked to the driving task, the mental condition should not be worsened.

In the socio-psychological condition not all factors contribute positively. While stress will be reduced through entertained passengers and a simpler driving task, and concentration will be increased because of less haptic and more voice-induced actions, trust is considered to be missing, as Expert 1 found during her research on customer trust in AI.

The knowledge and skills the individual driver brings when buying or entering an intelligent vehicle does matter as well. Experienced drivers obviously have more skills in driving a car than less experienced drivers. However, that factor might mix up because it is unclear yet how to translate experience with traditional vehicles into experience with intelligent vehicles. Hence, this factor depends strongly on the situation and the user. Based on the interviews it appeared that an education step (option) when buying an intelligent vehicle should be introduced. This training will have positive impact on the knowledge and skills of a driver if done right.

Most of the environmental factors in the drivability model are dependent on the exact situation, for example weather, road conditions and visibility. The only relevant factor is the vehicle type. It contributes to drivability in a positive way, because it is the enabler of all other positive factors.

Risk awareness is hardest to understand from interviews solely. Overall, it can be said that the automation of the driving process and the development in direction autonomy are reducing the attention level. This is not necessarily bad, if cars are autonomous and no human interaction is required. However, as long as mixed agents are driving in traffic and the human is still driver of the car, a reduction in attention level is negative.

Sensors and assistants which react in emergencies, for example the brake assistant, are external support for the driver and have very positive influence on risk awareness. It is not the driver who is aware of the risk, but the technology which might be even more precise.

How risk is perceived in the end depends strongly on vehicle type, automation level and the driver itself. Therefore, risk perception is important for drivability, but contributes neutral.

Lastly, the workload for drivers will reduce with automation and assistants. The overall driving task requires less resources and workload contributes positively to drivability.

5. CONCLUSION

5.1 Managerial Implications

5.1.1 Manufacturer's Desires

Manufacturers and other affected parties of the automotive value chain should prepare to invest in augmented analytics. The newly gained big data from intelligent vehicles needs to be processed and analyzed. Human resources are too expensive to be used for that and thus, augmented analytics are a key technology if big datasets should provide any value.

Managers should as well focus on redesigning the marketing mix, in order to develop attractive offers for potential consumers. Especially because people have low trust in AI applications, the advantages and convenience of the product need to be displayed well by the holistic offering.

As IV's enable extensive (live-)targeting for the first time, managers should open for personalization. It promises higher sales, better customer satisfaction and a more sustainable consumer/product relationship. Targeting information can be collected from web-visitors and from the IV fleet. In the future, predictive targeting holds big potential for profitability.

As with any product, managers should never forget that there is valuable information to gain from the market. Intelligent Vehicles enable a more precise customer need analysis and contribute to enriching market intelligence. Moreover, IV's can be used to analyze customer reactions.

A very interesting opportunity, especially in sales is restructuring human resources. Experienced automotive salespersons might have the expertise to sell cars, but their affinity to new

technologies and their ambition to diffuse them is often low. It is up to human resource managers to identify early which employees have the right attitude towards AI and digital interior to transfer enthusiasm to potential customers.

5.1.2 Consumer's Desires

If the perceived customer value of Intelligent Vehicles should be high, IV designers need to regard that the driving task must be eased. Primarily, it is not important if driving an IV is easier or not. It is rather important, how marketers and manufacturers communicate and present the value of their product.

For in-car entertainment and in-vehicle infotainment, new applications should be developed and available fast. Furthermore, consumers appreciate if IVI & ICE content is novel and live.

Product designers should understand and employ the drivability model as provider of overall consumer desires. If manufacturers aim to maximize drivability factors, consumers eventually will enjoy driving an Intelligent Vehicle more.

Lastly, consumers appreciate connectivity inside intelligent vehicles. They want to bring their devices in the car and have them connected automatically in a quick manner. They would also like to receive advantages from the connections, for example tiredness warning systems based on heart rates measured by smart watches etc.

5.2 Results

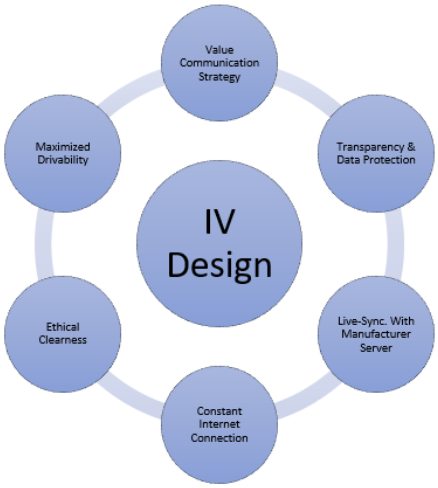

Figure 11. Intelligent Vehicle Design Results

Figure 11 displays the most important factors to reach Intelligent Vehicle design success:

A. Constant Internet Connection

Constant internet access is crucial for many benefits of IV's. It is needed to power AI, entertain driver and passenger and necessary to obtain the big datasets which bring the big opportunities. Automotive manufacturers need to invest in fast and reliable internet coverage around their vehicles.

B. Live-Synchronization with Manufacturer Servers

Manufacturers can only gain from big data, if it is available. Important for the availability of data is that it is in possession of the manufacturer and linked to its technology systems. Augmented analytics should be employed, otherwise human resources needed to analyze data jeopardizes profits. The less time is needed in the process from raw data to analysis results, the more accurate is the result.

C. Transparency and Data Protection

Both, experts and consumers have identified this factor as important. Transparency is the most important input to influence trust and thus, a proper mean to increase it. Manufacturers should be very transparent, otherwise users decline future products. Consumers are concerned, that data thieves and hackers manipulate the vehicle negatively. Furthermore, they fear that marketers might invade their privacy, if they have access to the user's devices. Lastly, a manufacturer is gaining competitive advantage through increased marketing intelligence. This advantage needs to be secured by protecting data servers of manufacturers.

D. Ethical Clearness

50% of the consumers interviewed have stated that they want the ethical question to be answered, before they would ever buy an IV. They are concerned, if the vehicle decides in emergency, they might not be satisfied with the car's decision. Furthermore, it needs to be clear whose fault it is if technology fails and causes an accident. Users fear uncertain situations and think having an IV might disadvantage them.

E. Value Communication Strategy

Users need to be educated about the advantages of IV's, to understand their own value if they buy a new car. Furthermore, they want to see test reviews and information material before the purchasing decision. As the orientation process of potential consumers is online, websites and social media should be major part of those value communications. Especially videos are a popular format. Manufacturers should also care about *who* communicates the value. There is no sense to let an experienced manager develop the strategy, if he does not have the affinity to recent innovations. The novelty of the product desires that ambitious staff with a positive attitude towards new technologies communicates with potential customers. They will be able to transfer enthusiasm better than a manager, who still needs to learn anything himself.

F. Maximized Drivability

The Drivability model introduced by Bekiaris, Amditis and Panou and elaborated in this research is the most static indicator to improve vehicles. It can be used to measure results reliably and should be regarded to satisfy customers.

5.3 Research Limitations

Research limitations occur through the interview sample and a set timeframe. The consumers interviewed to represent market specifications all origin in the region of Mid-Europe. It is not known to which extent Mid-European driver's opinions are projectable to drivers from other geographical regions. Furthermore, the set timeframe of this research limits the maximum amount of resources that can be invested.

5.4 Further Research

This research can be extended in sample size and geographical diversity. Following its approach, similar insights and results can be reproduced based on a certain sample, which also enables detailed insight into demographic user groups.

Moreover, the adoption and diffusion of Intelligent Vehicles can be analyzed. Researching customer reactions holds potential for early technology improvement and more consumer satisfaction.

6. ACKNOWLEDGEMENTS

First, I want to appreciate the support and guidance by Dr. Agata Leszkiewicz. She helped me in developing and elaborating the idea and provided useful help based on her experience in the domain of marketing and new technologies.

Secondly, I want to show gratitude to all interview participants, who provided valuable insights and drove this research to results with their opinions and concerns.

I am grateful for the support of my family and friends. They powered this research in the background and have majorly contributed to its existence.

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8. APPENDIX

Expert Desire	Interview Quotes (#Expert)
Diffuse AI Innovation	"[…] there is a high scepticism , and also it is proven that there is a low adaption of applications[…]" (#1) "[…] [It] is still a challenge to make people use all the technology that is in the car." (#2) "Many older drivers do not use lane or other assistants." (#3) "AI will be employed, where humans want to solve problems fast in a satisfying manner." (#4) "Manufacturers could work with a reward system for early adopters, so that the technology gets more diffused." (#5)
Educate Consumers About AI	"The majority is thinking, that they are not using it [AI] at the moment, but obviously we are using it in our daily life[…]" (#1) "If people are more educated and more informed, uncertainty is vanishing." (#1) "A lot of people are not really educated, because who should educated them?" (#1) "Being transparent is trying to explain which choices they made based on the data collected." (#5)
Educate Consumers About IV's	"[…] the orientation process starts online." (#2) "IV's will ease driving, if one is open for new systems." (#3) "This is what concerns users: If I cant decide myself, will I be satisfied by the vehicles' decision?" (#4) "If the AI is intelligent enough, it can adjust to a person and make it intuitive for him." (#4)
Increase Customer Trust in AI	"The Trust in smart home devices is relatively low[…]" (#1) "[…] the majority of people is really concerned when it comes to their data security." (#1) "If the user makes 2 or 3 bad experiences with assistants, he wont use them anymore. " (#3) "There must be informed consent." (#5)
Profitability	"there is a high market size estimated for 2020[…]" (#1) "Of course it [direct selling] will be profitable, otherwise we wouldn't offer it." (#2)
Good Reputation	"My main finding until now is that the factors of reputation and data security are the most contributing ones [to trust] […]" (#1) "[…]transparency should be provided of course." (#1) "There is a clear relationship between brands and trust, proven by various researches." (#1) "You have to be transparent about what you do and what the data is used for." (#5)
Enrich Marketing Data	"We changed the creative and media agency […]. They [agencies] were chosen because of their digital capabilities, because we wanted to implement data-driven marketing." (#2) "We are now much more relying on web data and analytics data of web visitors." (#2) "I am sure if you add up all the data, you can do predictive selling." (#2)
Enrich Marketing Data through IV's	"Digital Marketing is very much at the focus , but the link to cars is not that evident at the moment." (#2) "[…]there is already intelligence in the car, but it is not yet linked to our systems, to the marketing." (#2) "I am sure there are lots of digital very capable people driving around in our product, so make use of them." (#2)
Support IV Adoption	"[…] they [consumers] have to perceive features provided in a car as useful." (#1) "[…] should be easy to use and easy to learn […]" (#1) "If the car functions like a taxi, it will be very interesting to many customer groups." (#4)
Connectivity	"Dashboards, connectivity. […] It is not about Horsepower anymore." (#2) "Also the cars need to communicate with each other. But there is no uniformity because every manufacturer 'cooks his own soup'." (#3)
Innovate Business Model	"It [direct selling] will be an option, for sure!" (#2) "The dealer margin will probably go down […]" (#2) "This [in-vehicle ads] would be cool for taxis or car sharing." (#2) "[…] maybe we can think of a business model with a lower fee, if you allow this [in-vehicle ads] to happen." (#2) "This will happen […], that you can activate a feature for a shorter period of time." (#2) "We [manufacturers] are teaming up on shared services, autonomous driving, navigation etc. […]" (#2) "Interested and open customers are below 40. Often they cant afford a car for 40-50 .000€." (#3)
Innovate Value Chain	"[..] you maybe need other people […], that already have a digital mind." (#2) "In fact, the approach of the dealer should be different[…]" (#2) "First manufacturers start selling direct […] The dealer network will change completely." (#3)

Appendix 1: Expert Interview Quotes

Consumer Desire	Interview Quotes (#Interviewee)
Sensing Driving Experience	"You might lose the feeling of being 'master' of the machine." (#3) "It would be OK, if driving assistants can't be shut off, for the sake of security." (#2)
Perceived Safety	"Somebody from an older Generation might not appreciate interventions. Maybe an unsafe feeling develops." (#3) "If you rely too much on technology, it [driving] might get more unsecure." (#3) "I would feel safer and better using an IV." (#4)
Voice Steering	"The voice-assistant would benefit myself a lot[…]" (#4) "To steer things like radio and navigation by voice would be convenient." (#1)
Actual Safety	"I am a driver who gets distracted a lot[…]. If there was a voice steering I'd be less distracted." (#4) "If you can speak a command aloud, the problem of distracted drivers is eliminated." (#1) "[…]Maybe many accidents would be avoided." "Cameras and sensors won't need reaction time." (#2) "If the older generations would drive IV's, many things like driving into a wall are impossible." (#2) "Cars will keep speed limits, which is not really done today." (#2)
Simplicity of Use	"Certainly, not everybody will like to deal with IV's." (#1) "Maybe it is possible for older people, […] that the car works similar to a taxi today." (#2)
IV Ethics	"How would an IV decide in case of emergency? […] That is a current concern that would always escort me." (#3) "What happens in case of an accident? Who is responsible?" (#2)
AI Trust	"I would inform myself with reviews and tests about the system performance first." (#4) "If Voice-steered navigation should bring me somewhere, there's the question if it works." (#1) "I would not buy such a car, if I wouldn't trust it." (#2)
Data Security	"I think manufacturers fulfil regulations, and I trust those regulations." (#3) "I haven't been careful with my data in the past. If data was passed on by IV manufacturers, I would accept that, but be concerned about how extensive that happens." (#4) "I would be careful with data. You never know where it goes and what happens with it."(#1) "I would not accept full access to my mobile phone. There is sensible data on it." (#1) "There could be hackers. I would like to know if my data is safe in the car." (#1) "There will be 'data thiefs' for sure. To change an IV's setup must be impossible for them." (#2)
Connected Entertainment	"[…] Music streaming, maybe news and e-mails directly in the car." (#3) "I like Music streaming, weather apps and maybe a note function, for shopping lists or other ideas." (#4) "Relaxing music […] e.g. while driving on vacation."(#1) "A memo function would be nice, for appointments" (#1)
Passenger Entertainment/ Workstation	"Movies are interesting. I guess you can also work [computer] nicely as passenger." (#3) "Business Interior could have a workstation on the passenger site." (#3) "It is great to entertain kids. If they are entertained, I can drive more calm." (#1) "For a long trip I would like books, games or movies." (#2)
Inter-Device Connectivity	"It would be cool, if you would enter the car and everything connects automatically." (#3) "Very exciting. I would find out upfront how much time and money that costs me." (#4) "I wouldn't like connections. I am concerned it would invade my privacy." (#1) "That would be appropriate. If you do it, then do it complete." (#2)

Appendix 2: Consumer Interview Quotes