CARS AS DEVICES

CONSUMER ATTITUDES TOWARDS NEW UNDERLYING
CONCEPTS IN AUTONOMOUS DRIVING CARS:
INSTRUMENTAL VERSUS EXPERIENTIAL IN-CAR ACTIVITY
POTENTIALS

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ABSTRACT

Title: Consumer Attitudes towards New Underlying Concepts in Autonomous Driving Cars: Instrumental versus Experiential Activity Potentials

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Autonomous driving is one of four major trends that will substantially shape the future automotive industry. The increasing importance of software-driven products in this sector, may drive technology companies to enter the market of autonomous vehicles. As the vehicle drives itself, drivers will gain additional free time that may be used otherwise. This additional free time is the basis for new in-car activities which will provide the opportunity to spend the commute time meaningfully. This empirical study investigates consumers' attitudes towards such in-car activities. Therefore, various possibilities were clustered into experiential, such as entertainment or sleeping, and instrumental, such as communication or productivity, in-car activities. Findings indicated a general consumer interest and a higher rating of instrumental activities compared to experiential activities. Furthermore, it was found that with increasing free time the interest in instrumental activities decreases. The study revealed that consumers with a high willingness to adopt new technologies stated a higher receptiveness for instrumental activities. Similarly, persons with a higher willingness of technology adaptation consider purchasing an autonomous driving car from technology companies entering the market. Traditional car brands need to consider changing market structures and consumer needs to defend their position which might be threatened by new market players. Considering the increasing importance of technology experiences within the vehicle, such in-car activities may represent a crucial driver for success and customer satisfaction.

Keywords: Autonomous driving; in-car activities; car as device; technology adaptation; hedonic; utilitarian; experiential; instrumental; attitudes towards technology adaptation

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SUMÁRIO

A condução autónoma é uma das quatro tendências principais que irão definir substancialmente a industria automóvel. A crescente importância de produtos baseados em software neste setor pode levar as empresas de tecnologia a entrar no mercado de veículos autónomos. À medida que o veículo se movimenta, os condutores ganham tempo livre que pode ser usado de outra forma. Esse tempo livre adicional é a base para novas atividades no carro que proporcionarão a oportunidade de gastar o tempo de viagem de maneira significativa. Este estudo empírico investiga as atitudes dos consumidores em relação a tais atividades no carro. Deste modo, várias possibilidades foram agrupadas em experiência, como entretenimento ou sono, e instrumental, como comunicação ou produtividade, atividades no carro. Os resultados indicaram um interesse geral do consumidor e uma classificação mais alta de atividades instrumentais em comparação com atividades experienciais. Além disso, constatou-se que, com o aumento do tempo livre, o interesse pelas atividades instrumentais diminui. O estudo revelou que os consumidores com maior disposição para adotar novas tecnologias apresentaram maior receptividade para atividades instrumentais. Da mesma forma, pessoas com maior disposição de adaptação tecnológica consideram a compra de um carro de condução autónoma de empresas de tecnologia que entraram no mercado. As marcas de carros tradicionais precisam de reconsiderar a possibilidade de mudar as estruturas de mercado e as necessidades dos consumidores para defender sua posição, que pode ser ameaçada pelos novos participantes do mercado. Considerando a crescente importância das experiências tecnológicas no veículo, essas atividades no carro podem representar um fator crucial para o sucesso e a satisfação do cliente.

Palavras-Chave: condução autónoma; atividades no carro; carro como dispositivo; adaptação tecnológica; hedonismo; utilitário; experimentação; instrumental; atitudes em relação à adaptação tecnológica

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"Isn't it funny how day by day nothing changes,
but when you look back everything is different?"
- C.S. Lewis

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LIST OF ABBREVIATIONS

ADC – Autonomous driving cars

AD – Autonomous driving

H – Hypothesis

M – Mean

OEM – Original Equipment Manufacturer

RQ – Research question

SD – Standard Deviation

WTP – Willingness to pay

I. INTRODUCTION

1. BACKGROUND

The automotive industry changes at an increasing pace: Start-ups seem to enter the industry successfully overnight and high-tech and cash-rich companies compete with automotive manufacturers at the customer interface. Consumers' interests shifted from hardware and horsepower towards software and tech-interior and a holistic mobility experience. These changes are shaped by four major and mutually reinforcing trends: autonomous driving (AD), shared mobility, connectivity and electrification all of which reveal signs of acceleration and pressure traditional business models. The necessity for Automotive Original Equipment Manufacturers (OEMs) to include hardware, software and services within an integrated and seamless car environment is increasing (Heineke, et al., 2017).

Technological advancements influence market and competitive structures. According to Christensen (1997), most technological industry improvements have a sustaining character. Sustaining innovations foster the improvement of existing and well-established products that mainstream consumers in a major target market have valued. Sustaining innovations target demanding and high-end customers by offering products with better performance than previously available. Whereas disruptive technologies were initially defined as innovations that introduce a different value proposition to the market that did not exist previously. Technological disruption occurs when a new technology replaces a mainstream technology from a mainstream market despite its inferior performance (Christensen, 1997; Christensen & Raynor, 2003; Danneels, 2004; Adner, 2002). [1]

AD and new in-car activities may be disruptive innovations in the car and the related interior segment as they revolutionize the existing market for driving and interior concepts and components. Meanwhile, AD and such activities may be interpreted as sustaining innovations or a modernization and extension of existing opportunities.

2. AIM OF THE STUDY AND RESEARCH QUESTIONS

This dissertation aims to reveal and analyse potential consumer attitudes towards new interior concepts in the fast-moving automotive industry as crucial future sources of profit and core part of the brand equity. It is focussed on one of the aforementioned major trends: autonomous

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[1] The theoretical foundation of disruptive versus sustaining innovations is further discussed in Appendix 1.

driving [2]. Thereby, conclusions for the market potential and managerial implications for the market introduction are drawn. Aiming to steadily fulfil the increasingly demanding consumer needs in an internationalizing and diversifying market, the invention of new in-car business models might be crucial for maintaining the competitiveness. Therefore, the problem statement is defined as:

"What are the consumers' attitudes towards autonomous driving cars (ADC) and new in-car activities based on additional free time?"

To better structure the data acquisition and the final managerial implications, the problem statement is substantiated into the following research questions (RQ):

RQ1: What are potential consumers' attitudes towards new in-car activities?
RQ2: Will consumers prefer experiential or instrumental activities?
RQ3: Which group has the highest willingness to adopt these new technologies?
RQ4: Will people with a high willingness to adopt new technologies consider a new technology brand entering the car manufacturing business?

3. SCOPE OF ANALYSIS

This dissertation is based on a framework of assumptions for two reasons. Firstly, a clear structure of the variety of future opportunities is provided. Secondly, the data collection is simplified for respondents as the topic is futuristic. This might result in answer biases. Limitations caused by the defined scope of the analysis will be examined within chapter 5.3.

Since the degree of vehicle automation influences the complexity and utilization comfort of potential activities, the study assumes a scenario of AD (Level 5[3]); i.e. it is assumed that technological, legal and ethical obscurities were resolved. Thereby, the commute time becomes available for a broader spectrum of additional activities (Dungs, et al., 2016).

Furthermore, experiential and instrumental activities are clearly differentiated. The definition of these activities will be derived in chapter 3.2. People without driver's licenses are included

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[2] Within this dissertation the expressions "(fully) autonomous driving" and "self-driving" have the identical meaning.
[3] The categorization of automation levels will be examined in chapter 2.5.i.

in the data acquisition process as they may represent the same degree of interest in autonomous cars (AC) and in-car activities.

The trend of AD influences market structures significantly which causes new business models and revenue streams to emerge (for example car ownership models or car sharing services). However, this dissertation focuses exclusively on arising opportunities caused by AD within a vehicle. Therefore, neither emerging business strategies nor changing ownership models triggered by AD are considered.

4. ACADEMIC AND MANAGERIAL RELEVANCE

AC will account for a significant share in the automotive market in the medium-run. The penetration rate of highly and fully automated vehicles is expected to increase from 1% in 2020 to 25% in 2035[4] (Dungs, et al., 2016). While only approximately 1% of vehicles sold in 2016 were equipped with partial autonomous-driving-technologies, 80% of the top ten OEMs announced plans for highly AC equipment by 2025 (Heineke, et al., 2017). Since Google is testing its own fleet of autonomously driving vehicles, the threat of new industry entrants became more realistic. Information technologies will become core competencies in the future of the automotive industry (Dungs, et al., 2016, p. I). Furthermore, the inclusion of advanced driver-assistance systems was expanded from luxury-class vehicles to the compact and medium-sized car segment. The expansion was based on the market growth of 50 percentage points within two years. The number increased from 90 million units in 2014 to 140 million units in 2016. This implies a growing WTP, consumer market acceptance and relevant economic potential for self-driving technologies (Heineke, et al., 2017). Altered industry structures, changing consumer expectations and the threat of losing market share to new competitors pushes OEMs towards the development of business models to defend their market position.

5. RESEARCH METHODOLOGY

To answer the research questions adequately, this dissertation includes a descriptive, comparative, explanatory and exploratory approach as well as secondary and primary research. The data from the secondary research were derived from scientific papers, journals, reference books and newspaper articles. The literature information posed as fundament for the empirical data acquisition. The primary data originated from a two-dimensional approach. Qualitative in-

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[4] These numbers refer to the German auto market.

depth interviews delivered the basis for the quantitative online survey. The results of the quantitative online survey were statistically evaluated to derive realistic managerial implications.

6. DISSERTATION OUTLINE

The literature review presented in Chapter 2 delivers the conceptual framework for this dissertation and describes tangent areas of the research topic.

Chapter 3 presents the methodology for the primary research by describing the research approach and research design.

Chapter 4 addresses the analysis of results of the research methods. The results of the qualitative in-depth interviews and quantitative online survey are evaluated.

Chapter 5 includes conclusions, managerial implications and limitations as well as future research prospects. Chapter 2 and Chapter 4 are the basis for drawing recommendations for companies.

II. LITERATURE REVIEW

1. CONCEPTUAL FRAMEWORK

Within this dissertation, a holistic investigation of the research object is conducted. Therefore, several theoretical approaches from tangent research fields were consulted to create the framework. This initial framework builds on secondary research and is the initial basis for the research questions. Figure 1 illustrates the fields of research and its interdisciplinary for the problem statement graphically.
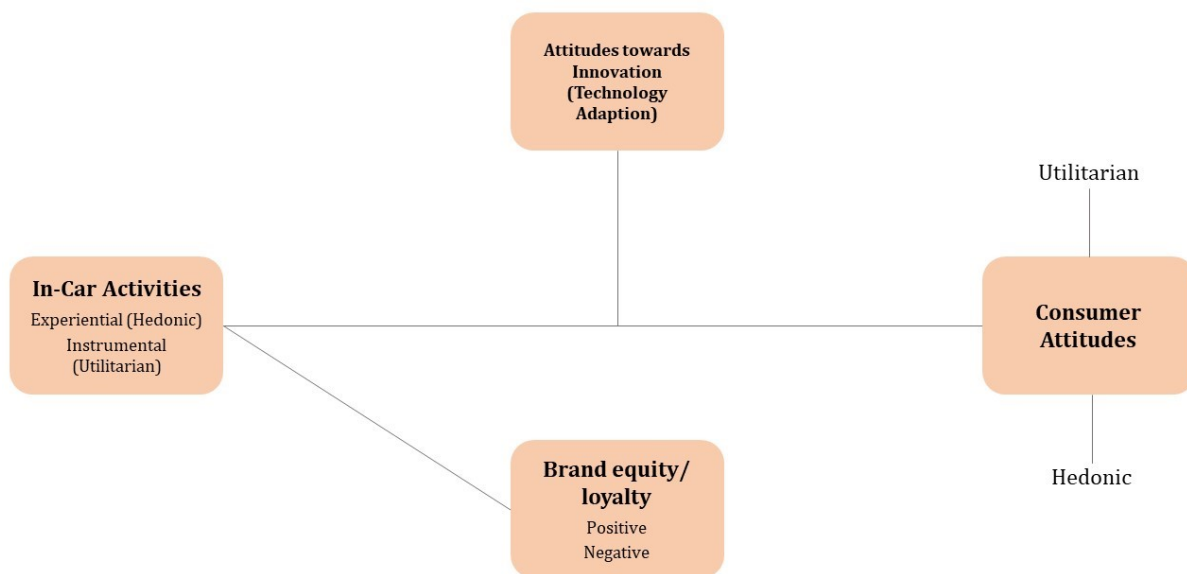
Figure 1: Conceptual Framework.

2. CONSUMER BEHAVIOUR

The concern of consumer behaviour is not solely the moment of purchase but the holistic consumption process including all issues influencing the consumer before, during and after the purchase situation. Companies' superordinate goal is the identification and satisfaction of consumers' needs in a more gratifying manner than competitors can. This demonstrates the imperative importance of understanding and adapting to changing requirements (Solomon, et al., 2006; Solomon, 2018).

The traditional funnel analogy suggests that the selection of available brands or products is narrowed down rationally and systematically by weighing options until the purchase. Based on increasing product choices, digital innovations and the emergence of the challenging, well-

informed and information-seeking consumer, a more dynamic approach is needed for the comprehension of consumer behaviour (Court, et al., 2009).

Additionally, regarding a consumer as a logical and exclusively rational problem solver neglects crucial consumption patterns such as emotional responses, aesthetic enjoyment, variety seeking and sensory pleasures. By adding the experiential perspective, consumer attitudes were regarded as complex and multidimensional constructs. Thereby, the focus shifted from conventional goods providing tangible benefits and performing utilitarian functions to symbolic product meanings of more subjective characteristics (Holbrook & Hirschman, 1982). Holbrook and Hirschman (1982) define the experiential view as a state of consciousness including a variety of symbolic meanings, hedonic responses and aesthetic criteria. This approach includes the symbolic meaning that most products carry and that might be more salient than utilitarian functions for specific products.

Hedonic and utilitarian product attributes may influence the consumer attitudes which impact consumer behaviour. The next section defines the terminology and highlights the connection between attitudes and hedonic or utilitarian patterns.

1. CONSUMER ATTITUDES

Consumer attitudes are a crucial determinant for the prediction of consumer behaviour. Solomon, et al. (2006) define attitudes as an evaluation of people, objects, advertisements or other issues that is consistent over time. Generally, an attitude comprises three components which represent the internal interdependencies between knowing, feeling and doing: affect, behaviour and beliefs. The relative importance of those components is derived by the consumer's motivation towards an attitude object (Solomon, et al., 2006; Solomon, 2018).

Consumer attitudes are influenced by intangible product attributes which are affected by the consumers' hedonic motivations towards a product. Therefore, the emotional response represents a core aspect of an attitude. The role of cognition throughout the process of judgment is not eliminated but enriched by adding the importance of aesthetic and subjective experience. This holistic judgment process is more likely in the case of evaluating a product that primarily delivers expressive and sensory pleasure rather than a purely utilitarian value (Solomon, et al., 2006; Solomon, 2018; Voss, et al., 2003).

2. HEDONIC AND UTILITARIAN CONSUMPTION

Consumer attitudes are inherently bi-dimensional and therefore comprise hedonic and utilitarian components. A consumption object is assessed by its placement on both a utilitarian dimension based on its instrumentality, i.e. its usefulness or beneficial effects, and a hedonic dimension which measures the experiential affect, i.e. the pleasure it provides. Both dimensions contribute differently to the perceived gratification of a product or behaviour (Batra & Ahtola, 1991).

Hirschman and Holbrook (1982) define hedonic consumption as "those facets of consumer behavior that relate to the multi-sensory, fantasy and emotive aspects of one's experience with products". Compatible to this definition, Dhar and Wertenbroch (2000) specify hedonic goods as those whose consumption is mainly driven by a sensory and affective experience. Contrarily, utilitarian consumption is based on cognition, instrumentality and goal-orientation of accomplishing function tasks (Strahilevitz & Myers, 1998).

According to Batra and Ahtola (1991), consumers perform consumption for two underlying reasons: Consummatory affective, hedonic gratification based on sensory attributes of a product and instrumental, utilitarian reasons with expected consequences. Similarly, Botti and McGill (2011) state that consumer goals, products and activities are driven by extrinsic and intrinsic motivations. These types of motivational drivers are essential for the perception of hedonic or utilitarian. Hedonic consumption is defined as being intrinsically motivated and is sought as a goal within itself. Contrarily, utilitarian experience is extrinsically motivated as the experience is instrumental for the achievement of a higher-level goal (Botti & McGill, 2011).

Summarizing, the choice between hedonic or utilitarian consumption, decisions or experiences is not between positive or negative. It is rather an approach providing guidance to better structure and understand consumer behaviour.

A study of the relationship between car owner and their vehicles revealed that consumers tend to personify their cars and are strongly attached to them on emotional levels. Both high financial and emotional investments are made whereas a vehicle may enable people's major milestones in their lives. Therefore, cars may be products with strong hedonic dimensions (AutoTrader.com, 2013; Turchi, 2014).

3. DEFINITION OF EXPERIENTIAL AND INSTRUMENTAL GROUPS OF ACTIVITIES

For a holistic investigation of the consumer attitudes towards new in-car activities, the variety of possibilities needs to be structured. For this dissertation, two distinct, overarching activity groups were defined: experiential and instrumental activities[5]. This distinction is based on the study "The Value of Time" (Dungs, et al., 2016) in which six overarching needs were derived each of which contains several activity groups. These needs were based on 60 potential activities identified which were assigned to 21 groups.[6] Table 1 illustrates the distinction between experiential and instrumental activities including underlying groups.

	Overarching Need	Group	Activity Examples
Instrumental Activities	Productivity	Work, Education, Organization of daily-life-tasks, Purchases for daily needs	Prepare meetings and presentations, language courses, virtual classes, online-banking, tax declaration, etc.
	Information	Information about surrounding/ route, product information, gathering information online	Virtual sightseeing, virtual apartment seeking, product (price) comparison or virtual trial, consumption of virtual or conventionally presented news/ information
	Communication	Personal communication, consultation sessions, social networks	Chatting, meetings in virtual rooms, simple or complex consultation sessions, conventionally presented or virtual social media content
Experiential Activities	Basic Needs	Food/ Drinks, Sleeping, Clothing, Laundry washing/ changing	Consume prepared food/ prepare food, changing/ put on tie, deep sleep/ naps, cleaning shoes

[5] Experiential activities refer to hedonic experiences whereas instrumental activities to utilitarian ones.
[6] The underlying study "The Value of Time" by Fraunhofer-Institut IAO and Horváth & Partners provides an initial valuable insight in a new and unexplored topic. However, to assure reliability and validity, the needs and groups need to be further investigated by independent studies. Nevertheless, the modernity of this topic and the representativeness of the study were used as basis for this distinction and further parts of this dissertation.

	Well-Being	Wellness, Beauty, Health, Fitness	Meditation, Yoga, make-up, whole-body care, treadmill, barbell training, virtual doctor appointments, enjoyment of view/ nature
	Entertainment	Games, artistic activities, passive entertainment	Video/ smartphone games, virtual reality games, painting, play music, watching (virtual reality) movies/ series, listen to audiobooks

Table 1: Distinction experiential and instrumental service potentials

Source: Own representation aligned to Dungs et al. (2016), p.8

Experiential and instrumental activities were distinguished based on the definition of hedonic/ experiential and utilitarian/ instrumental products and activities. Therefore, the main aspect of differentiation was the achievement of a certain goal. Therefore, hedonic/ experiential experiences are a goal within themselves while utilitarian/ instrumental experiences are an intermediate step towards a higher-level goal.

3. ATTITUDES TOWARDS INNOVATION – TECHNOLOGY ADAPTATION

AD and in-car activities are considered as innovations in the automotive sector. Consumers adapt in a different pace to new technologies. From a behavioral point of view, Rogers and Shoemaker (1971) define the new-product adoption behavior as a varying degree to which specific individuals adopt innovations relatively earlier than other members in the same social system. Roger's (1983) theory "Diffusion of Innovation" categorizes five consumer groups by differentiating them by their pace and willingness of adoption. Figure 2 illustrates the adopter categories in comparison to the increasing market share over time. Thus, individuals in specific categories have a similar degree of innovativeness.
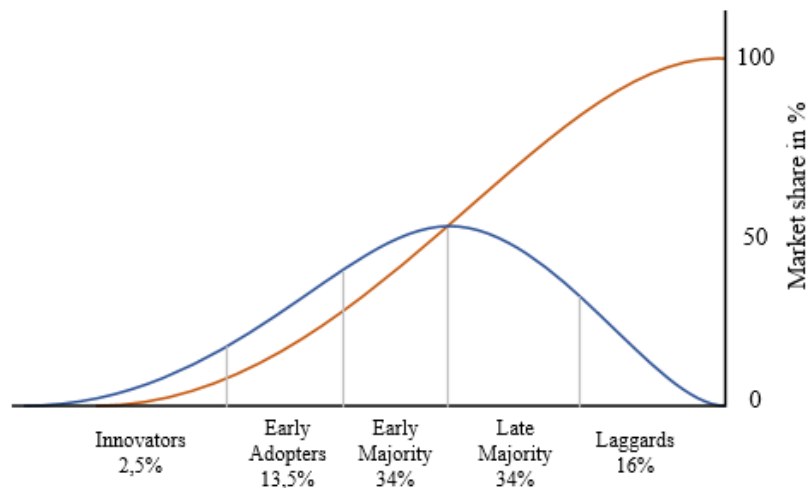
Figure 2: The Diffusion of Innovation
Source: Own representation aligned to Illert (2018)

The area below the blue graph represents the distribution of adopter categories while the orange graph illustrates the increasing market share over time. Innovators and Early Adopters are eager to try new ideas and adopt innovations early. Individuals in these categories accept a certain level of uncertainty and financial risk. Early Adopters are socially prestigious and influence members of their social system more significantly, i.e. early adopters act as role models. The Early Majority adopts when the market share is increasing significantly. The Late Majority is skeptical towards new ideas and adopts slightly after the average adopter. A main driver of adoption is peer pressure; thus, the Late Majority will not adopt until the main part of their social system did so. Laggards are traditional and adopt innovations when it may already be replaced by a new one which is already being used by the innovators. (Rogers, 1983).

The pace of technology adaption and an innovations' success may be influenced by several factors. According to Griffith and Rubera (2014), a *culture's character traits* influence the degree to which an innovation is adopted. Thus, a technological innovation may be adopted slower in cultures with a high degree of uncertainty avoidance while countries showing high degrees of individualism and indulgence are eager to adopt technological innovations (Griffith & Rubera, 2014).

Potential adopters may differ from one another in terms of higher income and education and younger age and have a greater social mobility, are more willing to accept risks and are opinion leaders in their social systems. Thus, representatives of those predispositions are more likely to adopt innovations earlier, i.e. Innovators and Early Adopters are more likely to represent these traits (Im, et al., 2003).

Chaudhuri and Micu (2014) demonstrated the influence of the kind of communication on the willingness to try and adoption of an innovation. It was proven that a mixture of verbal and visual stimuli influences the willingness to try an innovation. The results showed that the willingness to try an innovation increases significantly for a hedonic verbal description when a visual stimulus is added to a verbal description and vice versa for utilitarian descriptions (Chaudhuri & Micu, 2014; Pham, 1998).

4. INFLUENCES ON BRAND EQUITY – BRAND LOYALTY

Aaker (1991) defines brand equity as the combination of brand awareness, brand loyalty, brand associations, proprietary brand assets and the perceived quality as a distinctive source of competitive advantage. According to Oliver (1999), brand loyalty is a deep commitment to consistently re-buy or re-patronize a preferred product or service despite situational marketing influences. According to Aaker (1991), brand loyalty consists of the following aspects: Reduced marketing costs, Trades leverages, increase of brand awareness and customer acquisition and reaction time to competitive threats.

This dissertation exclusively focuses on brand loyalty and therefore, the four remaining constructs of brand equity are not further examined. Moreover, brand loyalty within this dissertation investigates the loyalty towards a group of brands; i.e. OEMs.

In their study, Chaudhuri and Holbrook (2001) investigated the role of brand loyalty. It was found that brand trust and affection impact the creation of brand loyalty. Thereby, brand affection is positively correlated to the hedonic product value and vice versa to the utilitarian value; i.e. brand affect is associated with lower utilitarian values which implies communication strategies for different product categories. Therefore, the study presented brand loyalty as possible connection that indirectly links brand trust and affect with performance-related aspects of the brand equity.

5. AUTONOMOUS DRIVING – STATUS QUO AND CATEGORIZATION

AD means the self-reliant and purposeful driving of a vehicle in real traffic situations without intervention of the driver. In the case of partly automated driving, the driver cannot pursue any other activities besides driving. Highly automated driving describes vehicles that realizes their boarders and transfer the control back to the driver, i.e. other activities are possible to a limited degree. Fully AD means that vehicles decide and react on their own based on algorithms without

any active interventions of the driver. Given the fact that the vehicle masters all situations, the driver can fully conduct other activities or no driver is required (Daimler AG, 2018).

The following section defines the categorization of driving automation on which this dissertation is based on (Figure 3).

Level 0 – Driver only	Level 1 – Assistant	Level 2 – Partly automated	Level 3 – Highly automated	Level 4 – Fully automated	Level 5 – driverless
Driver controls car constantly	Driver controls car constantly	Driver monitors system constantly	No constant monitoring but readiness to intervene	No driver necessary in specific situations	No driver necessary during whole commute time. System manages all situations autonomously
No supportive system active	Supportive systems active	Systems controls car in specific situations	Systems controls car in specific situations and re-transfers control in complex situations	System can overcome complex situations, full control in specific situations.	System thoroughly controls car. No driver necessary.

Figure 3: Categorization of AD

Source: Own representation aligned to Dungs et al. (2016), p.2

Throughout these categories, the level of automation increases while the necessity for the driver's readiness to intervenes decrease. Level 0 until Level 2 require the continuous readiness of intervening whenever an eventually active system reaches its boarder. However, throughout those levels, the driver is increasingly supported by systems. Level-3-vehicles are able to safely guide themselves while the driver does not need to monitor the systems constantly. However, control will be handed over in complicated situations. In Level 4, all vehicle functions will be guided autonomously. No intervention in hazardous situations are necessary. Level 5 is named "driverless driving" meaning that all guiding system are able to capture and process all traffic situations and react accordingly. Thereby, the vehicle does no longer require the presence of a driver as interventions will neither be necessary nor possible. Presently, the technological development contains Level 0-4 driving, while Level 4 is still being tested and not commercially available. (National Highway Traffic Safety Administration, 2013; Verband der Automobilindustrie, 2015; Dungs, et al., 2016)

This dissertation assumes a scenario in which Level 5 AD functions perfectly and there is no longer a steering wheel in the car. Further, it is assumed that all ethical, technological and

political doubts were figured out and the experience is comparable with an individual plane or train.[7]

6. CARS AS DEVICES

1. STATUS QUO

The future cars' ability of driving autonomously assures the opportunity for passengers to engage otherwise, as control and responsibility are transferred to the vehicle. Therefore, occupants may invest their newly won free time in activities which generate profits for online service providers (Wehinger & Cords, 2015). Based on the degree of automation, such activities differ in their degree of complexity. If an activity needs to be supported technologically, e.g. by licenses, visual media or specific software-based contents such as apps or artificial intelligence components, the opportunity arises to establish profit potentials (Dungs, et al., 2016).

Visions and concept cars of OEMs containing interior concepts which provide enormous leeway for other activities present how those new activity offers can exceed the present imagination of opportunities. Demand and supply, whether the consumers' WTP will be sufficient to create profitable business models and the influence of duration, character of the driving distance as well as demographic and cultural aspects on the usage of such activities may hardly be predicted. Therefore, forecasts of the future automobile environment can be drawn to a limited degree. (Dungs, et al., 2016)

The following sections contain analyses of the market and customer environment. These insights provide the theoretical framework with valuable content and support the survey conduction which quantifies and structures the current environment of such activity offers regarding consumer attitudes.

I. MARKET ANALYSIS

The market analysis is divided in two subsections: Demand side and industry structures.

According to Aboagye et al. (2017), in-vehicle user experience drives customer satisfaction. Thus, a shift from hardware-driven products towards software-driven product focus was

[7] A description of legal and ethical aspects can be found in Appendix 2.

detected. Furthermore, previous research found a general consumer WTP and interest in such activities which implies business potential and market acceptance (Dungs, et al., 2016).

In the study "The Value of Time" (Dungs, et al., 2016), differences in consumer preferences were found. Firstly, consumers from different countries preferred differing activities. This may be related to varying levels of technology affinity. These insights might support the identification of test markets for activities. Secondly, the average time spent within the car varied which influenced the consumer preferences. Dungs, et al. (2016) found a positive correlation between the time spent in a vehicle and the WTP for activity. This implies the opportunity of adjusting the product portfolio accordingly. Therefore, prices for activities should be adjusted to varying periods of usage for different countries. It was found that especially the activity potentials "Communication" and "Productivity" pose high market potentials as they were rated highly important by consumers. Further, the posed the highest profit potential compared to other activity groups. In the meantime, "Entertainment" was rated the lowest. (Dungs, et al., 2016)

Previous research presented a high WTP for short-distance rides throughout younger drivers. The WTP increased at a disproportionally low rate with an increasing ride duration. Meanwhile, younger drivers tend to be more receptive towards those technologies. (Dungs, et al., 2016)

Deloitte (2016) revealed a leap of faith of OEMs as great benefit compared to technology companies. Simultaneously, consumers expected higher quality products. However, solely a low general level of distrust towards new entrants of the industry was detected which represents an opportunity for tech companies entering the market environment to gather market shares (Deloitte, 2016).

The four aforementioned major trends will sustainably shape the automotive industry structure. Such vehicles will account for a significant share of the industry profits which represents an interesting opportunity for new players to enter the industry. Conclusively, high-tech and cash-rich companies could compete with OEMs at the consumer interface taking advantage of a higher level of know-how and experience in software-driven products and data management. (Gao, et al., 2016). Additionally, disruptive technologies are expected to represent the strongest growth engines which urges OEMs to adjust every section of the value chain (Aboagye, et al., 2017). In the meantime, a manifesting shift from ownership towards sharing business models is revealed (Deloitte, 2016).

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Summarizing, value-adding activities are essential for the OEMs' competitiveness (Dungs, et al., 2016). First consumer research reveals crucial insights for OEMs to adjust the development and product portfolio to the needs of consumers from different countries with varying psychographic traits of character. Insights concerning the demand side proved the business potential and highlighted a high market acceptance adopted by a broad audience of potential consumers. Thus, in-car activities will be relevant for potential consumers in the future.

II.   CUSTOMER ANALYSIS

Consumers' attitudes towards vehicle experiences altered. According to Aboagye et al. (2017), a significant share of consumers would consider switching car brands to have access to technologies. Prior research revealed the consumers' main interest in potential activities that transfer the conduction of such activities within the vehicle which normally. Accordingly, activities that provide the opportunity of fulfilling value generating and compulsory tasks were preferred which indicates that respondents of prior studies preferred an efficient usage of their commute time. Thus, activities that support gaining more leisure time were ranked as more attractive compared to entertaining activity offers (Dungs, et al., 2016).

Furthermore, the main motives for the utilization of those activities were both gaining time and comfort. These findings underline the importance of time as resource for which consumers prove a significant WTP. Consumers of all segments demonstrated a WTP. However, prior research revealed a higher level of receptiveness and WTP of younger potential consumers compared to older ones. Accordingly, consumers of all vehicle segments stated their demand for value-adding activities. As the WTP is independent from the belongingness to a specific vehicle segments, activity offers and pricing may be designed consistently thoroughly which enables OEMs to reach a broad mass of potential consumers at an early stage of market penetration. (Dungs, et al., 2016)

The demand of additional in-car activity offers is, besides various more factors, influenced by both consumers' demographic and psychographic traits as well as the character of the journey itself. The value of time[8], which was found to positively correlate with the consumers' WTP, differs widely between different consumer groups, i.e. young consumers, big income earners, sports car drivers and German participants assigned the highest monetary value to an additional hour of free time (Dungs, et al., 2016).

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[8] The „value of time" is defined as monetary amount a consumer would be willing to pay for one additional hour of free time per day.

Summarizing, consumers demonstrated a relatively high level of interest and a significant WTP for new in-car activities which in turn indicates that users may accept required fees. Nevertheless, differences between consumers segments were examined which in turn influence both the demand of and WTP for additional activities within the car. Consumers interpret the scenario of FAD as very abstract and therefore assign a slightly higher added value to activities offered in fully autonomous vehicles compared to highly AC. The interest and thus WTP depends on variables such as psychographics, demographics (i.e. country of origin, generation, technology affinity, etc.), character of the commute (i.e. length and type), and level of vehicle automation. Furthermore, the value of time is situational and individual, i.e. the importance of an additional hour is perceived differently depending on the urgency of tasks and already available free time.

7. HYPOTHESES DERIVATION AND CONCEPTUAL FRAMEWORK

The following section describes the hypotheses (H) demonstrating the skeleton for the empirical study and the conceptual framework linking the concepts of the literature review. Consumer attitudes towards new products may significantly influence its market acceptance.

As the consumer attitudes may crucially influence consumer behavior and finally purchase decisions, identifying the interest in new technologies may support the estimation of market potential (Solomon, et al., 2006; Solomon, 2018). Therefore, Research Question 1[9] is covered by the following hypotheses which investigate the general consumer behavior towards new activities and possible preferences towards experiential versus instrumental activity groups.

H$_{1.1}$: Consumers are interested in potential activities in ADC.
H$_{1.2}$: Consumers prefer experiential over instrumental activities.

Prior research stated that the monetary value of an additional hour of free time is situational and individual. In other words, the less free time available and the higher the importance and urgency of a task is, the higher the monetary value of an additional hour of time (Dungs, et al., 2016). Conversely, this may imply that the value of instrumental/ utilitarian activities will be perceived as higher the less free time available. Based on this finding, the second hypothesis covers Research Question 2[10]:

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[9] RQ1: What are potential consumers' attitudes towards new in-car activities?
[10] RQ2: Will consumers prefer experiential or instrumental activities?

H₂: There is a correlation between the amount of free time and the preference of activity.

H₂ₐ: There is a correlation between the amount of free time and the preference for instrumental activities.

H₂ᵦ: There is a correlation between the amount of free time and the preference for experiential activities.

Especially within the scope of launching new technology activities, the level of technology adaption needs to be considered to derive the main target group and address marketing activities properly. Ideally, *Innovators and Early Adopters* should be identified which increase the attractiveness and decrease the perceived risk for the subsequent adaptor groups (Rogers, 1983). Prior research stated that younger consumers are more willing to adapt to such activity potentials (Dungs, et al., 2016). Therefore, the third hypothesis covers Research Question 3 [11] investigating both activity groups:

H₃.₁: The preference of activity differentiates with age groups.

H₃.₁ₐ: The preference of instrumental activities differentiates with age groups.
H₃.₂ᵦ: The preference of experiential activities differentiates with age groups.

And

H₃.₂: There is a correlation between the level of technology adoption and preference of activities.

H₃.₂ₐ: There is a correlation between the level of technology adoption and instrumental activities.

H₃.₂ᵦ: There is a correlation between the level of technology adoption and experiential activities.

Furthermore, OEMs may be threatened by new market entrants such as technology-companies which are testing their own fleets of autonomous cars (Dungs, et al., 2016). Based on previous literature, it is assumed that Early Adopters will be more willing to adopt to innovations such as ADC from technology companies (Rogers, 1983). Furthermore, persons that are willing to early adapt to new technologies may crucially influence the market entry strategy and initial

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[11] RQ3: Which is the group of early adopters for these new technologies?

launch of specific activity offers. Therefore, the fourth block of hypotheses cover Research Question 4[12]:

H4: There is a correlation between technology adaptation and the interest in a ADC from technology companies.

H4a: There is a correlation between technology adaptation and the belief in better technologies from technology companies.

H4b: There is a correlation between technology adaptation and the consideration of buying an ADC from a technology company.

H4c: There is a correlation between technology adaptation and the belief in the attempt of technology companies to gather more data by offering ADC.

The conceptual framework (Figure 4) demonstrates the linkage between the theoretical concepts graphically and illustrates the applicability of the hypotheses within the skeleton.
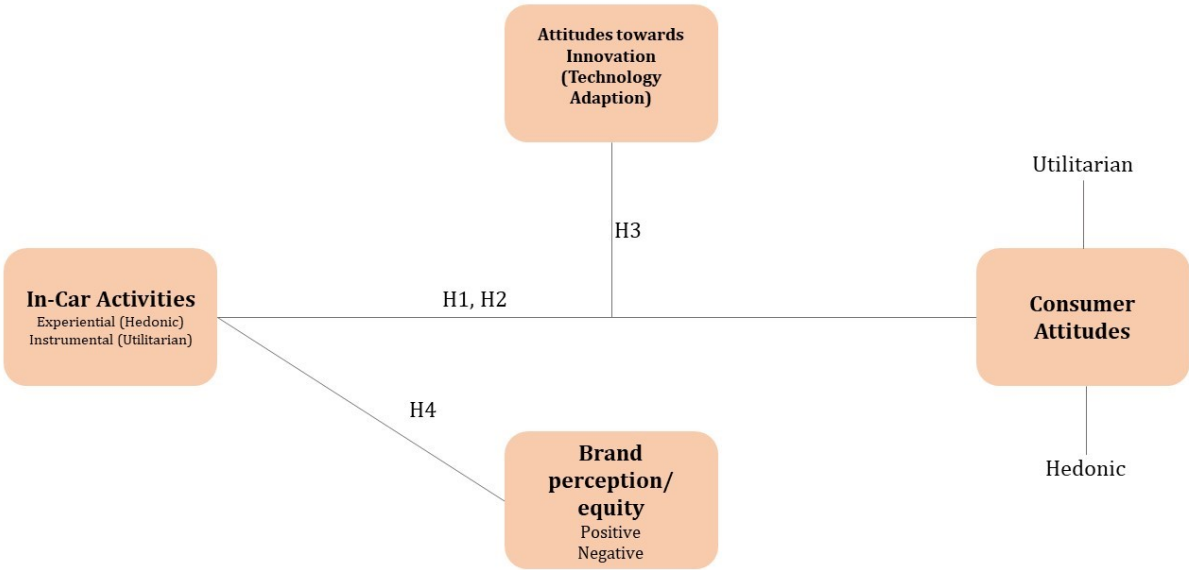
Figure 4: Conceptual Framework.

The aim of the study is two-fold: On the one hand, potential customers' general attitudes towards new in-car activities in ADC should be derived. On the other hand, a distinction

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[12] RQ4: What is the consumers' willingness to consider a new technology brand entering the car manufacturing business?

between the attitudes towards activities of hedonic and utilitarian nature should be investigated. Therefore, the preference for each group of in-car activities will be investigated as dependent variables.

III. METHODOLOGY OF DATA COLLECTION

1. RESEARCH APPROACH

In general, three types of strategy influence the manner of research conduction: Exploratory, descriptive and explanatory research strategies all of which provided the skeleton of this study. Those research strategies are not mutually exclusive, i.e. a mixture of those strategies may enable outweighing disadvantages and highlighting advantages (Saunders, et al., 2009). The combination of an explorative, descriptive and explanatory research approach should help to holistically investigate the aim of the study. Furthermore, both primary and secondary data acquisition was conducted. Primary data were collected through descriptive and explanatory research, i.e. qualitative in-depth interviews based on a half-standardised guideline and quantitative data collection was built upon an online survey. The exploratory research approach was reflected by the obtaining data from previous research and studies (Figure 5). The conclusions for the initial research problem consolidate all types of data attained.

2. RESEARCH DESIGN

The Research Design defines the methods applied to investigate the problem statement and thereby represents the means to achieve the goal of this dissertation. The overarching objective of the research is to answer the research questions and provide relevant and realistic managerial implications for the initial problem statement. Figure 5 demonstrates the process graphically.
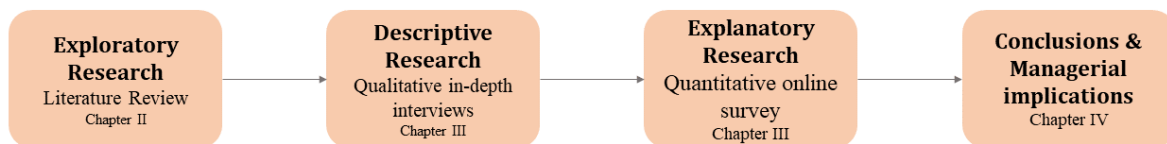
Figure 5: Research Design Framework.

The initial exploratory research goal was achieved through existing research from prior authors. These secondary data were used to narrow down the research problem and formulate the research questions which finally led to the derivation of the hypotheses. For the empirical investigation, two usually independent survey methods were combined. Firstly, the descriptive research goal was acquired by conducting qualitative half-standardised in-depth interviews of which the results were used to achieve the explanatory research goal. Secondly, a quantitative online survey was conducted of which the results built up the main part of the results analysis.

The conclusions and managerial implications were derived by combining the holistic set of data acquired throughout the research process. The main findings enabled an elaboration of the potential consumers' attitudes towards ADC and whether distinctions between hedonic and utilitarian activities were revealed.

3. QUALITATIVE RESEARCH: IN-DEPTH INTERVIEW

1. THE PROCESSES OF MEASURES

The first step of acquiring data for this study was conducted through six personal in-depth interviews which were based on a half-standardized interview guideline and endured for around 45 minutes. This level of standardization was chosen to enable a certain degree of freedom but allow for comparability of the answers.

For realistic evaluations of the duration, comprehensibility of the questions, validity and reliability, a pretest was conducted ex ante with two persons. The participants of the pretest phase were not included in the main data collection as multiple conduction of one interview causes answer biases. The pretesting phase enabled the adaption of slight changes of the formulation and order of the questions.

The in-depth interviews were conducted face-to-face or via phone. None of the respondents dropped out. The respondents' awareness about recording, appropriate use and anonymity was raised beforehand.

2. SAMPLING

The data was collected through the application of a partial sample survey based on the targeted population. Given the fact that the population for both survey methods was identical, the sample for the in-depth interviews was chosen based on a nonprobability and purposive sampling. Thereby, feature bearers were chosen based on their psychographic and demographic traits to ensure a variety of qualitative answers and a breadth of insights out of different angles. As this process was not based on the probability principle but on systematic considerations, the representativeness was only given to a certain limited degree and was therefore classified as precarious.

3. IN-DEPTH INTERVIEW STRUCTURE

During the conception of the underlying half-standardized interview guideline[13], the formulation of questions, dramaturgy and possible disruptive effects were considered. The guideline is illustrated schematically in Figure 6.

Introduction	Warm-Up	Main Body	Round-Up
Recording, appropriate use, anonymity	Car Ownership	Part 1: Autonomous Driving Part 2: In-car Activity Potentials	Eventual questions of respondents
3 Minutes	5-10 Minutes	25-30 Minutes	2 Minutes
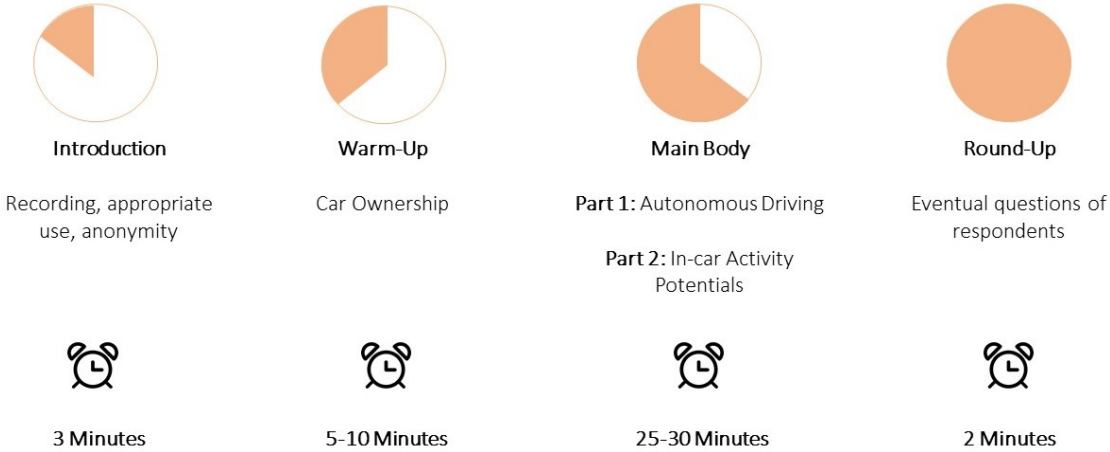
Figure 6: Schematic Illustration In-Depth Interview Process.
Source: Own Diagram.

During the introduction, the participants were informed about the framework conditions. Thereby, a comfortable and trustworthy atmosphere was created in which the participants were dispelled fear of wrong answers and encouraged to reply honestly.

The Warm-Up dealt with the topic of Car Ownership. The level of specification of the starting questions was low to accustom the participants to the interview situation and sensitize them for the upcoming topic. The participants were faced with the hedonic versus utilitarian values of cars and ownership.

The Main Body of the interview contained the topics Autonomous Driving and New In-Car activities. An introduction to AD supported a low level of biases as the participants were sensitized for a futuristic topic and not overwhelmed by the abstract imaginations of new in-car activities. Therefore, a definition of fully AC was presented by the interviewer to guarantee a common scope for the upcoming questions. Within the second part of the main body, the mindset about in-car activities was examined.

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[13] The detailed guideline containing all questions can be found in Appendix 2.

The interview was closed by the fourth block with the opportunity for participants of posing questions. The collected data was transcribed and analyzed in chapter 4.1 and additionally built the skeleton of the subsequent online survey.

4. QUANTITATIVE RESEARCH: ONLINE SURVEY

1. THE PROCESSES OF MEASURES

To investigate the hypotheses, the second stage of the primary research process contained an online survey. It was performed using Qualtrics and shared on various social networks and survey sharing communities through an anonymous link. Thereby, a considerable number of participants was reached in a cost-efficient way. The survey could be accessed through the participants' own devices at any time during the data collection period.

The questionnaire was standardized which means it contained closed questions providing prescribed answer categories for each question. Thereby, the comparability and representativeness were ensured to finally allow for quantifications of the results and conclusions about the population based on the sample. For the construction of the survey, both the extensive literature research and initial insights in consumer behaviour from the qualitative research were considered.

Before the main data collection process started, a pretest with eight participants was conducted. As the participants were not familiar with the research subject, small adjustments concerning the formulation and order of questions were made to ensure the understandability of this futuristic topic. The participants of the pretest phase were not included in the main data collection as multiple answers from one person causes answer biases.

2. SAMPLING

The sample was selected based on a nonprobability and purposive sampling technique. On the contrary, in a probability sampling technique all members of the population have the same probability of being part of the sample, i.e. in this study this trait was not given. This sampling technique was chosen as it was the most convenient and efficient procedure to acquire as many proband as possible and therefore a high variety of answers. As the survey was shared by respondents, the snowball sampling technique was applied. If strictly interpreted, based on these techniques, generalizing conclusions about the population are not possible. However, according to Malhotra (2010), this applied technique enabled the collection of respondents within a limited

cost- and timeframe. The survey was created in both English and German to achieve the highest possible amount and variety of responses.

3. ONLINE SURVEY STRUCTURE

The survey consisted of four blocks containing 14 items in total (Appendix 4). Figure 7 presents a schematic illustration of the survey structure. Responses for each question were required to continue to subsequent pages. The survey took around seven minutes to complete. Whenever a question required the evaluation of several statements, these were randomized to avoid answer biases through serial-position effects. By conducting pretests, the formulation of the questions was optimized to guarantee the highest possible level of understanding. Most of the questions were based on bipolar 5-point scales (similar to Likert-Scales) (from "Strongly disagree" until "Strongly agree" with "Neither agree nor disagree" as neutral middle) presenting various statements[14].

Block 1

Introduction:
Duration, Anonymity and confidentiality, appropriate use of data, contact information

Block 2

Warm-Up:
Attitude towards cars (emotional versus rational value)

Block 3

Main Body I:
Definition autonomous driving cars

a) Attitudes towards autonomous driving

b) OEMs versus technology companies

Block 4

Main Body II:
Defintion in-car activities

a) Attitude towards in-car activities

b) Differentiation between experiential and instrumental activities (with attention check)

Block 5

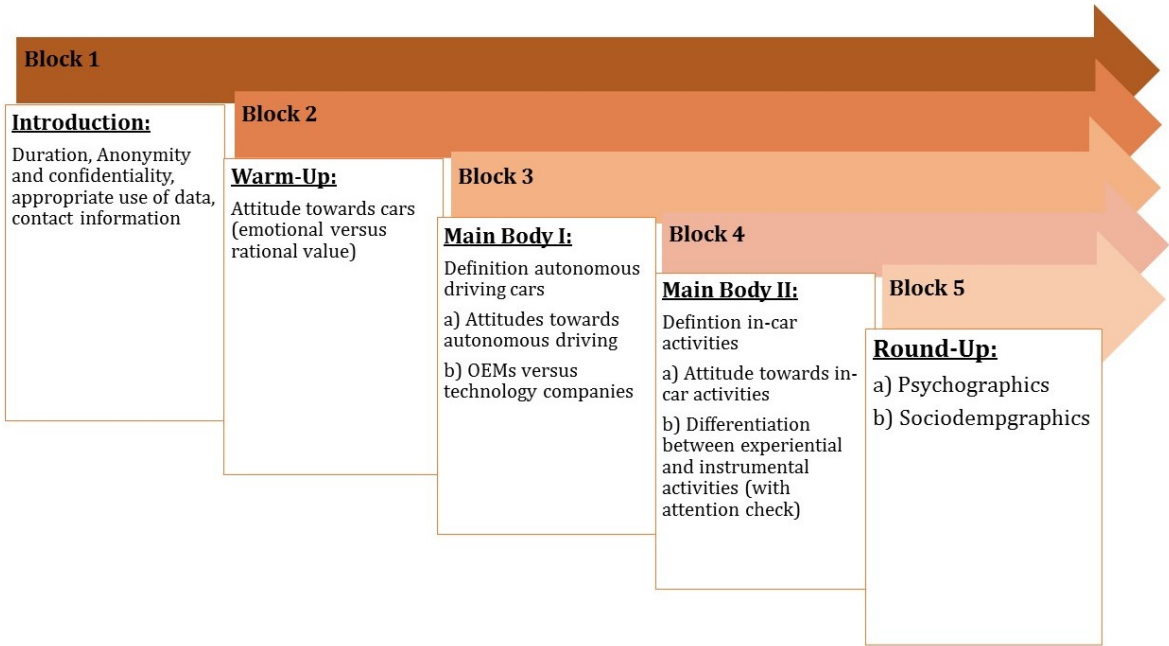**Round-Up:**
a) Psychographics

b) Sociodempgraphics

Figure 7: Schematic Illustration Online Survey Structure.

Within the introduction, the area of research and framework conditions of the survey were presented. The second block contained questions about attitudes towards cars. This block served as warm-up to accustom the participant to the situation.

The third block introduced a general definition of AD and the assumption on which the dissertation is based upon. Thereby, a generally valid framework was presented. Although

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[14] If not stated specifically, it may be assumed that the questions described were constructed as 5-point Likert-Scales.

lengthy text passages increase the drop out risk, this common scope was crucial as a common knowledge of every participant about research topic could not be assumed. Thereafter, attitudes towards AD were examined. Subsequently, the scenario of technology-companies entering the car manufacturing market was introduced. Fictive cars produced by technology-companies were described as comparable products to avoid possible doubts or biases due to imagination difficulties. The last part of the first block investigated the brand loyalty towards OEMs and the willingness to switch the brand type because of technologies.

The fourth block introduced in-car activities. By presenting pictures of a Mercedes-Benz Concept Car, the interior design of a futuristic car was demonstrated to simplify the imagination of activities. Afterwards, in-car activities were defined and short examples were stated. The assessment of general attitudes towards these activity potentials led the participants towards the differentiated evaluation of experiential versus instrumental activities. For both activity groups, specific examples were derived without disclosing the group belongingness of each item. This question block contained the attention check which ensured validity of answers.

The survey was ended by assessing psychographic and sociodemographic information. Besides that, tendencies towards technology adaptation were examined by including statements based on the characterization of Early Adopters by Rogers (1983).

IV. ANALYSIS OF RESULTS

1. QUALITATIVE RESEARCH: IN-DEPTH INTERVIEWS

The following section presents the most important findings of the qualitative interviews as the basis for the subsequent quantitative survey.

The first block implied a conflict concerning hedonic/ experiential versus utilitarian/ instrumental aspects of cars. Throughout the whole block, the emotionality overweighed the rationality. Hedonic traits such as freedom, independence, flexibility, aesthetics and speed were named as main advantages and main determinants of purchase decisions and satisfaction. Accordingly, the participants named utilitarian factors such as financial burdens (costs, a high initial investment, loss of value over time), risk, environmental pollution and wasting time in traffic or searching for parking lots as disadvantages or reasons for not owning a car. Even after pointing out disadvantages of car ownership, participants stated that none of the alternatives such as sharing services could compensate the advantages of owning a car. Therefore, the shift from owning to sharing a car (Deloitte, 2016) was not confirmed through the interviews. Participants showed interest in sharing services but were not willing to fully give up ownership. The willingness to use sharing services was highly dependent on appropriate fees for each ride despite highlighting that every ride with an own car may be more expensive. Furthermore, male participants named rather rational reasons (cost-effectiveness, quality of materials) compared to females whose motivations were hedonic (prestige, luxury, aesthetics and acceleration/speed).

The analysis of the second block revealed insights about the participants' generic attitudes towards AD as the fundament for the adaption of new in-car technologies. While time gain was the most significant benefit of AD and general interest was expressed, the participants named lacking trust, regulatory, ethical clarity and data security as major downsides. The lack of trust was mainly driven by missing personal experiences and valid trustworthy data. This indicates that participants need emotional and rational explanations and justifications to base trust upon. Nevertheless, the participants expressed their willingness and openness to new technologies and stated that it was imaginable to fully hand over control to a computer. In this context, references to other industries such as trains or airplanes has been drawn as people were already willing to give up control and trust autopilots. Therefore, respondents consider AD to be in its infancy and require more personal and statistical evidence and time to accustom to a new technology and break existing habits. Furthermore, the interviews yielded a leap of faith in

favor of OEMs based on their experience, expertise and know-how of building cars. However, the participants expressed doubts concerning the OEMs' abilities, novelty and innovativeness of inventing technologies and software components which caused wishes for joint ventures between traditional OEMs and tech-companies to unite the strengths both are offering. The participants stated interest in buying an AC from a pure tech-company. However, a full offer of high-quality cars providing a safely working technology was expected to be received from OEMs. Thus, the main determinants for this decision were safety, quality and aesthetics. It was expected that OEMs would buy-in the needed know-how to adapt to the technology leap, maintain the competitiveness and avoid cannibalization effects caused by entrants. Participants estimated that the market will not be fully disrupted by 2035 and were not certain whether the trend of AD will finally prevail.

Within the scope of the third block, in-car activities were examined. The main benefit constituted spending the newly gained time meaningfully. Therefore, in-car activities embody the benefit of the whole concept AD as they enable passenger to conduct activities for which they do not have or make time and transform cars to a living space. However, the concept was interpreted as complex and fictional. A general WTP was revealed with the prerequisite of no existing possibility to self-implement the activities externally; i.e. by bringing apps or devices into the car for free or which are already owned. This would dilute the initial benefit. Accordingly, the value added provided by AD was interpreted as insufficient without any activity offers; i.e. the activity opportunities based on AD are tremendously crucial drivers for the success and perceived benefit of the implementation of AD. This finding supports the increasing importance of the experience within the car. Participants stated their wish for customizing an individual on-demand set of activities indicating the request for implementing various activities. This was approved by the participants' preferences of hedonic versus utilitarian activities. Although all participants tended to choose rather utilitarian activity offers, generally a mixture of both types was required flexibility and diversion. The preference of activities strongly depended on factors like duration and destination of the ride and time of the day. Similarly, the value of time was described as situational and individual, i.e. all participants based it on their (estimated) hourly income and assigned higher values in stressful times, for value-adding activities or moments of time scarcity. Furthermore, a higher importance to chasing new technologies and innovations than to brand loyalty was assigned. In other words, brand switches were considered if the favorite OEM would not offer in-car activities as the sole benefit of AD was not sufficient. Fictional joint ventures proved the interviewees' technology

lock-ins[15] (Zauberman, 2003), i.e. a willingness to switch brands in order to stick with familiar technologies was stated.

The offer of activity opportunities for self-driving cars influences their brand perception, i.e. the pursuit of new technologies was expressed as consumer need and an association between the ability to innovate and addressing changing market needs has been drawn. Therefore, the offer of such activities may finally influence the brand loyalty as the interviewees interpreted, brands that would not offer those new technologies as old-fashioned and no longer relevant. However, a higher level of trust in OEMs than industry trends was revealed. In other words, if big players of the industry would not implement such activities, the participants would rather trust in the OEMs' reasons of not launching activities and therefore doubt the industry trend.

Summarizing, the interviews confirmed the prior findings of the literature review and supplemented them. The main findings of the interviews were:

- Consumers face a conflict of a tremendous emotional value while owning a car nowadays becomes harder to rationalize because of high investments, costs and attractive, cost-efficient alternatives.

- Consumers show a high interest in AD. However, lacking trust in the underlying technology, blurry regulatory, infrastructural and ethical aspects and futuristic of the topic hamper the market acceptance.

- In-car activities present a high potential of interest and thus market acceptance because they provide the benefit of effectively saving time. According to the potential consumers, those activities will be crucial future drivers of success.

2. QUANTITATIVE RESEARCH: ONLINE SURVEY

I. SAMPLE CHARACTERIZATION

Throughout the data collection period, a total number of 248 responses were collected. Responses were discarded if the survey was not completed (total number of 42) or the attention check was failed (absolute number of 19) which indicates a correct completion rate of 75%. The subsequent statistical procedures were based on a valid sample of 187 completions.

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[15] Lock-in is defined as a consumers' lower tendency of searching and switching after making an initial investment which is determined by both the preference of minimizing immediate costs and by the anticipation inability of future switching costs. Lock-in strategies are often used by electronics- or technology-related brands to increase loyalty for products that may be equally well developed and easy to replace through incompatibilities between software.

The sample consisted of 113 female participants (60%) compared to 74 male respondents (40%). The age span ranged from 18 years to 64 years. The biggest portion was represented by 25-34 years-olds (58%) which was the average participant's age (Median=3.04; SD=.854). The smallest group was between 55 until 64 years old. The majority of participants completed a Bachelor's Degree (33% or 61 persons), a trade, technical or vocational training (24% or 44 persons) or a Master's Degree (20% or 38 persons). The major share of the respondents stated that they were employed (63% or 117 persons) or students (23% or 42 persons). The main parts of respondents stated a current annual income of less than 10.000 Euros (22%) and between 10.000 and 19.999 Euros (15%). 13% stated an annual income of 50.000 until 59.999 Euros. The by far greatest portion of the sample stated they owned a car and valued is a very important object in their everyday lives (123 persons or 66%).

II.   SCALE RELIABILITY

The scale reliability of summarized variables is measured by conducting Cronbach's alpha. Thereby, the reliability and internal consistency of the multi-item scales of the study are verified. Low values for Cronbach's alpha indicate a lack of internal consistency between items in a scale, meaning that summarizing those items to measure one specific construct is not justified. The internal consistency is considered good with an alpha value between 0.70 and 0.90 on a scale from 0.1 to 1 (Peterson, 1994; Terwee, et al., 2007). Table 2 presents the scales based on summarizing items from the questionnaire to measure one specific construct and the scale's Cronbach's Alphas.

Characteristics (new variables name)	Items	Aggregated Cronbach's alpha	Number of items
Attitude towards activities (INTACT)	Q26_1-2	.803	2
Experiential Activities (EXPER)	Q27_6, 8, 9-15, 20, 21	.639	10
Instrumental Activities (INSTRU)	Q27_1-5, 7, 16-19	.790	10
Technology Adoption (TECHADOPT)	Q31_1-5	.921	5

Table 2: Reliability test for multi-item scales
Source: Own Diagram

Given the high Cronbach's Alphas values, all scales are considered internally consistent with the lowest value of .639 indicating a dubious level of internal consistency. All scales are considered for the statistical analysis. However, Cronbach's Alpha for Experiential Activities is doubtful and therefore, needs to be treated with cautious throughout the subsequent statistical analysis. A description of the aggregated variables can be found in Appendix 5.

Prior research states a consensus of p-values of 0.05 for testing the null hypotheses of the statistical measures. Therefore, each statistical test conducted is considered statistically significant if the p-value was below 0.05.

III.   CONSUMER ATTITUDES

H1.1 (Consumers are interested in potential activities in ADC.) is based on the descriptive analysis of "Attitude towards activities". The aggregated top three and bottom three boxes are compared. According to the initial scales of the questions, the frequencies and percentages of 4 until 5 are considered as top three boxes while 1 until 2 were bottom three boxes. The combined frequencies show that 66.8% stated a positive attitude towards in-car activities compared to 9.1% in the bottom three boxes (Appendix 6). Therefore, *H1.1 is accepted:* Consumers are interested in potential activities in ADC.

The investigation of H1.2 (Consumers prefer experiential over instrumental activities.) requires comparing the means of the aggregated variables "Experiential Activities" and "Instrumental Activities" in a paired samples t-test (Appendix 6). The difference between two conditions within the scope of dependent observations is measured, considering the two variables as two paired samples. The prerequisites of related samples/ groups, normal distribution of the difference between the paired values and an interval-scaled dependent variable are met. The test was significant ($p<.000$), i.e. H0 assuming the true difference between the means equals 0 can be rejected. A statistically significant difference between the means of experiential and instrumental activities is found. Further, a statistically significant weak uphill relation is revealed ($p<.002$). Summarizing, *H1.2 is accepted* as a statistically and significantly difference between the means was found. Based on comparing the means (instrumental activities 3.52 > experiential activities 3.15), instrumental activities are on average rated as more essential than experiential activities (SD instrumental activities=.636; SD experiential activities=.568).

IV.   NEW BUSINESS MODELS: CARS AS DEVICES

The second hypothesis (H2: There is a correlation between the amount of free time and the preference of activity.) assumes a relation between the amount of free time and the preference of activity. H2a investigates the correlation between free time and instrumental activities while H2b examines the correlation with experiential activities. Two linear regressions, one for each activity group, are conducted to predict the behavior of the dependent variable based on the independent variable (Appendix 8). Thereby, the relation of both variables may be quantified.

In this section, it is investigated how the dependent variable (preference towards activity) behaves if the predictor (free time) is increased by one hour.

Firstly, the assumptions of linear regression can be verified: a) linear Relationship, b) multivariate normality, c) no or little multi-collinearity, d) no auto-correlation and e) homoscedasticity (Appendix 8)[16]. After validating these assumptions, the linear regression model could be consulted to predict the relation between the variables (Table 3). The model's significance is tested by investigating the null-hypotheses. H0 assumes that all betas (predictors) are equal to zero.

	ANOVA Sig.	R	R^2	B Coefficient
Instrumental Activities	.009	.190	.036	-.068
Experiential Activities	.572	.042	.002	.013

Predictor (Constant): How much free time do you have per day during a normal working week (approximately)?

Table 3: Results linear Regression H2a and H2b

As the p-value in the ANOVA table shows a statistical significance (p>.009), H0 can be rejected; i.e. the independent variable predicts the dependent variable to a certain degree. R equaling .190 indicates a weak but positive relation between the variables. A R^2 value of .036 shows that 3.6% of the variance of the dependent variable are explained by the independent variable. Accordingly, the unstandardized B value of -.068 indicates a decrease of the dependent variable of 6.8 scale points if the independent variable increases by one scale point, i.e. if free time[17] increases by one hour, the interest in instrumental activities decreases by 6.8 scale points[18].

The conduction of a linear regression for experiential activities shows that H0 can be accepted (p>.572) as no statistical significance is found. Therefore, the independent variable free time does not predict the dependent variable. No associations between free time and the experiential activities are found.

Based on these results, *H2a is accepted while H2b is rejected*. Although, there is a structural correlation between free time and instrumental activities, the relation is weak. Summarizing, an increasing amount of free time indicates a decreasing preference for instrumental activities.

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[16] The assumptions of linear regression were verified accordingly for all linear regression in this dissertation.

[17] In this case, free time is defined as time that is available for any desired activities and not necessarily related to newly won free time through autonomous driving.

[18] The 5-point scale for these variables ranged from "strongly disagree" until "strongly agree".

Given the weak explanatory power of free time for the aggregated variable Instrumental Activities, the items are investigated separately. Firstly, linear regressions with the three highest rated items are examined: communicating (M=4.13; SD=.854), organizing everyday tasks (M=3.98; SD=.880) and working (M=3.88; SD=1.115) (Appendix 8.5). However, none of these tests shows a statistical significance. Thus, the variable free time does not influence the values assigned to those activities. Further, a Spearman's Correlation test (Appendix 8.6) is applied with all items the aggregated variable contains. Statistically significant correlations are found between the independent variable and "searching online for new products" and "watch the news/ read newspapers". Both correlations are negative. This indicates that the value assigned to those activities decreases with an increasing amount of free time. Although the other items are not statistically significant, negative correlating tendencies are noted. This supports the finding of the initial linear regression using the aggregated variable Instrumental Activities.

The same procedure is applied for experiential activities, as the initial linear regression have statistically significant explanatory power of the aggregated variable Experiential Activities. The three highest rated experiential activities are: Listen to music (M=3.98; SD=1.026), sleep (M=3.78; SD=1.137) and watch movies/series (M=3.75; SD=1.115). Spearman's Correlation test reveals one statistically significant positive correlation between free time and the item "lean back and enjoy the view" (Appendix 8.7). This indicates, that an increasing amount of free time positively influences the valuation of "lean back and enjoy the view".

V.   ATTITUDES TOWARDS INNOVATION – TECHNOLOGY ADAPTATION

Within this hypotheses block, the preference for the activity groups are examined by checking the relation with two other variables: Age groups[19] and level of technology adaptation.

The first hypothesis of this block (H3.1: The preference of activity differentiates with age groups.) investigates eventual differences concerning activity preferences between age groups. Therefore, H3.1a examines differences concerning instrumental activities while H3.1b focused on experiential activities. To perform a parametric One-way ANOVA sample needs to align with the assumptions of a) normal distribution, b) no significant outliers, c) homoscedasticity. Since the Levene's test of Homogeneity of Variance (Table 4) is statistically not significant (p<.635), the assumptions are violated. Therefore, the one-way ANOVA cannot be performed. Instead, a non-parametric Kruskal-Wallis[20] test for independent samples is conducted (Table 5).

[19] The relevant age categories were: 18-24, 25-34, 35-44, 45-54, 55-64.
[20] If a one-way ANOVA cannot be conducted due to violated assumptions, a Kruskal-Wallis test is performed to examine differing means between at least two medians.

For both activity groups, the null-hypotheses are retained. Therefore, no significant differences in the means between the age groups are detected. Summarizing, *H3.1a and H3.2b are rejected*. Therefore, for both types of activities, the preference does not differ with age groups.

	Levene Statistic	Sig.
Experiential Activities	.639	.635
Instrumental Activities	1.826	.126

Table 4: Levene's test of Homogeneity of Variance

	Null-Hypotheses	Sig.	Decision
Experiential Activities	The distribution of EXPER same across categories of AGE?	98,000	Retain H0
Instrumental Activities	The distribution of INSTRU same across categories of AGE?	254,000	Retain H0

Significance level is .05

Table 5: Kruskal-Wallis test for independent samples

The second hypothesis (H3.2: There is a correlation between the level of technology adoption and preference of activities.) assumes a relation between the amount of free time and the preference of activity. Accordingly, H3.2a investigates the correlation between the level of technology adoption and instrumental activities. H3.2b examines the same for experiential activities. A linear regression (Appendix 8) is conducted to predict how the dependent variable (preference towards activity) behaves if the predictor (free time) is increased by one hour. Firstly, the assumptions require verification.

In the next step, it is examined whether the independent variable (Technology Adaptation) can predict the behavior of the two dependent ones (Experiential Activities and Instrumental Activities) in case of an increase of the independent variable. Two linear regressions (one for each activity group) are conducted (Table 6) to examine whether an increase in the willingness to adopt new technologies leads to a change in interest for a specific activity group.

	ANOVA Sig.	R	R²	B Coefficient
Instrumental Activities	.000	.465	.217	.317

Experiential Activities	.778	.021	.000	.013

Predictor (Constant): Technology Adaptation

Table 6: Results linear Regression H3.2a and H3.2b

As the p-value of the ANOVA indicates a statistical significance (p>.000), H0 can be rejected; i.e. the independent variable predicts the dependent variable to a certain degree. The R-value of .465 indicates a weak positive correlation between the variables. The R^2 value of .217 implies that 21.7% of the dependent's variable variance are explained by the independent variable. Accordingly, the unstandardized B value shows an increase in preference for instrumental activities of 31.7 scale points if technology adaption would increase by one scale point. Therefore, *H3.2a can be accepted*. This means, the more willing a person is to adopt to new technologies, the higher the interest for instrumental activities.

The same procedure was conducted for experiential activities. As the p-value in the ANOVA did not show a statistical significance (p<.778), H0 can be accepted. Therefore, the independent variable (level of technology adaptation) does not predict the behavior of the dependent variable. Therefore, the model is not interpreted further and *H3.2b can be rejected*.

As no statistically significant explanatory power of Technology Adaptation is found for Experiential Activities, a Spearman's Correlation is conducted to investigate possible correlations between the single items of the aggregated variable. It is found that solely "Video Games" and "Audiobooks" positively correlate with Technology Adaptation (Appendix 9.5). Therefore, linear regressions are conducted with both single items (Appendix 9.6). Testing Technology Adaptation and Video Games reveal a statistical significance and an R-value of .132 indicating a weak positive correlation between the variables. R^2 (.018) implies that 1.8% of the dependent variable's variance are explained by Technology Adaptation. The statistically significant linear regression for Audiobooks reveals a weak positive correlation (R=.176). It is found that 3.1% (R^2) of the Audiobooks' variance are explained by Technology Adoption. Although these values indicate a substantially weak positive relationship, the aggregated variable does not indicate any relation between the variables.

VI.   BRAND LOYALTY TOWARDS OEMS VERSUS TECHNOLOY COMPANIES

The fourth block of hypotheses is to determine eventual correlation between the level of technology adaptation and the variables about the interest in ADC from technology companies (H_4: There is a correlation between technology adaptation and the interest in ADC from technology companies.). H4a tests correlations between technology adaptation and the belief in

better technologies from technology companies; H4b tests the same for the consideration of buying an AD car from a technology company and H4c examines the attempt of data collection by technology companies.

As those variables cannot be aggregated, correlations between the independent variable (Technology Adaptation) and each dependent variable are conducted[21]. As the Spearman Correlation test is robust towards outliers it is chosen to examine the relationship between the variables. According to the results (Appendix 10), the only variable correlating with Technology Adaptation is the willingness of considering an ADC from a technology company. However, only a weak positive correlation is found (Correlation Coefficient of .218). *H4.1b is accepted*. *H4.1a* (p<.071) and *H4.1c* (p<.378) *can be rejected* as both variables do not statistically significantly correlate with Technology Adaptation. Thus, persons that indicate a high willingness to adopt new technologies, would consider purchasing an autonomous vehicle from technology companies. However, neither the belief in technologies companies delivering better technologies nor the thought of data collection was related to technology adoption.

Correlations: Technology Adaptation		*Variable 1**	*Variable 2***	*Variable 3****
Correlations (Spearman's rho)	**Variable 1***	1	.209	.008
	Variable 2**	.209	1	.165
	Variable 3***	.008	.165	1
Sig. (2-tailed)	**Variable 1***	-	.004	.918
	Variable 2**	.004	-	.024
	Variable 3***	.918	.024	-

* The technology installed within a car will be better if it comes from tech-companies.

** I would consider buying an autonomous driving car from a tech-company that just entered the industry.

*** Tech-companies producing autonomous cars is just another attempt to collect data (reversed; initial item: Q22_10_tech_datacollection)

[21] The reversed variable of datacollection was used (datacollection_R).

V. CONCLUSION AND LIMITATIONS

1. DISCUSSION AND CONCLUSIONS

Generally, the 66.8% of participants stated a positive attitude towards in-car activities and assigned benefits to those technologies. The two-dimensionality of products according to Holbrook and Hirschman (1982) and Voss et al. (2003) was retrieved throughout the data acquisition. According to Batra and Ahtola (1991), the hedonic and utilitarian dimensions of a product contribute to the perceived product gratification to different, subjective degrees. This was confirmed, as the participants rated aspects of both the hedonic and utilitarian dimension as important. Especially, the emotional hedonic dimension was highlighted although consumers agreed on a high utilitarian value. The study revealed that 31.6% of the study participants highly value the aesthetics of their car and 25.1% stated they loved their car. Contrary, only 7.5% agree on a car solely being a matter of transport. Within the interviews, especially emotional aspects were rated as most important aspects of a car (aesthetics, freedom and fun factor through acceleration and speed).

Furthermore, within the study of Deloitte (2016), an increasing trend from owning to sharing vehicles was detected. This finding was not confirmed as 65.8% of participants assigned a significant importance to their cars. Contrary, only 12.3% (M=1.72; Std. Deviation=1.126) stated it would be easy to life without their car. Within the conducted interviews it was stated that none of the possible alternatives would compensate owning a car. It is concluded, the despite the stated disadvantages, cars are highly hedonic products which are considered as crucial part of the everyday lives.

Dungs et al. (2016) stated the consumers' preference for opportunities to fulfil value generating and compulsory tasks to gain leisure time. This was confirmed by this study: Value-generating instrumental activities were rated more essentially on average. Prior literature was enriched by the finding that the interest in instrumental activities decreased with an increasing amount of free time. Thereby, it might be concluded that consumers with less free time especially appreciate the opportunity of value-generating tasks. However, an investigation of the reversed causal relationship between free time and instrumental activities is required as well as additional influences on the interest in instrumental activities. As only few significant correlations with free time and weak explanatory powers of this variable were found, it is concluded that the valuation of experiential and instrumental activities is stronger influenced by other variables

which require further investigation. Nevertheless, 77% participants[22] stated the time gain as the biggest advantage of AD. Although free time did not have explanatory power, the additional free time still is a crucial aspect of AD.

Rogers (1983) stated that new technologies embody uncertainty and a certain risk of adoption. Accordingly, Rogers assigned an important role of social influence to Early Adopters showing a high receptiveness of innovation adoption. The study showed an increasing interest in instrumental activities with an increase in the receptiveness for innovations. It is concluded that persons with a high receptiveness for technology adoption adopt instrumental first and apply their social influence. Thus, experiences and opinions are shared and thereby the adoption is accelerated in later adopter categories. This increases the speed and likelihood of adoption throughout the adoption circle. Accordingly, instrumental activities are rated more essentially than experiential ones. Further, technology-affine people implicated a higher interest in instrumental activities. As the highest rated instrumental activities were communicating, organizing everyday tasks and working, these imply a special focus of development. Furthermore, Dungs et al. (2016) forecasted the highest potential profit for the activities around "Communication" and "Productivity" compared to activities such as "Entertainment". This finding was supported by the survey results. These findings highlight the importance of focusing on instrumental activities for market entry and penetration strategies.

Prior research found that higher monetary values were assigned to one additional hour of free time by younger people (Dungs, et al., 2016). This finding was not supported throughout the data acquisition as no significant differences concerning activity preferences between age groups were detected.

According to Aboagye, et al. (2017), brand loyalty is less important than chasing new technologies. This finding was confirmed throughout both steps of primary research. Participants stated a willingness to switch to technology companies. Although Deloitte (2016) identified a leap of faith in favour for OEMs, no general distrust was stated towards technology companies entering the market. The combination of these findings implies a threatened market positions of OEMs as consumers state a willingness to change. Further, participants stated that OEMs will no longer be relevant if they do not keep pace with market entrants. Within the survey, especially persons with a high receptiveness of adopting technologies might consider purchasing ADC from technology companies. Nevertheless, within the interviews a higher level

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[22] The top two boxes were applied.

of trust was stated towards OEMs as the experience of vehicle production and quality and safety were the main determinants of trust.

2. MANAGERIAL IMPLICATIONS

The following section describes potential actions of OEMs to overcome the threat of new market entrants and leverage existing benefits to profit from in-car activities.

The aforementioned willingness of brand switching of highly receptive people for technology adoption and their social influence on later adopter categories imply a special focus on this consumer group. People with a high willingness to adopt technologies stated interest in instrumental activities. Thereby, the three most valued instrumental activities were communicating, working and organizing everyday life tasks. OEMs enjoy a leap of faith compared to technology companies and thus may benefit from positive brand equity according to Aaker (1991). Therefore, technology-affine persons may support the market introduction of such activities for OEMs due to their interest in activities and openness to new technologies. However, the same group of persons stated a willingness to switch brands and therefore increasing the brand loyalty of such persons is crucial for OEMs. Therefore, it is implicated that firstly, a special focus of research, development, production and marketing should be on those highly rated instrumental activities. Additionally, these posed the highest potential for future profit. Thereby, market entry is enhanced. Secondly, OEMs should focus on activities to increase brand affection of those early-adopting-groups and thereby increase brand loyalty. Thus, economies of scale and a competitive advantage may be reached quickly which increases the market attractiveness.

By specifically investigating the needs and preferences of people with a high willingness to adopt new technologies, communication strategies, product design and components should be adjusted to their needs. Further, OEMs should trigger these persons' inherent social influence and incite recommendations to accelerate adoption in later adopter categories. Currently, this consumer group represents both the highest willingness to adopt technologies and the potential of brand switch. Thereby, a special focus on them is implied as later categories may follow the brand switch due to significant social influence.

Additionally, a cross-cultural analysis of technology adaptation may support the identification of initial test markets. Thus, factors such as average time spent in a car, working hours, cultural traits such as risk-aversiveness, psychographics or further demographics may influence the

process of technology adoption and therefore categorize a country as more or less important as test market. As stated in prior research, the WTP is not dependent on the vehicle segment (Dungs, et al., 2016). Therefore, these activities may be introduced throughout the major product portfolio whereas a higher number of potential consumers is addressed.

Given a lack of trust revealed in prior research and confirmed in the interviews, OEMs should offer opportunities to decrease risk and uncertainty of technology adaptation. Within the interviews, the participants stated that a mixture of both rational and emotional sources is needed to sustainably build trust. This means, that OEMs should focus on proving statistically and technologically how ADC may be safer but also offer opportunities of trial. Further, incentives to recommend and share opinions are crucial. Furthermore, communication activities should build on the existing leap of faith and the greater experience of OEMs for vehicle production. Prior research showed how specific communication enhances the willingness of technology trial. As instrumental activities are considered rather utilitarian, verbal descriptions without visual stimuli achieve this effect (Chaudhuri & Micu, 2014; Pham, 1998) while visual stimuli supported hedonic experiences. Therefore, the communication strategy of such activities should include both rational explanations and justifications in favour for the product but also emotional triggers as the hedonic dimension of the product substantially important for the participants. As most of the interviewees stated and valuation of instrumental activities indicated, consumers want to spend their additional free commute time meaningfully. This comfortable and easy time gain may be a crucial unique selling proposition as a first-mover in the market of AD.

3. LIMITATIONS AND FUTURE RESEARCH

Most of the subsequent limitations may be resolved by future research. The main limitations are related to the quantitative data acquisition process. Given the limited scope of this dissertation, a nonprobability sampling technique was used for both survey methods which may cause selection bias. However, this cannot meet the same quality criteria of probability sampling (Flick, et al., 2004). Combined with a relatively small sample size (valid answers N=187), the representability is limited and the truthfulness of conclusions about the population are limited. As the aggregated variable EXPER showed doubtful Cronbach's Alpha values indicating a low internal validity. Accordingly, not all intended variables could be aggregated due to a lack of internal validity and therefore were tested separately. Statistical measures including this variable and conclusion based upon that may be biased.

Moreover, causal relationships were supposed when testing the influence of an independent variable (Free Time) on both activity groups. A comparatively low R^2 value for instrumental activities (.036) and no explanatory power of the model for experiential activities indicated the need for further research on influencing factors and limits the significance of this hypothesis (Table 3). Future research may increase the explanatory power by a) choosing a larger sample size based on probability sampling techniques and b) examining various possible independent variables. Further, standardized and precisely tested scales may increase the internal validity and allow for more reliable conclusions.

Within this research, experiential and instrumental activities were clearly differentiated and thereby only one dimension for each activity group was considered. However, according to (Batra & Ahtola, 1991), products or services are two-dimensional, thus each product or service carries both hedonic and utilitarian traits. Both dimensions contribute to different degrees to its perceived gratification. The evaluation of the hedonic or utilitarian dimension is subjective and a strict differentiation may be unrealistic. Further consumer research may investigate the degrees to which these activities determine gratification on hedonic and utilitarian dimensions to increase the accuracy of the activity distinction. Additionally, the preferences for consumers with lower levels of technology adaptation need to be derived.

This dissertation is based on a futuristic concept; i.e. present consumer attitudes towards products that will be available in the future were measured. Additionally, the abstraction of the research object complicated the data acquisition as a common framework for the participants of the studies needed to be introduced. Moreover, this dissertation assumes perfectly working and fully ADC and perfect solutions for legal, ethical and infrastructural obscurities. Currently, no clearly defined time frame is given when this scenario might be reality. Conducting similar studies closer to the realization of AD and the implementation of in-car activities may influence the truthfulness of consumer attitudes. Further, legal and ethical aspects are expected to be refined in the short-run. If the legislation keeps pace with the innovation, the market entry and acceptance of technologies will be enhanced.

Concluding, the consumer's attitude towards ADC and new in-car activities is generally positive and are considered to propose an attractive market potential as they may increase the benefit of AD.

VI. APPENDIX

1. APPENDIX 1: DISRUPTIVE VERSUS SUSTAINING INNOVATION: CRITICAL DISCUSSION OF EXISTING LITERATURE

Although Christensen contributed significantly to a common understanding of disruptive innovation, prior literature identified a need of improving the existing theory. In the initial definition of disruptive innovation, Christensen and Raynor (2003) stated that the same innovation may be sustaining to one group but disruptive to another group. According to Nagy et al. (2016) this implies that disruptive innovation causes markets to behave differently. However, no specific characteristics of such innovations were identified as reasons for such changes. Therefore, the lack of a stipulated definition that provides insights into disruptive innovation characteristics was identified. Typical characteristics identified such as inferior but good enough product quality and price competition are defined as being business strategies rather than inherent characteristics of innovation. Thus, the initial definitions rather focus on business strategies concerning market entry and external factors to the innovation such as costs, quality and performance metrics including consumer expectations (Nagy, et al., 2016). Markides (2006) examined how the existing theory is applied for different types of disruptive innovations over time. Markides' argued that different kinds of innovations influence markets differently which implies that each kind needs to be treated as unique phenomena rather than treating them identically. In other words, a refined categorization set is needed to identify varying influences on markets and challenges for companies (Markides, 2006). Chesbrough (2001) and Danneels stated in addition that no consistent terminology was used when proving the initial theory, i.e. a lack of common criteria of classification for differing kinds of technologies was detected.

Summarizing, the theory of disruptive innovation enabled gaining first insights in market phenomena but several questions were left unanswered. It is questionable when a technology becomes disruptive, i.e. whether disruptiveness is an inherent character trait or a technology is disruptive only when an existing market is invaded or when incumbents are displaced by the new technology.

2. APPENDIX 2: LEGAL AND ETHICAL ASPECTS OF AUTONOMOUS DRIVING

VII. CRITICAL ISSUES ABOUT THE ETHICAL AND POLITICAL FRAME

The concept "autonomous driving" addresses various groups of stakeholders[23]. New technologies require the adjustment of the legal framework on national and international levels. A lacking harmonized international legal framework hampers the technological advancements and market acceptance. However, legislations increasingly address this issue. The legislation differentiates automated and autonomous driving. For instance, the Vienna Convention which was passed in 1968 was adjusted to current technological movements. The changes within the contract allow driving assistance systems such as automated functions that may influence the driver's actions within a vehicle. The prerequisite for this adjustment is the design of such technologies according to the provisions of the United Nations or the guaranteed ability of the driver to intervene at any time. Therefore, driverless autonomous driving is not yet enabled as a driver and the ability to intervene are still required.

Differences on national levels are implied by various regulations within the United States or member countries of the European Union. For instance, the German legislation included new rules for automated driving in 2017 as the first country providing a consistent legal framework for highly and fully automated systems. However, the prerequisite is the driver's readiness to overtake control at any time. Fully autonomous driving is not regulated. Within the United States, several individual states pass relevant laws. Since 2011, 22 states authorized the operation of autonomous vehicles. California expanded testing rules for autonomous vehicles in 2018 as the most popular state of testing such vehicles. Autonomous driving is a national concern and regulatory competition arises between different states as they are eager to be at the forefront of systems that may ensure higher levels of safety in traffic. (National Conference of State Legislatures , 2018; Karsten & West, 2018; Schreurs & Steuwer, 2016).

Additionally, the ethical issues need to be addressed. In 2016, the German government implemented an ethics committee that dealt with issues about political and ethical aspects of autonomous driving. 20 guiding theses were developed that define which prerequisites must be fulfilled to guarantee the successful implementation of ethics in autonomous vehicles. The key aspects were: (Bundesministerium für Verkehr und digitale Infrastruktur , 2017):

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[23] This section only frames the existing issues about autonomous driving briefly. It contains a few examples to exemplify the actions undertaken. However, the examples are not describes holistically and detailed given the limited scope of this dissertation.

- Autonomous driving is given if the systems cause less accidents relative to a human driver (increased level of safety).

- The protection of human lives is the highest priority in hazardous situations.

- In case of unavoidable accidents any qualification of human beings based on personal traits such as age, gender or physical or psychological constitution is not permitted.

- In every traffic situation it must be obvious whether the computer or a person is responsible for driving.

- The driver must be able to decide about the transfer and use of collected data.

Summarizing, autonomous driving impacts various areas. A lack of a consistent framework may hamper the development and the market acceptance as it increases the risk and uncertainty for consumers.

3. APPENDIX 3: HALF-STANDARIZED INTERVIEW GUIDELINE

GUIDELINE FOR IN-DEPTH INTERVIEWS

General Information:

Duration: 20-25 minutes

Sample Size: around 5-6 candidates, choice was based on different demographic and psychographic issues in order to ensure the variety of qualitative answers and the breadth of insights out of different angles

Aim of the study: Identification of consumers' attitudes towards new in-car services and the differentiation between hedonic and utilitarian services

1. Introduction/ Warm-up: Car Ownership

START:

Welcoming, thanking for participation.

Indication that there are no wrong or right answers and asking people to answer as honestly as possible.

Interposed questions are welcomed. Vice versa, asking participants to not be surprised about interposed questions from the interviewer

1. Do you currently own a car? / Do you want to own one?

2. What do you think are the advantages and disadvantages of owning a car?

3. Do you enjoy driving a car or do you purely use it as a matter of transportation/ means to an end?

4. Why would you decide to buy/ own a car?

5. Would you be willing to use a sharing service? (you order a car whenever you need it without owning it) → This does not imply that you necessarily need to give up your car (you can use the sharing service as an add-on)

6. What is the main factor of choosing a car? (except for price)

7. Which factor in a car "satisfies" you the most? (Speed, Safety, Technology, Comfort)

Introduce downsides of owning a car: Always searching for parking lots when living in a city. Paying extra fees for renting parking lots. High taxes, insurance and high costs on gas.

Having those disadvantages in mind: Would you still want to own a car?

Rationally: Would you prefer being part of a community of a sharing service for autonomous driving cars?

2. Main Body: Autonomous driving

Collection of participants existing knowledge about the topic, introduction into the topic of discussion. Creation of pleasant atmosphere and answering relevant beforehand questions.

Introduction into autonomous driving and short description how the future might look like: We are now moving on to the topic of autonomous driving. A autonomous driving car is defined as a car that is driven by an intelligent computer and supportive systems, taking over all the actions a human driver would conduct. It is able to communicate with other cars and the streets themselves. The driver becomes a passenger without having to worry about the eventual need of taking over control in complicated situations.

1. Do you like the idea about autonomous driving cars?

2. What do you think are advantages/ disadvantages?

3. Could you imagine to fully give up control?

4. Would you rather buy an autonomous driving car from a well-established brand or would you also consider buying it from tech-companies (start-ups or big players) which recently entered the industry?

5. Would you be willing to pay a higher price for an autonomous driving car (compared to the same car without the function of autonomous driving)?

6. Do you think car companies are facing the urgency to adapt to new technologies?

7. How do you imagine the "car world" in 2035?

3. Main Body: In-Car Services.

Investigation of attitudes and mindset about in-car services by first introducing an exemplary scenario.

Aim: Reveal opinions, preferences, main influencing factors on satisfaction and attitudes towards services.

Introduction into problem statement: Imagine your next own car will be fully autonomous (L4/5). This implies that the technology is developed well enough for the driver to lean back and not be prepared to intervene in complicated traffic situations. Autonomous driving works over long distances, independently from weather conditions and the location (highway, rural roads or certain geographic areas). This means, people will have additional free time during their car rides. This additional free time can be used otherwise.

Based on this situation, new services are offered to be implemented within the cars.

Services= Opportunities like working, entertainment opportunities, information about the landscape/ environment, information about restaurants/ hotels/ bars closeby, phone- or videocalls, talking to other passengers, ...

Hardware components will be implemented by the manufacturer

Services also consist of software components (apps, voice bot based on artificial intelligence...)

> ➔ Example working: Installation of an office within your car, Communication: Software and hardware technologies required, Working out: Treadmill/ space for yoga, Music: piano, Kitchen to prepare food

1. Would you be interested in such services?
2. What was the first thought you had about those services?
3. Would you feel comfortable using them while the car is driving itself?
4. Would you be willing to pay an additional price for those services? (on top of the function of autonomous driving)
5. Would you buy an autonomous car of another brand offering such services if your current/ favorite/ preferred car brand did not offer them?
6. How much would you be willing to pay for an additional hour a day (per month)?
7. Would you like to be free to choose which "service-package" you could implement in your car or would you prefer to have a standardized set of services?
8. Do such services increase your interest in autonomous driving? (added value)
9. Would you like to spend your additional free time in a productive way/ a way that fulfills a certain purpose/ a service with which you can achieve a certain goal or would you prefer entertaining services? (sleeping as a "productive service")
10. Which factors are indispensable for you concerning those services?

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11. Would technology lock-ins (such as the implementation of certain technology brands) or partnerships change your car brand choice?

12. Do you think your perception of a specific car brand will be changed if they offered such services/ or not offered them?

13. Imagine a traditional car brand such as Mercedes Benz or BMW. What do you think will their future look like if they decided to not offer such new technologies (autonomous driving or introducing additional services). Would you still consider buying from them?

14. What would be your preferred payment model?

4. Round-up

Providing the opportunity to talk about topics that haven't been discussed until now

Is there anything we haven't talked about or that came to your mind during this discussion? Do you have any questions?

4. APPENDIX 4: QUANTITATIVE ONLINE SURVEY (ENGLISH VERSION)

Q30

Dear participant,

Thank you very much for taking your time to participate in this study. I sincerely appreciate your effort of supporting me with thoughtful insights. In order to complete my Master Thesis at Católica Lisbon School of Business and Economics, I am researching consumer attitudes towards new in-car activities based on fully autonomous driving.

The survey will take you approximately 7 minutes to complete.

Please be assured that your answers are **strictly anonymous and confidential**. No individual responses will be used. There are **no right or wrong answers** so please make sure to **answer every question as honestly and spontaneously as possible**.

If you have any questions or concerns about this survey, please do not hesitate to contact me immediately: 152116150@alunos.lisboa.ucp.pt.

Have a great day! Melissa Lindt

Q23

This first part of the survey is about your opinion about cars in general.

Please indicate your level of agreement or disagreement for the following statements.

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
The biggest advantages of an own car are freedom and flexibility. (1)	○	○	○	○	○
The biggest disadvantages are the costs of buying and maintaining an own car. (2)	○	○	○	○	○
The aesthetics of my car are important to me. (3)	○	○	○	○	○
A car is exclusively a matter of transport to me. (4)	○	○	○	○	○
I love my car. (5)	○	○	○	○	○
I enjoy driving the car most of the times. (6)	○	○	○	○	○

End of Block: Car Ownership and Emotional versus Rational Value

Start of Block: Autonomous Driving

Q6

PLEASE READ THE FOLLOWING CAREFULLY.

An autonomous driving car is defined as a vehicle that is **guided by an intelligent computer**

and supportive systems. The car **takes over all actions** a human driver made in the past. The **driver becomes a passenger** without having to worry about the eventual need of taking over control in complicated situations. This causes the **passenger to gain additional free time** that might be spent meaningfully by using **new in-car activities**.

This survey is based on the **assumption** of **perfectly working, fully autonomous cars**, i.e. the driver can not intervene any longer but can lean back while the car is guiding itself. The car will **not have a steering wheel**, so the experience will be comparable with sitting on an individual train or plane where you **fully give up control** and trust the computer. Therefore, it is assumed that **all ethical, technological and political doubts were figured out.**

Q19

In this part of the survey, you will be asked questions about autonomous driving. Please indicate

your level of agreement or disagreement for the following statements.

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
I like the idea of autonomous driving. (1)	○	○	○	○	○
I will trust autonomous driving cars. (2)	○	○	○	○	○
Automonous driving will impact traffic and safety positively. (3)	○	○	○	○	○
I would be willing to pay a higher price for an autonomous driving car. (4)	○	○	○	○	○
The function "autonomous driving" provides a benefit. (5)	○	○	○	○	○
Autonomous driving will replace conventional driving. (6)	○	○	○	○	○
I waste a lot of time in the car that I may use otherwise. (7)	○	○	○	○	○

Q22

Please imagine you decided to buy an autonomous driving car. Several new tech-companies such as Apple, Google and smaller Start-ups just entered the market of autonomous driving cars and compete with well-known car brands such as Mercedes-Benz, BMW, Audi etc.

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Please note that the cars of tech-companies are fully certified in safety and comparable to cars produced by well-known car brands.

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
I would consider buying an autonomous car from a well-known car brand. (1)	○	○	○	○	○
I would consider buying an autonomous driving car from a tech-company that just entered the industry. (2)	○	○	○	○	○
I think that well-known car brands produce more reliable autonomous cars. (3)	○	○	○	○	○
I could imagine that autonomus cars produced by well-known car brands look better. (4)	○	○	○	○	○
The technology installed within the car will be better if it comes from tech-companies. (5)	○	○	○	○	○
The performance (speed, acceleration, sound, etc.) and quality (materials, interior and exterior design, fuel efficiency, etc.) will be better from well-known car brands. (6)	○	○	○	○	○
Tech-companies will have a hard time to establish in the market. (7)	○	○	○	○	○
The biggest problem for tech-companies will be a lack of experience and expertise in building cars. (8)	○	○	○	○	○
Well-known car brands will always produce safer and better cars. (9)	○	○	○	○	○

Tech-companies producing autonomous cars is just another attempt to collect data. (10)	○	○	○	○	○

Please indicate your level of agreement or disagreement for the following statements.

Q24
PLEASE READ THE FOLLOWING CAREFULLY.
Please have a look at the following pictures. This is how the interior of an autonomous driving car might look like in the future.

In-car activities are defined as possible opportunities inside the car while it is driving itself.   This means, the inner space of the car may be used for activities like working, sleeping, communicating, reading a newspaper, visiting virtual classrooms, organizing your every-day-

life, watching movies or documentaries, working out, listening to music, etc. For these activities, the car manufacturer includes hardware components such as screens, tables,

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
I like the idea of in-car activities while the car is driving itself. (1)	○	○	○	○	○
I am interested in having additional opportunities in my car. (2)	○	○	○	○	○
Companies that offer such activities are innovative. (3)	○	○	○	○	○
I would not consider buying from companies that do not offer in-car activities for autonomous driving cars. (4)	○	○	○	○	○
Well-known car brands are under pressure to innovate existing products. (5)	○	○	○	○	○
New entrants (Apple, Google, start-ups etc.) will threaten the traditional business of car manufacturers. (6)	○	○	○	○	○
In-car activities increase the benefit of autonomous driving cars. (7)	○	○	○	○	○
"Autonomous driving" does not prodvide a benefit without in-car activities. (8)	○	○	○	○	○
The biggest advantage of autonomous driving is the gain of additional free time. (9)	○	○	○	○	○
Those activities will help me spend my additional free time meaningfully. (10)	○	○	○	○	○

I would be willing to pay for an additional hour of free time a day. (11)	○	○	○	○	○
Time is a very valuable resource to me. (12)	○	○	○	○	○
If any product or service helps me save free time, I am very interested in paying for it. (13)	○	○	○	○	○

speakers, microphones and chairs. These activities are based on the service of autonomous driving. High-speed internet and various apps will be implemented.

Q26 Please indicate your level of agreement or disagreement for the following statements.

Please indicate your level of agreement or disagreement for the following statements.

If I had an additional hour a day, during my car ride I would want to ...

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
Prepare meetings or presentations, read and reply to emails and have calls to save free time. (1)	○	○	○	○	○
Organize my everyday life (online banking, scheduling appointments, ...). (2)	○	○	○	○	○
Shop online (groceries or clothes etc.). (3)	○	○	○	○	○
Participate in virtual classes. (4)	○	○	○	○	○
Take a virtual language course. (5)	○	○	○	○	○
Listen to audiobooks. (6)	○	○	○	○	○
Watch documentaries to educate myself further. (7)	○	○	○	○	○
Sleep. (8)	○	○	○	○	○
Watch movies and series. (9)	○	○	○	○	○
Listen to music. (10)	○	○	○	○	○
Play video games. (11)	○	○	○	○	○
Lean back and enjoy the view. (12)	○	○	○	○	○
This is an attention check. Please select "Somewhat disagree". (13)	○	○	○	○	○
Do yoga or meditate. (14)	○	○	○	○	○

Pursue a hobby (painting, singing, playing the guitar etc.). (15)	○	○	○	○	○
Communicate (phone/texts/ talking) and use social media. (16)	○	○	○	○	○
Search online for new products. (17)	○	○	○	○	○
Collect information about my surrounding (sight seeing, history etc.) (18)	○	○	○	○	○
Watch the news or read a newspaper. (19)	○	○	○	○	○
Consume prepared meals or even prepare them. (20)	○	○	○	○	○
Do my make-up/ body care. (21)	○	○	○	○	○

Q28 You are almost there! Thanks for your patience.

Q1 Do you currently own a car?

▼Yes and it is an important object in my everyday life. (1) ... No but I want to own one within the next 5 years. (4)

Q8 How much free time do you have per day during a normal working week (approximately)?

○ none (1)

○ 1 hours (2)

○ 2 hours (3)

○ 3 hours (4)

○ 4 hours (5)

○ 5 hours (6)

○ 6 hours (7)

○ more than 6 hours (8)

Q9 How many hours a week do you usually work (approximately)?

▼less than 20 hours (1) ... more than 60 hours (7)

Q31

Please indicate your level of agreement or disagreement for the following statements. Compared to my friends...

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
I am most likely one of the first ones to try new services or products. (1)	○	○	○	○	○
I rather try new methods before the others. (2)	○	○	○	○	○
I frequently try to experience new products or services. (3)	○	○	○	○	○

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I am more interested in new technologies. (4)	○	○	○	○	○
People ask me more often about my experiences and opinions about new products and services. (5)	○	○	○	○	○

Q11 What is your gender?

○ Male (1)

○ Female (2)

○ Other (3)

Q12 What is your age?

▼Under 18 (1) ... 85 or older (9)

Q13 What is your highest degree achieved? If currently enrolled, please indicate the highest degree received until now.

○ Less than Highschool (1)

○ Highschool Graduate (2)

○ Trade/ technical/ vocational training (3)

○ Bachelor's Degree (4)

○ Master's Degree (5)

○ MBA (6)

○ PhD (7)

○ Other (8)

Q14 What is your employment status?

○ Student (1)

○ Working Student/ Intern (2)

○ Employed (3)

○ Unemployed (4)

○ Searching for a job (5)

○ Retired (6)

○ Other (7)

Q15 What is your current income (per year)?

○ Less than €10,000 (1)

○ €10,000 - €19,999 (2)

○ €20,000 - €29,999 (3)

○ €30,000 - €39,999 (4)

○ €40,000 - €49,999 (5)

○ €50,000 - €59,999 (6)

○ €60,000 - €69,999 (7)

○ €70,000 - €79,999 (8)

○ €80,000 - €89,999 (9)

○ €90,000 - €99,999 (10)

○ €100,000 - €149,999 (11)

○ More than €150,000 (12)

5. APPENDIX 5: DESCRIPTION OF AGGREGATED VARIABLES

Code Name	Item	Description	Aggregated Name
Q26_1_act_like	I like the idea of in-car activities while the car is driving itself	Items assessing the interest in activities in general.	**Attitude towards activities**
Q26_2_act_interest	I am interested in having additional opportunities in my car.		
Q_27_6_exp_audiobooks	Listen to audiobooks.	Initial question: "If I had an additional hour a day, during my car ride I would want to…" The level of agreement towards these opportunities was stated. All items about experiential activates were aggregated.	**Experiential Activities**
Q_27_8_exp_sleep	Sleep.		
Q_27_9_exp_movies	Watch movies and series.		
Q_27_10_exp_music	Listen to music.		
Q_27_11_exp_videogames	Play video games.		
Q_27_12_exp_relaxview	Lean back and enjoy the view.		
Q_27_14_exp_yoga	Do yoga or meditate.		
Q_27_15_exp_hobby	Pursue a hobby (painting, singing, playing the guitar, etc.)		
Q_27_20_exp_eat	Consume prepared meals or even prepare them.		
Q_27_21_exp_bodycare	Do my make-up/ body care.		
Q_27_1_instr_work	Prepare meetings or presentations, read and reply to emails and have calls to save free time	Initial question: "If I had an additional hour a day, during my car ride I would want to…" The level of agreement towards these opportunities was stated. All items about instrumental	**Instrumental Activities**
Q_27_2_instr_organize	Organize my everyday life (online banking, scheduling appointments, …)		
Q_27_3_instr_shop	Shop online (groceries or clothes etc.)		
Q_27_4_instr_classes	Participate in virtual classes.		
Q_27_5_instr_language	Take a virtual language course.		

Q_27_7_instr_documentaries	Watch documentaries to educate myself further.	activates were aggregated.	
Q_27_16_instr_communicate	Communicate (phone/texts/talking) and use social media.		
Q_27_17_instr_compareprods	Search online for new products.		
Q_27_18_instr_collectinfos	Collect information about my surrounding (sight-seeing, history etc.)		
Q_27_19_instr_news	Watch the news or read a newspaper.		
Q_31_1_adopt_firsttrying	I am most likely one of the first ones to try new services or products.	Initial question: "Compared to my friends…" Agreement to these statements was stated. All items concerning technology adaption and receptiveness were aggregated.	**Technology Adaptation**
Q_31_1_adopt_newmethods	I rather try new methods before the others.		
Q_31_1_adopt_newexp	I frequently try to experience new products or services.		
Q_31_1_adopt_interestnewtechs	I am more interested in new technologies.		
Q_31_1_adopt_socialinfluence	P		

6. APPENDIX 6: H₁.₁ FREQUENCIES – ATTITUDE TOWARDS ACTIVITIES

Scale Point	Frequency	Valid Percent
1,00	1	0,5
1,50	5	2,7
2,00	11	5,9
2,50	10	5,3
3,00	11	5,9
3,50	24	12,8
4,00	58	31
4,50	29	15,5
5,00	38	20,3
Total	187	100

M=3.877; SD=.945

7. APPENDIX 7: H₁.₂ PAIRED SAMPLES T-TEST

1. ASSUMPTIONS: NORMAL DISTRIBUTION OF THE DIFFERENCE OF THE PAIRED VALUES
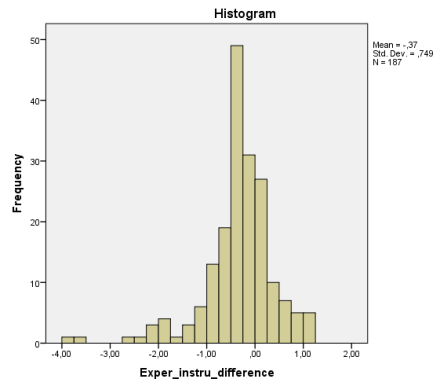
2. PAIRED SAMPLE CORRELATIONS

	N	Correlation	Sig.
Paired Experiential & Instrumental Activities	187	.230	.002

3. PAIRED SAMPLES TEST: PAIRED DIFFERENCES

	Mean	Std. Deviation	Std. Error Mean	Sig. (2-tailed)
Paired Experiential & Instrumental Activities	-.037005	.74917	.05478	.000

4. PAIRED SAMPLES STATISTICS

	Mean	N	Std. Deviation	Std. Error Mean
Experiential	3.1545	187	.56807	.04154
Instrumental	3.5246	187	.63655	.04655

8. APPENDIX 8: H2A AND H2B LINEAR REGRESSION – VERIFICATION OF ASSUMPTIONS

1. *LINEAR RELATIONSHIP BETWEEN VARIABLES AND HOMOSCEDASTICITY*
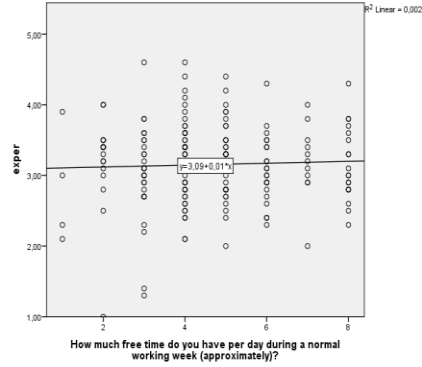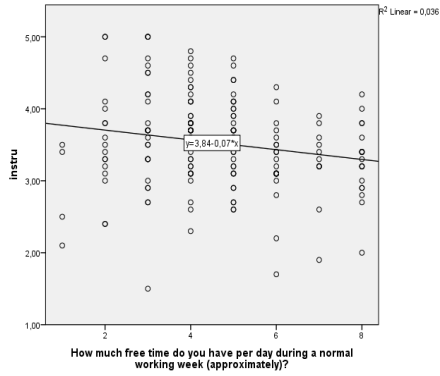
2. *NORMAL DISTRIBUTION OF RESIDUALS*
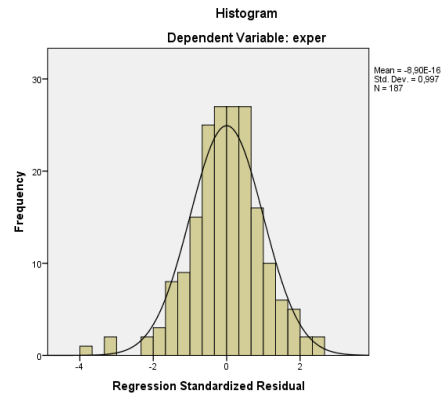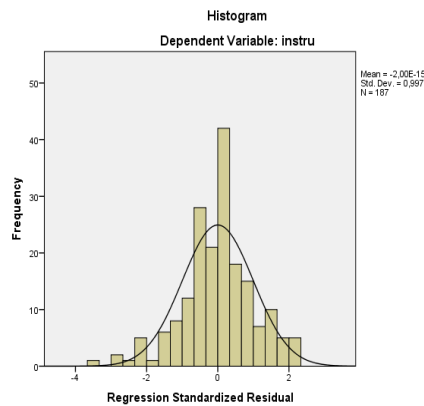
3. *NO MULTI-COLLINEARITY (NONE OF THE VALUES WAS ABOVE 0.8)*

		Free Time	Experiential Activities	Instrumental Acitivies
Correlations (Pearson)	*Free Time*	1	.042	-.190**
	Experiential Activities	.042	1	.230**
	Instrumental Activities	-.190**	.230**	1
Sig. (2-tailed)	*Free Time*	-	.572	.009
	Experiential Activities	.572	-	.002

Instrumental Activities	.009	.002	-

** Correlation significant at the 0.01 level (2-tailed).

4. *NO AUTO-CORRELATION (DURBIN WATSON CLOSE TO 2)*

	Durbin Watson
Instrumental Activities	1.853
Experiential Activities	1.663

5. *LINEAR REGRESSIONS WITH SINGLE ITEMS*

	ANOVA Sig.	**R**	**R²**	**B Coefficient**
Communication	.920	.007	.000	.004
Working	.912	.008	.000	-.005
Organizing everyday tasks	.154	.105	.011	-.052

Predictor: Free Time

6. *SPEARMAN'S CORRELATION TEST (INSTRUMENTAL ACTIVITY ITEMS)*

| **Correlations: Free Time**		*Search online for new products*	*Watch the news or read a newspaper*
Correlations (Spearman's rho)	**Free Time**	-.243	-.240
Sig. (2-tailed)	**Free Time**	.001	.001

7. *SPEARMAN'S CORRELATION TEST (EXPERIENTIAL ACTIVITY ITEMS)*

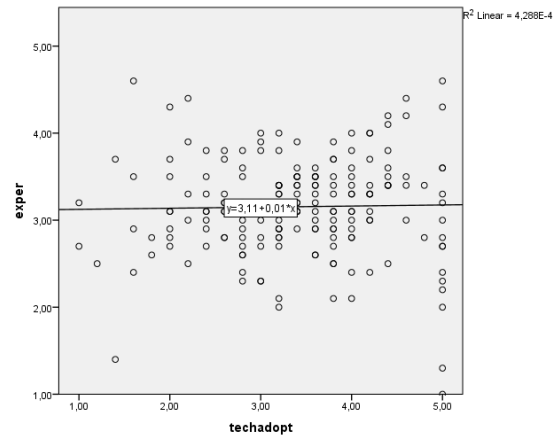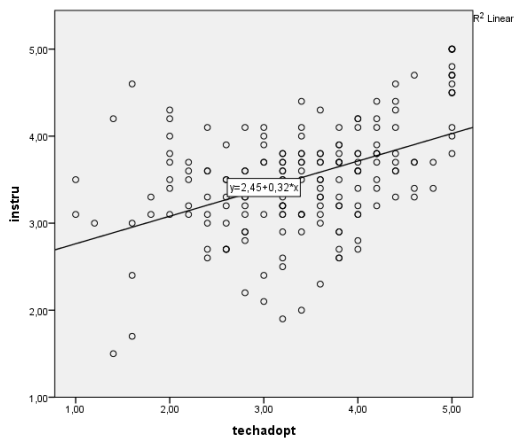| **Correlations: Free Time**		*Lean back and enjoy the view*
Correlations (Spearman's rho)	**Free Time**	.155
Sig. (2-tailed)	**Free Time**	.035

9. APPENDIX 9: H$_{3.2A}$ AND H$_{3.2B}$: LINEAR REGRESSION

1. NORMAL DISTRIBUTION OF RESIDUALS
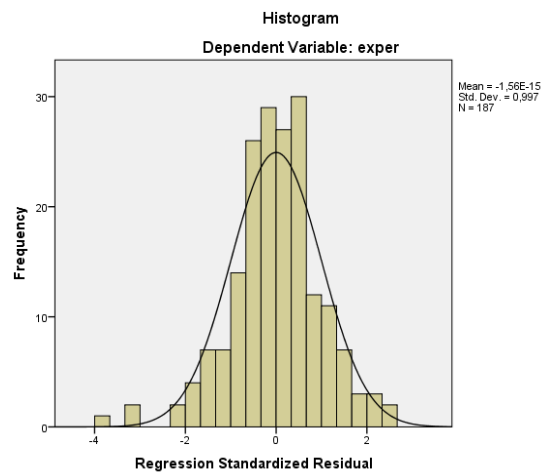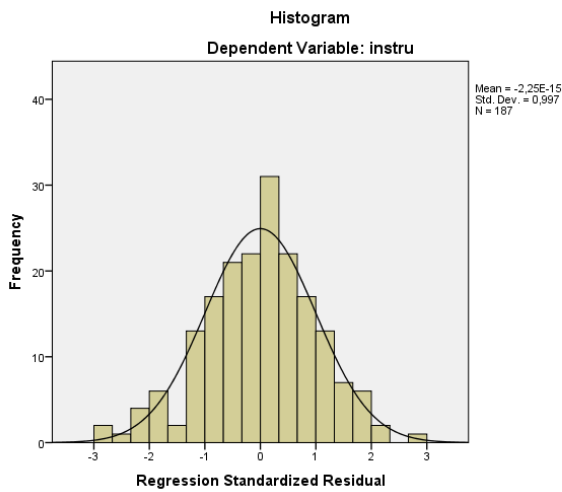
2. LINEAR RELATIONSHIP BETWEEN VARIABLES AND HOMOSCEDASTICITY

3. NO MULTI-COLLINEARITY (NONE OF THE VALUES WAS ABOVE 0.8)

		Technology Adaptation	Experiential Activities	Instrumental Activities
Correlations (Pearson)	Technology Adaptation	1	.21	.465**
	Experiential Activities	.021	1	.230**
	Instrumental Activities	.465**	.230**	1
Sig. (2-tailed)	Technology Adaptation	-	.778	.000
	Experiential Activities	.778	-	.002

Instrumental Activities	.000	.002	-

** Correlation significant at the 0.01 level (2-tailed).

4. NO AUTO-CORRELATION (DURBIN WATSON CLOSE TO 2)

	Durbin Watson
Instrumental Activities	1.843
Experiential Activities	1.631

5. SPEARMAN'S CORRELATION TEST: EXPERIENTIAL ACTIVITY ITEMS

Correlations: Technology Adaptation		*Play video games*	*Listen to audiobooks*
Correlations (Spearman's rho)	**Technology Adaptation**	-.243	-.240
Sig. (2-tailed)	**Technology Adaptation**	.001	.001

6. LINEAR RGERESSIONS WITH EXPERIENTIAL ACTIVITY ITEMS

	ANOVA Sig.	**R**	**R²**	**B Coefficient**
Play video games	.071	.132	.018	.180
Listen to audiobooks	.016	.176	.031	.242

Predictor: Technology Adaptation

10. APPENDIX 10: H41A-C: SPEARMAN CORRELATION

1. CORRELATIONS

Technology Adaptation		
	Pearson Correlation	*Sig. (2-tailed)*
*Q22_5_tech_techbetterfromtech**	.119	.105
*Q22_2_tech_considertech***	.241	.001
*Datacollection_R****	.026	.721

* The technology installed within a car will be better if it comes from tech-companies.

** I would consider buying an autonomous driving car from a tech-company that just entered the industry.

*** Tech-companies producing autonomous cars is just another attempt to collect data (reversed; initial item: Q22_10_tech_datacollection)

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