Explaining consumer intentions to use autonomous vehicles

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ABSTRACT

The authors develop and test a model explaining consumer intentions to use fully autonomous vehicles (AVs). Based on the TAM, TPB and UTAUT2, the model includes attitudinal, motivational, resource-related, normative and habitual influences on intention. To test the model, the authors use an experiment comparing intentions to use AVs with or without optional manual controls. While no significant differences between the two AV variants are observed, the results reveal several antecedents of AV adoption: attitude toward using AVs, habitual compatibility, perceived usefulness, perceived enjoyment, perceived risk, perceived self-identity, perceived ease of use, and personal norms all have direct or indirect influences on AV usage intentions. Taken together, these constructs explain a high degree of the variance in intentions to use both AVs with (77%) and without (81%) manual controls. The paper concludes with implications and suggestions for future research.

Keywords  
autonomous vehicles, autonomous products, self-driving cars, innovation adoption, structural equation modeling

1. INTRODUCTION

Autonomous vehicles (AVs) are currently on the path to becoming the first truly intelligent autonomous products available to consumers (Gill et al., 2015), and are on the agenda of all major car producers today, as well as several large tech companies such as Google, Apple, Intel and Uber. Tesla even claim that their cars produced since late 2016 already have the
necessary hardware for autonomous driving at a safety level higher than human driving, and that software updates will enable these cars to operate autonomously in the near future (Tesla, 2016). Statista (2018) suggests that the global market for autonomous vehicles in 2025 will be 36 billion US dollars for partially autonomous vehicles and 6 billion US dollars for fully autonomous vehicles, while Intel estimates the total global economic impact of autonomous driving technologies to reach seven trillion US dollars by 2050 (Strategy Analytics, 2017).

AVs are also predicted to have other large consequences for society. First, AVs that remove the human component to driving could save millions of lives by reducing both the number and severity of traffic accidents (Fagnant & Kockelman, 2015). Second, AVs may reduce car emissions, optimize traffic and improve fuel economy (Fagnant & Kockelman, 2015). Third, AVs could reduce commute time and free up users’ time in the vehicle, while simultaneously improving mobility for individuals who currently cannot drive (Fagnant & Kockelman, 2015). Fourth, AVs may change the industry’s design focus from optimizing the driving experience to creating experiences while driving (Shanker et al., 2013). Finally, as consumer preferences are shifting toward on-demand access of transportation over ownership (Crews, 2015), AVs may bring about major changes to the automobile business model. Hence, understanding customers’ criteria for adopting and using AVs is of interest to society, and will be critical for car producers to survive and profit from the large changes and opportunities brought by AVs in the future.

Although AV adoption could have a major impact on the car industry and society, user acceptance of AVs represents the least understood aspect of autonomous driving technologies (Rosenzweig & Bartl, 2015). A systematic review of surveys on acceptance of AVs was published in 2017 (Becker & Axhausen, 2017). Of the 17 studies included in the review, four were published articles, three were conference papers, and the remaining 10 were reports. These studies reveal several consumer opinions regarding AVs, and some also include measures of technology acceptance, willingness to pay, or usage intention. However, few studies investigated the antecedents of adoption intention and their relative importance with respect to the adoption decision. Furthermore, a theoretical or conceptual model to base such studies on is lacking (Zmud et al., 2016). Hence, the purpose of this paper is to develop a model of predictive antecedents on consumer intentions to use AVs, and test it on a sample of potential customers.

Since the capabilities of intelligent autonomous products mainly follow from computer technology (Rijsdijk et al., 2007), we base our research model on frameworks from the information systems research – the TAM (Davis, 1989), TPB (Ajzen, 1991) and UTAUT2 (Venkatesh et al., 2012) – yet adapt the model to suit the study of AV adoption in particular by consulting findings in related research areas. The resulting model captures a broad spectrum of antecedents influencing adoption of AVs (Figure 1).

A key distinction between AVs and non-autonomous cars is the capacity to independently make decisions and operate controls, thereby relieving the user of the task of driving. However, industry players are currently developing two different types of AVs: Some developers have based their strategy on an incremental introduction of AV technology in addition to manual driving (e.g., Tesla), while others attempt to develop fully computer-controlled vehicles without manual controls (e.g., Google). Since AVs of the future
may differ in terms of being autonomous and manual (AM) or autonomous only (AO), we seek to assess the validity of our model in both cases. In addition, previous research has noted significant differences in consumer perceptions of AVs depending on the level of vehicle automation (Rödel et al., 2014). While we only study consumer intentions to adopt AVs with SAE Level 5 Full Automation (SAE International, 2016), i.e. vehicles capable of performing all driving functions under all conditions without human intervention, we test for the potential moderating effects of including manual controls that allow for optional human driving.

Below, we present the research model of the empirical study, including the hypotheses for direct and indirect effects on intention to use AVs. We then test the model using data from an online survey of potential adopters of AVs, before we discuss the findings, their implications for research and practice, as well as avenues for future research.

**Figure 1: Research Model**

### 2. RESEARCH MODEL

Technology adoption research typically focuses on intention to use the innovation (e.g., Davis et al., 1989; Moore & Benbasat, 1991; Venkatesh et al., 2012). Behavioral intention is defined as “the strength of one’s intention to perform a specific behavior” (Fishbein & Ajzen, 1975:288), and is frequently predicted by utilizing multi-attribute models.

The Theory of Planned Behavior (TPB: Ajzen, 1991) and the Technology Acceptance Model (TAM: Davis, 1989) are the two most commonly used models to predict technology
adoption. More recently, the extended Unified Theory of Acceptance and Use of Technology (UTAUT2: Venkatesh et al., 2012) has provided a model specifically developed for the study of technology adoption in consumer settings.

The TPB postulates three predictors of behavioral intention; attitudes toward the behavior, social (subjective) norms and perceived behavioral control (Ajzen, 1991), while the TAM includes two antecedents of adoption intention; perceived usefulness and perceived ease of use (Davis, 1989). Building in part on the TAM and the TPB, the UTAUT2 includes similar constructs to usefulness (i.e., performance expectancy), ease of use (effort expectancy), social norm (social influence), and behavioral control (facilitating conditions), but adds hedonic motivation, price-value\(^1\), and habit as antecedents of usage intention (Venkatesh et al., 2012).

In addition to constructs taken from these frameworks, we explore three additional factors that have been revealed as relevant to either consumer adoption of autonomous products in general, adoption of other car innovations, or as important motives for car use: perceived self-identity (e.g., Bergstad et al., 2011; Steg, 2005; Stradling et al., 1999), perceived risk (Rijsdijk & Hultink, 2003) and personal norms (Jansson, 2011; Petschnig et al., 2014).

Inspired by the TPB, TAM and the UTAUT2 models, we propose a model for studying adoption of AVs (Figure 1) based on a broad spectrum of antecedents pertaining to attitudinal (attitude toward use), motivational (perceived usefulness, enjoyment, self-identity, and risk), resource-related (perceived behavioral control and ease of use), normative (social and personal norms) and habitual (habitual compatibility) influences on usage intention. All antecedents are well anchored in established adoption theory.

2.1 Attitudinal Influences

Attitudinal influences are included in this paper in terms of attitudes toward using AVs, defined as the degree to which the consumer has a favorable or unfavorable evaluation or appraisal of using AVs (Ajzen, 1991:188). Attitudes toward use generally exert a positive influence on an individual’s behavioral intention (Ajzen, 1991; Fishbein & Ajzen, 1975), and have been found to affect consumer intentions to adopt AVs (Payre et al., 2014).

\[ H1: \text{Attitude toward using AVs has a positive influence on intention to use AVs.} \]

2.2 Motivational Influences

Perceived usefulness and hedonic motivation can be seen as motivational influences on intention (see Davis et al., 1992; Nysveen et al., 2005; van der Heijden, 2004), as products fulfill distinct underlying consumer needs or motivations along functional, hedonic and symbolic dimensions (Park et al., 1986). These three motivational dimensions are commonly explored in technology adoption studies (e.g., Hong & Tam, 2006; Nysveen et al., 2005; Venkatesh & Brown, 2001), and have been revealed as central consumer motives for both car use (e.g., Kent, 2014; Steg, 2005; Stradling et al., 1999) and adoption of car inno-

\[ \text{1. We excluded price-value as the price of using AVs was not established at the time of this study.} \]
Pertaining to functional motivation, perceived usefulness is defined as the degree to which a person believes that using a product would enhance his or her performance (Davis, 1989:320). Consumers report several functional benefits from using AVs, for instance in terms of saving or freeing up users’ time and increasing productivity (e.g., Howard & Dai, 2013; Schoettle & Sivak, 2014). Thus, perceived usefulness should impact intentions to use AVs positively.

H2: Perceived usefulness has a positive influence on intention to use AVs.

Hedonic motivation, often conceptualized as perceived enjoyment, can be defined as the intrinsic reward obtained from using an innovation (Venkatesh et al., 2012:161). The enjoyment users get from using an AV may be influenced both by a reduced need to operate the vehicle, for instance in tedious traffic conditions, and an increased possibility to perform other entertaining activities, such as using one’s smartphone while being driven. Enjoyment related factors have previously been linked to consumer intentions to use AVs (Becker & Axhausen, 2017; Zmud, 2016).

H3: Perceived enjoyment has a positive influence on intention to use AVs.

Furthermore, Starbuck and Webster (1991) suggest that enjoyment contributes to extrinsic motivation. As perceived enjoyment could affect the value of the time AVs free up for consumers, we hypothesize that enjoyment influences the perceived usefulness of the product. Past studies have revealed a direct influence of perceived enjoyment on perceived usefulness in technology adoption (Arbore et al., 2014; Hong & Tam, 2006).

H4: Perceived enjoyment has a positive influence on the perceived usefulness of AVs.

Regarding symbolic motivation, research on motives for car use reveals several symbolic functions that strongly influence car use, such as status, sociability, ego-formation and power, which serve as signals both to oneself and to one’s peers (e.g., Bergstad et al., 2011; Steg, 2005; Stradling et al., 1999). AV adoption may have various symbolic implications. For instance, AVs may represent a status symbol as cutting-edge technology, or pose a challenge to one’s identity by performing a task the user might view as an expression of self. Consequently, perceived self-identity, defined as how well the innovation reflects and expresses one’s social and personal identity (Arbore et al., 2014), should affect intention to use AVs.

H5: Perceived self-identity has a positive influence on intention to use AVs.

In addition, we address risk perceptions, which may give people motivation to avoid using an innovation (Sheth, 1981). Perceived risk, defined as the potential realization of negative goals or the failure to satisfy positive goals (Moreau et al., 2001), is included as a variable in many technology adoption studies to complement the TAM (e.g., Lee, 2009). Previous
studies have shown that perceived risk influences consumer appreciation of autonomous products (Rijsdijk & Hultink, 2003). Potential safety risks are reported to be consumers’ main concern regarding AVs (Schoettle & Sivak, 2014). Consequently, we expect consumer perceptions regarding AV safety risks to affect usage intention.

**H6: Perceived risk has a negative influence on intention to use AVs**

Finally, an individual’s evaluation of salient beliefs about a behavior has the potential to impact the individual’s general attitude toward the behavior (Ajzen, 1991; Fishbein & Ajzen, 1975). Thus, evaluations of positive outcomes (e.g., perceived usefulness) should positively affect attitude toward using the product, while evaluations of negative outcomes (e.g., perceived risk) should affect attitude negatively. Such relationships have previously been reported in adoption research with respect to perceived usefulness (e.g., Davis, 1989), perceived enjoyment (e.g., Nysveen et al., 2005), symbolic factors (e.g., Karahanna et al., 1999), and perceived risk (e.g., Rijsdijk & Hultink, 2003).

**H7: Perceived usefulness has a positive influence on attitude toward using AVs.**

**H8: Perceived enjoyment has a positive influence on attitude toward using AVs.**

**H9: Perceived self-identity has a positive influence on attitude toward using AVs.**

**H10: Perceived risk has a negative influence on attitude toward using AVs.**

### 2.3 Resource-related Influences

Resource-related influences cover perceptions of external and internal constraints on behavior that may affect intention (Ajzen, 1991). Although consumers may have good reasons for adopting an AV, perceptions of whether they will be able to make full use of the product’s benefits may affect adoption intention.

**Perceived behavioral control** covers consumers’ perception regarding “the presence or absence of requisite resources and opportunities” to adopt an innovation (Ajzen & Madden, 1986:457). Perceptions regarding resource availability may shape consumer intentions to use AVs as, for instance, the computers and sensors needed to enable autonomous driving are expected to add significantly to the price of cars (Fagnant & Kockelman, 2015).

**H11: Perceived behavioral control has a positive influence on intention to use AVs.**

**Perceived ease of use,** defined as “the degree to which a person believes that using a particular system would be free of efforts” (Davis, 1989:323), represents a resource-related influence covering the match between a consumer’s abilities and the skills required to make use of an innovation (Mathieson, 1991). Consumers who perceive AVs as easy to use report higher intentions to adopt such vehicles (Zmud et al., 2016).

**H12: Perceived ease of use has a positive influence on intention to use AVs.**
Perceived ease of use often serves as an antecedent of perceived usefulness since consumers perceive greater utility from adopting products that are easy to use (Davis, 1989). Consequently, potential AV adopters may find the product more useful if they believe it will be easy to use.

H13: Perceived ease of use has a positive influence on the perceived usefulness of AVs.

According to the TAM, perceived ease of use also influences attitude toward the product (Davis, 1989; Karahanna et al., 1999). A direct influence of perceived ease of use on attitude has been shown in numerous innovation adoption studies (e.g., Davis, 1989; Karahanna et al., 1999; Nysveen et al., 2005), including studies on consumer intentions to adopt car innovations (Petschnig et al., 2014). Thus, consumers who perceive AVs as easy to use may have more favorable attitudes toward using one.

H14: Perceived ease of use has a positive influence on attitude to use AVs.

2.4 Normative Influences

Normative influences refer to the role played by perceived social pressures and moral obligations to adopt an innovation (Ajzen, 1991). AVs have several implications for society that may lead to normative influences on usage intentions, for instance in terms of improving traffic safety and abating car emissions (Fagnant & Kockelman, 2015).

Social norms are proposed in the TPB (Ajzen, 1991) and UTAUT2 (Venkatesh et al., 2012), and are defined as “the person’s perception that most people who are important to him think he should or should not perform the behavior in question” (Fishbein & Ajzen, 1975:302). Social norms have previously been linked to AV adoption intentions (Zmud, 2016), and have been revealed as important in connection with adoption of other car innovations, such as alternative fuel vehicles (Jansson, 2011; Petschnig et al., 2014). Given the positive impact AVs can have on traffic efficiency, safety and the environment, people may perceive a social pressure to use AVs once they are available.

H15: Social norms have a positive influence on intention to use AVs.

Personal norms are defined as a consumer’s “personal feelings of moral obligation or responsibility to perform, or refuse to perform, a certain behavior” (Ajzen, 1991:199). While not included in the TPB, they are expected to have similar effects on intention as social norms, since an individual acts in accordance with perceived internal or external pressures (Ajzen, 1991). Personal norms regarding the environment have previously been found to positively influence adoption intention of alternative fuel vehicles (Petschnig et al., 2014). Since AVs are expected to have a positive environmental impact (Fagnant & Kockelman, 2015), consumers’ personal norms regarding the environment may affect usage intention.

H16: Personal norms have a positive influence on intention to use AVs.
2.5 Habitual Influences

The UTAUT2 (Venkatesh et al., 2012) proposes habit as an antecedent of technology adoption. While direct measures of past behavior or habit are difficult to implement in studies pertaining to new technologies, such as AVs, people tend to generate intentions for future responses which are consistent with past behavior due to self-perception processes or cognitive consistency pressures (Ouellette & Wood, 1998). As such, consumers who perceive AVs to be consistent with their current habits and fit into their lifestyle may be more likely to make use of the technology. Hence, we propose that habitual influences can be studied based on consumers’ perception of habitual compatibility, defined as the degree to which using AVs is perceived as compatible with consumers’ habits, past experiences, and lifestyle².

H17: Habitual compatibility has a positive influence on intention to use AVs.

In addition, AVs potential of bringing utility to potential adopters may depend on the extent to which the perceived necessary changes to their current habits and lifestyle are deemed acceptable (see Rogers, 1983). Consumers who see the innovation as compatible with their lifestyle and past experiences are more likely to find it useful (Holak & Lehmann, 1990). Therefore, we hypothesize that consumers who perceive greater habitual compatibility of using AVs will find them more useful.

H18: Habitual compatibility has a positive influence on the perceived usefulness of AVs.

2.6 Comparing AVs With and Without Manual Controls

As industry players are pursuing both AVs with and without manual controls, we seek to test our model for each scenario: autonomous and manual (AM) versus autonomous only (AO). Since these variants are equal in terms of the level of automation (SAE Level 5), we expect our model to be applicable in both scenarios.

However, previous studies on consumer opinions toward AVs have reported worries over loss of control or reduced driving pleasure if manual controls are not available (e.g., Kyriakidis et al., 2015). Thus, the inclusion of manual controls (i.e., a steering wheel and pedals) in the AM scenario may have potential moderating effects on the hypothesized relationships. Consumers may, for instance, perceive differences in terms of how much control they have over the car, how innovative or radical the technology is, or the extent to which the AV replaces them as drivers. Such perceptions could, in turn, affect the factors included in our model. For example, there could be differences in the role played by perceived enjoyment, if the user finds pleasure in the activity of driving; perceived self-identity, if driving skills are part of what shapes the user’s sense of self; or perceived risk, if the user believes manual driving is safer under certain conditions.

At the same time, there is also a growing consumer acceptance of the notion that vehicles control critical functions such as braking and steering (JDPA, 2015), and consumers’

². Our measure of habitual compatibility lends from the compatibility construct in the Diffusion of Innovations Model (Rogers, 1983), yet disentangles its multidimensional content (see Karahanna et al., 1999) to focus solely on habitual fit.
desire to feel in control has been reported to not influence AV usage intentions (Zmud et al., 2016). There are also indications that drivers soon start trusting the autonomous capacities of the vehicle, as driving performance decreases with higher levels of automation (Strand et al., 2014). If users are generally willing to entrust the car with the task of driving, optional manual controls may not be perceived as a key differentiator between AVs.

Hence, we do not hypothesize any specific effect of including manual controls, but rather explore potential moderating effects on all structural paths through the following proposition:

P1: Influences of the antecedents included in the research model may vary across the AM and AO groups.

3. METHOD

3.1 Data Collection and Sample
To test the hypotheses, we conducted an online survey between 15 April and 10 May 2016, in which we employed an experimental design using scenarios to test for structural differences between AVs with (AM) and without (AO) manual controls (please see Appendix A for a description of the AM and AO scenarios). Participants were randomly assigned into two even groups and were presented with different stimulus texts focused on one of the AV variants, along with an introductory text to the topic (Appendix A).

The survey was distributed to 3252 student email addresses at a Norwegian university, as well as through social media to reach a wider population. Participation in the survey was voluntary and not compensated. There were 383 respondents to the study. However, 63 respondents were deleted because they had more than nine consecutive identical answers or a completion time shorter than 180 seconds. These two criteria were used to identify careless responding. Consequently, the final sample consisted of 320 responses (160 in each group). As can be seen in Table 1, respondents were relatively young and highly educated. Both age and education levels were included as control variables in the model.

Table 1: Sample demographics (N=320)

<table>
<thead>
<tr>
<th>Gender</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>49.4</td>
</tr>
<tr>
<td>Female</td>
<td>50.6</td>
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</table>

<table>
<thead>
<tr>
<th>Age</th>
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</tr>
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<tbody>
<tr>
<td>18–24</td>
<td>48.4</td>
</tr>
<tr>
<td>25–29</td>
<td>37.8</td>
</tr>
<tr>
<td>30–39</td>
<td>8.8</td>
</tr>
<tr>
<td>40+</td>
<td>5.0</td>
</tr>
</tbody>
</table>
3.2 Measures

Based on the recommendation by Moore and Benbasat (1991), we worded all items in terms of using the innovation, e.g., attitude toward using the product, not toward the product itself. Moreover, we measured all items (Table 2) using seven-point Likert-type scales (ranging from strongly disagree to strongly agree), except for attitude toward use, which we measured on a semantic differential scale with four items adapted from Bagozzi and Dholakia (2006) and Nysveen et al. (2005).

To measure perceived usefulness, we adapted three items from Davis et al. (1989) and Karahanna et al. (1999). For perceived enjoyment, we used four items from Hong and Tam (2006) and Nysveen et al. (2005), and worded them to cover both enjoyment from the drive itself and activities performed while riding the AV. We utilized four items from Arbore et al. (2014) to measure perceived self-identity, and made use of three items very similar to those employed by Wiedmann et al. (2011) to measure perceived risk.

Furthermore, we measured perceived behavioral control with three items adapted from Taylor and Todd (1995) and took three items from Davis et al. (1989) to measure perceived ease of use. The three items we used to measure social norms were based on those used by Hong and Tam (2006), while we adapted three items from Jansson (2011) and Petschnig et al. (2014) to measure personal norm.

Moreover, we used three items to measure habitual compatibility, adapting two items from Meuter et al. (2005) and one from Petschnig et al. (2014). Finally, we adapted two items from Hong and Tam (2006) to measure intention to use AVs.

### Education

<table>
<thead>
<tr>
<th>Education</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than high school</td>
<td>0.3</td>
</tr>
<tr>
<td>High school graduate</td>
<td>18.1</td>
</tr>
<tr>
<td>Bachelor / 3 year degree</td>
<td>48.1</td>
</tr>
<tr>
<td>Master / 5 year degree</td>
<td>32.2</td>
</tr>
<tr>
<td>PhD / more than 5 year degree</td>
<td>1.3</td>
</tr>
</tbody>
</table>

### Nationality

<table>
<thead>
<tr>
<th>Nationality</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norwegian</td>
<td>82.8</td>
</tr>
<tr>
<td>Other</td>
<td>17.2</td>
</tr>
</tbody>
</table>
Table 2: Items and convergent validity

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item Description</th>
<th>Loadings</th>
<th>CR</th>
<th>AM</th>
<th>AVE</th>
<th>OA</th>
<th>AO</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived usefulness</td>
<td>Using an AV would give me more time for other activities.</td>
<td>0.69</td>
<td>0.88</td>
<td>0.85</td>
<td>0.65</td>
<td>0.65</td>
<td>0.65</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>Using an AV would make my life easier.</td>
<td>0.78</td>
<td>0.83</td>
<td>0.80</td>
<td>0.76</td>
<td>0.76</td>
<td>0.76</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>I would find an AV useful in my daily life.</td>
<td>0.90</td>
<td>0.88</td>
<td>0.91</td>
<td>0.87</td>
<td>0.87</td>
<td>0.87</td>
<td>0.91</td>
</tr>
<tr>
<td>Perceived enjoyment</td>
<td>Perceived enjoyment</td>
<td>0.87</td>
<td>0.88</td>
<td>0.92</td>
<td>0.94</td>
<td>0.94</td>
<td>0.94</td>
<td>0.92</td>
</tr>
<tr>
<td></td>
<td>I would find it enjoyable to use an AV.</td>
<td>0.90</td>
<td>0.91</td>
<td>0.92</td>
<td>0.92</td>
<td>0.92</td>
<td>0.92</td>
<td>0.92</td>
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<tr>
<td></td>
<td>I would be entertained while using an AV.</td>
<td>0.91</td>
<td>0.94</td>
<td>0.96</td>
<td>0.94</td>
<td>0.94</td>
<td>0.94</td>
<td>0.96</td>
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<tr>
<td></td>
<td>I would have fun while using an AV.</td>
<td>0.94</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
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<tr>
<td>Perceived self-identity</td>
<td>Using an AV would reflect who I am.</td>
<td>0.84</td>
<td>0.86</td>
<td>0.88</td>
<td>0.86</td>
<td>0.86</td>
<td>0.86</td>
<td>0.88</td>
</tr>
<tr>
<td></td>
<td>Using an AV would express the personality that I want to communicate to others.</td>
<td>0.92</td>
<td>0.91</td>
<td>0.92</td>
<td>0.91</td>
<td>0.92</td>
<td>0.92</td>
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</tr>
<tr>
<td></td>
<td>Using an AV would reflect who I am.</td>
<td>0.94</td>
<td>0.96</td>
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<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
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<tr>
<td>Perceived risk</td>
<td>Using an AV would make me more concerned about potential physical risks of driving.</td>
<td>0.91</td>
<td>0.92</td>
<td>0.91</td>
<td>0.91</td>
<td>0.91</td>
<td>0.91</td>
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</tr>
<tr>
<td></td>
<td>Using an AV would make me more concerned about potential physical risks of driving.</td>
<td>0.84</td>
<td>0.87</td>
<td>0.90</td>
<td>0.91</td>
<td>0.91</td>
<td>0.91</td>
<td>0.91</td>
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<tr>
<td></td>
<td>While using an AV, I would have stronger security concerns in the case of an accident.</td>
<td>0.92</td>
<td>0.91</td>
<td>0.92</td>
<td>0.91</td>
<td>0.92</td>
<td>0.92</td>
<td>0.91</td>
</tr>
<tr>
<td>Perceived behavioral control</td>
<td>When AVs are available for purchase, I believe I will afford to use one.</td>
<td>0.86</td>
<td>0.85</td>
<td>0.77</td>
<td>0.77</td>
<td>0.77</td>
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</tr>
<tr>
<td></td>
<td>When available, I will have the necessary means and resources to use an AV.</td>
<td>0.91</td>
<td>0.93</td>
<td>0.91</td>
<td>0.93</td>
<td>0.91</td>
<td>0.93</td>
<td>0.93</td>
</tr>
<tr>
<td></td>
<td>When available, I will have the ability and opportunity to use an AV if I want to.</td>
<td>0.86</td>
<td>0.86</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Perceived ease of use</td>
<td>Learning to operate an AV would be easy for me.</td>
<td>0.84</td>
<td>0.86</td>
<td>0.92</td>
<td>0.92</td>
<td>0.92</td>
<td>0.92</td>
<td>0.92</td>
</tr>
<tr>
<td></td>
<td>I would find it easy to get an AV to do what I want it to do.</td>
<td>0.80</td>
<td>0.85</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
</tr>
<tr>
<td></td>
<td>I would find it easy to get an AV to do what I want it to do.</td>
<td>0.96</td>
<td>0.94</td>
<td>0.96</td>
<td>0.94</td>
<td>0.96</td>
<td>0.94</td>
<td>0.96</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
<th>Description</th>
<th>Loadings</th>
<th>CR</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social norm</td>
<td>SN1</td>
<td>People who influence my behavior would think I should use an AV.</td>
<td>0.86</td>
<td>0.88</td>
<td>0.92</td>
</tr>
<tr>
<td></td>
<td>SN2</td>
<td>People who are important to me would want me to use an AV.</td>
<td>0.86</td>
<td>0.85</td>
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</tr>
<tr>
<td></td>
<td>SN3</td>
<td>People whose opinions I value would prefer me to use an AV.</td>
<td>0.95</td>
<td>0.96</td>
<td></td>
</tr>
<tr>
<td>Personal norm</td>
<td>PN1</td>
<td>I would feel a moral obligation to use AVs due to their lower fuel consumption.</td>
<td>0.94</td>
<td>0.97</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>PN2</td>
<td>I would feel a moral obligation to use AVs due to their lower emissions.</td>
<td>0.95</td>
<td>0.98</td>
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<tr>
<td></td>
<td>PN3</td>
<td>I would feel a moral obligation to use AVs as they are more environmentally friendly.</td>
<td>0.94</td>
<td>0.97</td>
<td></td>
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<tr>
<td>Habitual compatibility</td>
<td>HCO1</td>
<td>Using an AV would be compatible with my lifestyle.</td>
<td>0.92</td>
<td>0.90</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>HCO2</td>
<td>Using an AV would fit well with my habits.</td>
<td>0.97</td>
<td>0.96</td>
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<tr>
<td></td>
<td>HCO3</td>
<td>Using an AV would fit the way I do things.</td>
<td>0.93</td>
<td>0.94</td>
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<tr>
<td>Attitude toward use</td>
<td>AT1</td>
<td>Bad – Good</td>
<td>0.81</td>
<td>0.89</td>
<td>0.94</td>
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<tr>
<td></td>
<td>AT2</td>
<td>Harmful – Beneficial</td>
<td>0.86</td>
<td>0.88</td>
<td>0.94</td>
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<tr>
<td></td>
<td>AT3</td>
<td>Foolish – Wise</td>
<td>0.87</td>
<td>0.84</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AT4</td>
<td>Negative – Positive</td>
<td>0.95</td>
<td>0.94</td>
<td></td>
</tr>
<tr>
<td>Intention to use</td>
<td>INT1</td>
<td>When available in the future, I intend to use an AV.</td>
<td>0.94</td>
<td>0.96</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td>INT2</td>
<td>I intend to use an AV frequently in the future.</td>
<td>0.96</td>
<td>0.92</td>
<td></td>
</tr>
</tbody>
</table>

Note: AM = Autonomous vehicles with manual controls; AO = Autonomous vehicles without manual controls; CR = composite reliability; AVE = average value extracted. Values indicating convergent validity are loadings > 0.7, CR >0.7, AVE > 0.5 (Hair et al., 2010)
3.3 Measurement Model

We analyzed the collected data using statistical analytics software and structural equation modeling (SEM) in a two-stage testing procedure by first assessing the validity of the measurement model based on model fit and construct validity, before we examined the structural relationships between constructs in order to evaluate the research model and test the research hypotheses. Given our experimental setting with two groups, we applied group comparison methods for SEM.

We first performed the confirmatory factor analysis (CFA) of the measurement model using Mplus 7 (Muthén & Muthén, 2012), and assessed model fit based on three absolute fit indexes and two incremental indices, in line with the recommendations by Hair et al. (2010). The measurement model with all parameters freely estimated in the two groups indicated reasonable fit ($\chi^2 = 1747.495, p = 0.0000$, $\chi^2/df = 1.73$, RMSEA = 0.068, SRMR = 0.043, TLI = 0.926, CFI = 0.938). Next, metric invariance was tested by constraining factor loadings to be equivalent in the two groups, which resulted in an insignificant change in model fit ($\Delta\chi^2 = 58.855, \Delta df = 48, p > 0.05$). Hence, the factor structure appeared to be similar for both groups and we proceeded deeming the constructs to have the same meaning in both groups (Hair et al., 2010).

We then assessed construct validity by first examining convergent validity. As reported in Table 2, the factor loadings indicated acceptable convergent validity compared to both the required score of 0.5 and the recommended score of 0.7 or higher (Hair et al., 2010:709). In addition, the constructs were tested in terms of composite reliability (CR) and average variance extracted (AVE). All constructs exceeded recommended values for both measures (CR > 0.7, AVE > 0.5; Fornell & Larcker, 1981; Nunnaly, 1978), indicating good internal consistency (Table 2).

To assess discriminant validity, we investigated whether all constructs shared more variance with their items than with other constructs by testing whether the square root of the AVE was larger than the correlations between constructs (Fornell & Larcker, 1981). This relationship held true for all constructs (Table 3), indicating acceptable discriminant validity (Fornell & Larcker, 1981; Hair et al., 2010).
Table 3: Latent means, correlation coefficients, and AVE square roots for AM and AO groups.

<table>
<thead>
<tr>
<th></th>
<th>Means (AM)</th>
<th>PU</th>
<th>PE</th>
<th>PSI</th>
<th>PR</th>
<th>PBC</th>
<th>PEOU</th>
<th>SN</th>
<th>PN</th>
<th>HCO</th>
<th>ATT</th>
<th>INT</th>
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<tr>
<td>Perceived usefulness (PU)</td>
<td>4.802</td>
<td>.807**</td>
<td>.660</td>
<td>.470</td>
<td>-.268</td>
<td>.344</td>
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<td>Perceived enjoyment (PE)</td>
<td>4.592</td>
<td>.690</td>
<td>.896*</td>
<td>.443</td>
<td>-.165</td>
<td>.261</td>
<td>.345</td>
<td>.409</td>
<td>.263</td>
<td>.541</td>
<td>.525</td>
<td>.660</td>
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<td></td>
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<td>(.054)</td>
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<td>(.083)</td>
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<td>(.075)</td>
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<td>(.076)</td>
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<td>Perceived self-identity (PSI)</td>
<td>2.778</td>
<td>.043</td>
<td>.51</td>
<td>.934*</td>
<td>-.099</td>
<td>.323</td>
<td>.398</td>
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<td>.541</td>
<td>.443</td>
<td>.546</td>
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<td>Perceived risk (PR)</td>
<td>4.566</td>
<td>-.163</td>
<td>-.215</td>
<td>-.294</td>
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<td>Perceived behavioral control (PBC)</td>
<td>3.580</td>
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<td>(.074)</td>
<td>(.081)</td>
<td>(.081)</td>
<td>(.083)</td>
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<td>Perceived ease of use (PEOU)</td>
<td>5.083</td>
<td>.357</td>
<td>.482</td>
<td>.271</td>
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<td>.431</td>
<td>.885*</td>
<td>.867**</td>
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<td>(.074)</td>
<td>(.081)</td>
<td>(.070)</td>
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<td>Social norm (SN)</td>
<td>2.960</td>
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<td>.279</td>
<td>.257</td>
<td>.251</td>
<td>.896*</td>
<td>.892**</td>
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<td>.285</td>
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<td>(.067)</td>
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<td>Personal norm (PN)</td>
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<td>.281</td>
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<td>-.054</td>
<td>.554</td>
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<td>.946**</td>
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<td>(.079)</td>
<td>(.079)</td>
<td>(.074)</td>
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<tr>
<td>Habitual compatibility (HCO)</td>
<td>4.183</td>
<td>.725</td>
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<td>.597</td>
<td>-.169</td>
<td>.254</td>
<td>.319</td>
<td>.548</td>
<td>.317</td>
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<td>.936**</td>
<td>.674</td>
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<td>(.063)</td>
<td>(.047)</td>
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<tr>
<td>Attitude toward use (ATT)</td>
<td>5.088</td>
<td>.523</td>
<td>.478</td>
<td>.369</td>
<td>-.400</td>
<td>.266</td>
<td>.353</td>
<td>.380</td>
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<td>.489</td>
<td>.888*</td>
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<td>(.073)</td>
<td>(.072)</td>
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<td>(.064)</td>
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<tr>
<td>Intention to use (INT)</td>
<td>4.151</td>
<td>.691</td>
<td>.629</td>
<td>.531</td>
<td>-.368</td>
<td>.238</td>
<td>.342</td>
<td>.421</td>
<td>.355</td>
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<td>(.075)</td>
<td>(.071)</td>
<td>(.071)</td>
<td>(.040)</td>
<td>(.040)</td>
<td>(.950**)</td>
</tr>
</tbody>
</table>

Note: Standard errors in parentheses. Latent means estimated using effect coding (Little, 2013). Correlation coefficients AO group above the diagonal. Correlation coefficients AM group below the diagonal. Diagonal: Square roots of Average Variance Extracted for AO* and AM** groups.

Finally, we controlled for common method bias using two tests: First, we conducted Harman’s one-factor test to assess whether one factor accounted for the majority of the variance (Podsakoff et al., 2003), and found the highest scoring factor acceptable at 37.2 percent. Second, we used the unmeasured latent method factor test (Podsakoff et al., 2003), in which the unmeasured factor accounted for only 9.7 percent of the total variance. Hence, we concluded that common method bias was not a substantial threat to the analysis, and proceeded with the model test without including the common method variable.

Table 4 reports the descriptive statistics for all constructs in terms of their mean, standard deviation, variance, skewness and kurtosis.
4. RESULTS
4.1 AM and AO Group Comparison
To test our proposition that there might be differences in the mechanisms behind adoption intention toward AVs with (AM) or without (AO) manual driving controls, we compared construct means for the two groups. The test revealed no significant differences. Next, we investigated potential differences in structural paths between the two groups by constraining the structural paths in the models one at the time.\(^3\) We found no significant changes in terms of model fit for any of the paths (i.e., for every constraint, \(\Delta \chi^2 < 3.84, \Delta df = 1\)), indicating no structural differences between the AM and AO experimental groups. As the differences between the groups were not statistically significant, we proceeded our analysis with the combined sample.

The path diagram in Figure 2 presents the unstandardized path coefficients, explained variance and a model fit summary. The fit of the structural model was deemed reasonable (\(\chi^2 = 1864.647, p = 0.0000, \chi^2/df = 1.70, \text{RMSEA} = 0.066, \text{SRMR} = 0.057, \text{TLI} = 0.929, \text{CFI} = 0.935\)).

---

\(^3\) The implicit hypothesis tested here was that at least one structural path would be different between the AM and AO groups.
4.2 Direct and Indirect Effects

Considering the antecedents of intention, significant direct effects were found for attitude ($\beta = 0.53$, $p < 0.001$), habitual compatibility ($\beta = 0.24$, $p < 0.001$), perceived usefulness ($\beta = 0.17$, $p < 0.05$), perceived enjoyment ($\beta = 0.16$, $p < 0.01$), perceived self-identity ($\beta = 0.09$, $p < 0.05$) and personal norms ($\beta = 0.09$, $p < 0.05$), supporting H1, H2, H3, H5, H16, and H17. However, no significant influence on intention was revealed for perceived behavioral control ($\beta = 0.08$, $p > 0.1$), perceived risk ($\beta = -0.04$, $p > 0.1$), perceived ease of use ($\beta = -0.07$, $p > 0.1$) or social norms ($\beta = 0.02$, $p > 0.1$). Thus, we did not find support for hypotheses H6, H11, H12 and H15.

Regarding the determinants of attitude toward use, significant effects were found in the predicted direction for perceived risk ($\beta = -0.32$, $p < 0.001$), perceived usefulness ($\beta = 0.28$, $p < 0.001$), perceived ease of use ($\beta = 0.27$, $p < 0.001$) and perceived self-identity ($\beta = 0.10$, $p < 0.05$), supporting H7, H9, H10 and H14. However, no significant influence of perceived enjoyment ($\beta = 0.10$, $p > 0.1$) on attitude was found, lending no support to H8. In terms of the antecedents of perceived usefulness, significant effects were found for all the hypothesized relationships: habitual compatibility ($\beta = 0.40$, $p < 0.001$), perceived enjoyment ($\beta = 0.33$, $p < 0.001$) and perceived ease of use ($\beta = 0.15$, $p < 0.01$), supporting H4, H13 and H18.
5. DISCUSSION

Overall, the research model developed in this paper shows decent fit and had a good explanatory power regarding intentions to use AVs. The results highlight the role of attitudinal, motivational, resource-related, normative and habitual influences on AV adoption intention (Figure 2). We explored consumer intentions to adopt both AVs with (AM) and without (AO) manual controls, and the research model appears to be robust across both groups: The model explains a high share of the variance in consumers’ intention to adopt AVs (AM = 77%, AO = 81%), as well as in perceived usefulness (AM = 65%, AO = 60%) and attitude toward using AVs (AM = 49%, AO = 61%). Thus, the model offers a promising framework for future adoption studies on AVs.

5.1 Theoretical Implications

Our study reveals several additional adoption drivers not included in previous studies on AV adoption, and extends the body of research on antecedents of consumer intentions to use AVs (see Becker & Axhausen, 2017). The results demonstrate the value of studying effects of attitudinal, motivational, normative, resource-related and habitual influences in combination.

Attitude toward use emerged as a significant predictor of AV usage intentions, which supports findings in previous adoption research on car innovations (Petschnig et al., 2014), including within the field of autonomous driving technologies (Payre et al., 2014). Furthermore, the effects observed for perceived usefulness, enjoyment, self-identity and risk in this study lend support to the notion that motivational factors have direct influences on technology usage intentions (e.g., Hong & Tam, 2006; Nysveen et al., 2005; van der Heijden, 2004). They also indicate that motivational variables should be explored along functional, hedonic and symbolic dimensions (Park et al., 1986), in addition to risk perceptions (Sheth, 1981). Our findings reveal that these dimensions are central to consumer intentions to use AVs, and lend support to previous studies that have identified them as important motivations for car use in general (e.g., Bergstad et al., 2011; Kent, 2014; Sheller, 2004; Steg, 2005; Stradling et al., 1999). In addition, the results indicate that motivational factors may influence each other, as perceived enjoyment was found to be a strong predictor of perceived usefulness.

We found no support for the proposed direct impact of resource related influences on intention. Nevertheless, perceived ease of use had indirect effects via perceived usefulness and attitude toward use, as postulated by the TAM (Davis et al., 1989).

In terms of normative influences, we did not find any significant influence of social norms. However, the results indicate that personal norms regarding the environment are relevant to AV adoption, lending support to studies that propose the inclusion of the construct as an antecedent of adoption intention (e.g., Jansson, 2011; Petschnig et al., 2014).

Our study also reveals a direct influence of habitual compatibility on intentions to use AVs. Such habitual influences on AV usage intentions have not previously been studied (see Becker & Axhausen, 2017), yet appear to be an important component to understanding consumer adoption of AVs. This finding supports the addition of habitual influences on usage intention in adoption models (e.g., Venkatesh et al., 2012); however, while direct
measures of past behavior are often used to measure habits, we propose a measure of habitual compatibility as an alternative proxy. Furthermore, our results imply that habitual fit may affect motivational influences on intention, as we found habitual compatibility to be an antecedent of perceived usefulness.

Finally, we sought to investigate whether including manual controls in the AV would have moderating effects in our model. The results showed only insignificant differences of including the option of manual driving on consumers’ perceptions of using fully autonomous cars. This is perhaps to be expected, as previous research has found only relatively small differences in consumer perceptions concerning AVs with different levels of automation (Rödel et al., 2014), and both our AM and AO variants are capable of the same level of automation (SAE Level 5). While this finding should be interpreted with some caution since previous studies report consumer apprehensions over losing manual controls (e.g., Kyriakidis et al., 2015), it suggests that many consumers may not be very concerned with optional manual controls in fully autonomous cars.

5.2 Managerial Implications

Our results also have implications for product developers and marketing managers of AVs. First, attitude toward use emerged as a predictor of intention, highlighting the role of forming positive consumer attitudes regarding AVs. Given that perceived risk was a predictor of attitude, a key concern should be not to launch AV technology prematurely to the market before its safety can be ensured, as negative publicity in the early adoption phase might have lasting impacts on consumer attitude.

Second, motivational influences play a key role in forming adoption intentions toward AVs, both through their direct impact on intention and through their indirect effects via attitude. The direct and indirect effects of perceived usefulness indicate that consumers see value in AVs ability to free up their time, and that designing AVs that allow users to spend this time productively, for example by working while in transit, could be important. Perceived enjoyment also emerged as a direct predictor of intention, and as an antecedent of perceived usefulness, suggesting that the industry should put effort into developing AVs as platforms for enjoyable experiences. Since previous research has found that higher levels of vehicle autonomy lead drivers to engage more in non-driving activities (Jamson et al., 2013), special attention should be put on including entertainment technologies and a stable internet connection in AVs, thereby allowing users to stream videos, listen to music, play video games, or use social media. Regarding perceived self-identity, both direct effects on intention and indirect effects via attitude were found. This suggests that developers and marketers of AVs need to consider the symbolic implications of shifting to autonomous driving, particularly as owning and driving cars may contribute both to consumers’ image and status (e.g., Sheller, 2004; Steg, 2005), and their ego-formation and sense of personal identity (Kent, 2014; Sheller, 2004).

Third, personal norms regarding the environment had a direct effect on intention. As people are becoming increasingly environmentally conscious, the demand for more sustainable vehicles is predicted to rise (Crews, 2015). Thus, the environmental benefits of AVs should be communicated to consumers.
Fourth, habitual compatibility influenced both perceived usefulness and intention to use AVs. Consequently, industry players should highlight the fit between AVs and the potential adopter’s lifestyle and habits. For instance, commute time can be a desirable component of people’s daily lives, particularly as it provides transition time between work and home roles (Redmond & Mokhtarian, 2001). At the same time, the experience of driving is becoming less important to consumers (Shanker et al., 2013). Hence, AVs capable of relieving the user from the task of driving the car in monotonous or stressful driving conditions could seamlessly fit into commuting habits while allowing for even more meaningful commute time.

6. FUTURE RESEARCH

Extensive effort was made to ensure the reliability and validity of the results obtained in this study. Nonetheless, future studies could contribute to ascertain the results’ generalizability and the models’ potential boundary conditions.

Participation in the survey was voluntary and the response rate was 9.8 percent. This means that self-selection of respondents is a potential source of bias and that the respondents in the study may have a higher interest in AVs compared to the general population. The respondents in the study reported here are rather young (86.2 percent of the sample is between 18-29 years old) and well educated (81.6 percent had 3 or more years of higher education). Future studies should strive to include a sample that is more representative of the general population. Furthermore, as most respondents lived in an urban area in Norway, the model should be tested in different countries, as previous studies on consumer opinion toward AVs indicate that situational and cultural differences in perceptions may exist between consumers in various countries (e.g., Kyriakidis et al., 2015; Schoettle & Sivak, 2014).

Reaching a wider population and testing the model across different countries and traffic conditions would also contribute to assessing the general applicability of our finding regarding the AM and AO experiment. While we found only insignificant moderating effects from including manual controls in an AV, further studies are needed to uncover potential factors influencing this relationship. First, as noted, our sample was also relatively young, and given the declining youth interest in cars (Shanker et al., 2013), it is possible that other age groups will perceive greater differences between AM and AO. Second, further research is needed to reveal whether our findings apply to other countries or, indeed, whether there are differences within countries based on, for instance, the degree of urbanization in an area. Third, our model did not test for potential differences based on consumers’ personality, which may be relevant. For instance, consumers who find great pleasure in driving may be more reluctant to give up manual controls. Also, note that we did not conduct a manipulation test, meaning that the manipulation we used (Appendix A) may not have worked as intended. Moreover, responses based on actual product interaction were not feasible for the present study, but such stimuli would make an interesting addition in future research. Hence, we recommend that future studies try other manipulations than the one we used and include manipulation tests.

There are also several factors not covered in this paper that may be relevant to explore in future studies of AV adoption, such as additional personal norm dimensions (e.g.,
related to traffic safety), different risk perceptions (e.g., liability, data privacy, or cyber security), financial aspects (e.g., AVs potential to save money, or price-value from the UTAUT2), vehicle design (e.g., outfitted for work, entertainment, or sleeping), usage situations (e.g., for work or leisure, short or long rides, or level of congestion), or personality traits (anxiety, risk aversion, need for control, or driving pleasure).

Finally, we suggest that our model may be generally relevant to studying consumer adoption of other car innovations, as well as other intelligent and autonomous products. Regarding car innovations, our research model may be interesting to explore as it explains a considerably higher portion of the variance in adoption intention than has been the case for models used to study adoption of alternative fuel vehicles (e.g., Moons & De Pelsmacker, 2012; Pestschnig et al., 2014; Schuitema et al., 2013). In terms of intelligent and autonomous products, our model also offers an alternative to previous research models (e.g., Rijsdijk & Hultink, 2003). However, cars are highly involving as a product category (Lapersonne et al., 1995), require a high degree of experience and skill to operate, and may have fatal consequences in cases of malfunction. Thus, in applying our model to different intelligent and autonomous products, the effects of a product's score along such dimensions as involvement, difficulty of operation and consequences of malfunction would be valuable to explore.

REFERENCES


**APPENDIX A: INTRODUCTION TEXT AND GROUP PRIMING**

Autonomous vehicles (AVs), also called self-driving cars, can drive themselves by combining advanced computers with cameras, radars and sensors. In 3-5 years, AVs will be able to take you where you want to go at the push of a button—no driving required. In an AV, you set the destination, and the car then drives there by itself while communicating with other AVs in order to optimize traffic and make the trip time efficient, fuel efficient and safe. Meanwhile, you can spend your time on other activities, such as reading, watching a movie or sleeping. When you leave the car, it can find a parking lot and parks by itself.

**AM Group:**

In this survey, we are looking for your opinion on AVs that can be driven both manually (a human drives the car as in standard cars) and autonomously (the car drives itself). The driver can freely choose to switch between these modes whenever (s)he wants to, including during a trip.

**AO Group:**

In this survey, we are looking for your opinion on AVs that can only be driven autonomously (the car drives itself). The AV has no steering wheel or pedals, but the driver/passenger can give destination input and, if (s)he wishes, press a stop button that will quickly stop the car in a safe way.