DERIVATION OF A MODIFIED TECHNOLOGY ACCEPTANCE MODEL FOR THE APPLICATION ON SELF-DRIVING CARS IN A CAR-SHARING-MODEL BASED ON QUALITATIVE RESEARCH

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Abstract
New transport modes and business models in addition to changing customer requirements admit future urban mobility. While technological advancements characterize new or adapted forms of transport modes, social changes such as the requirement for more flexibility, put forward the need for a paradigm change regarding mobility. New and adapted business models as well as the entry of new players in the mobility sector, demonstrate the possibilities of a changing mobility environment.
Acceptance on the individual side, as a major prerequisite for developing viable business models accordingly, is an internal process affected by external factors, including time. Based on these findings and the analysis of correlation of information/knowledge, a modified and three-dimensional acceptance model was designed, subdividing the process into different temporal phases.

Key words: *Acceptance model; innovation; self-driving cars; mobility; digitization.*

JEL Classification: *L91; O30*

I. INTRODUCTION

Over the last decades, different waves of disruptive innovation have severely impacted on business interactions as well as on the day-to-day activities of ordinary people. The role and depth of innovation in conjunction with the level of acceptance of the latest technological advancements is a key point towards understanding its significance for both clients and product suppliers. This intertwined relationship defining the waves of innovation may materialize along two different lines:

1. Customers demand certain features or services which require the market to innovate. On a positive note, customer acceptance is no longer a concern to be managed on the business side, but development processes tend to be lengthy under these circumstances. In a next step, a higher degree of acceptance on the client side positively impacts the development phase and further motivates innovation creation of the business side. A positive notion towards the final product is the highest reward of the development process, which is usually associated with time-intensive and high-rewarding innovations.

2. The second alternative is initiated with the launch of innovation testing customer acceptance in a vote for success. Its main characteristics are a concise launch and innovation acceptance period. In essence, this type of innovation encapsulates the idea that customer may not always fully understand their own requirements for a new product or service. A matter that has proven successful during the market launch of the iPhone 1 (Forbes, 2011).

Figure 1 highlights the relationship between market and customer with reference to innovation acceptance and development.

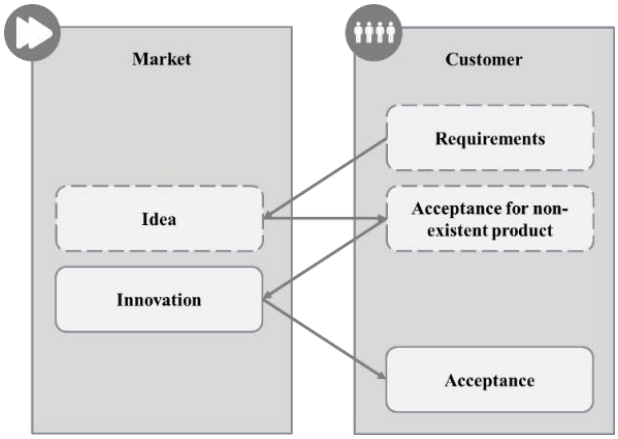

Figure 1 - Relationship of market and customer (Source: Geldmacher et al., 2017b)

The process of customer acceptance creation of final products has already received significant attention among scholars which is showcased by the number of available literature on this matter. Despite the obvious importance of customer input on technology creation, the matter of acceptance concerning new or innovations under development remains widely untouched from a scientific point of view.

This research paper compares acceptance models of innovation assisting to derive the forming process of customer acceptance for present forms of technology advancements, followed by an enrichment of these models with features allowing for use with new innovations. The final results set the stage for the envisaged improvement to existing acceptance models in innovation.

The acceptance of autonomous cars in the eye of the public is a prime example for the lack of capturing non-existent innovation in the current acceptance models. This innovative mode of transportation sparks heated debates including the issue of social acceptance. However, the issue of public acceptance is a key success factor for self-driving cars and is a matter of both positive evaluation and resulting affect (Geldmacher et al., 2017a). In the absence of a suitable model, improvements to the unified theory of acceptance and use of technology (UTAUT) by Venkatesh et al. (2003) were introduced by Geldmacher et al. (2017a). As a hypothesis, both information and knowledge were added to the UTAUT model as significant influencing factors. Its substance was verified on the basis of a trend analysis comparing the wish for information on the issue of autonomous driving in the German market as well as correlation with publications and the impact on stock market developments.

II. CONTEXT AND TARGETS OF THE RESEARCH ON ACCEPTANCE OF SELF-DRIVING CARS IN A CAR SHARING MODEL

A paradigm shift in the mobility sector and the necessity for technology acceptance

Private owned cars stand for high flexibility and comfort in contrast to public transport. A paradigm shift from possession (of a car) to usage (e.g. car sharing) is anticipated, while door-to-door mobility is to be improved. This paradigm change is characterized by several influencing factors, such as:

- Demographic change and the need for transport modes for elderly
- Increasing population and the need for a reduction of road traffic
- Environmental protection through reduction of use of natural resources

The implementation of self-driving cars in a car sharing model could hypothetically accommodate most of these changes or requirements. Researching the technology acceptance of such a model allows potential operators to adjust their business model according to the influencing factors and needs of individuals.

The concept of technology and its acceptance

The term “technology” has been defined in different ways in accordance with its impact on economy and society. Gibert (2004) characterizes the term “technology” as a productivity increase, related to positive changes and as a necessity for the further development of the society.

Technology acceptance is the eventual outcome of the use or knowledge of a particular technology. Acceptance is thereby depicted as the outcome of a psychological process that starts with sole interest in a technology and eventually leads to the daily use (Kollmann, 1998; Jockisch, 2010). This process comprises the elements of evaluation and affect as a consequence and is generally influenced by the subject (individual), the object (technology) and the context (environment) (Lucke, 1995).

The paper aims at identifying relevant influencing factors in the technology acceptance process for deriving a modified acceptance model. For this purpose, technology acceptance models and theories in the literature are analyzed in regard to their influencing factors and their application to non-existent innovations – here at the example of self-driving cars in a car sharing model.

The literature suggests various technology acceptance models and theories. However, the following paper examines the fundamental ones. All of the identified models and theories combine the concept of forecasting the influencing factors towards acceptance. The main theoretic characteristics of the identified models and theories are outlined below.

The "theory of reasoned action" (TRA) of Fishbein and Ajzen (1975) comprises the factors of influence and trigger. A revised and prolonged version of the TRA, the so-called "Theory of planned behavior" (TPB) is characterized by the amendment of attitude, subjective norm and perceived behavioral control (Fishbein and Ajzen, 1975).

Davis (1989) developed his "Technology acceptance model" (TAM) on the basis of the Theory of planned behavior by Fishbein and Ajzen (1975). In his model, Davis (1989) emphasizes the user through influencing factors such as perceived usefulness and ease of use. In 1996, Davis and Venkatesh extended the model with external factors in the so-called TAM 2. TAM 3, another model extension was presented in 2008 by Venkatesh and Bala (2008), who further distinguished the influencing factors of perceived ease of use.

Degenhardt (1986) and Schlag (1997) proposed models that were aimed at the application to designated fields. Degenhard suggested a model for explaining acceptance in regard to utility of screen texts and included factors of system configuration, task characteristics and user characteristics (1986). Schlag aimed at measuring acceptance of road charges and focused on influencing factors such as problem awareness, responsibility attribution and subjective knowledge (1997).

A rather different approach to acceptance models was established by Kollmann (1998) who explains acceptance in a dynamic process with several stages throughout his model. General influencing factors on a macroeconomic, social, technological and political level were included for explaining acceptance of innovative goods or systems.

Elements from the presented models and theories were picked up by Venkatesh et al. (2003) in the "Unified Theory of Acceptance and Use of Technology". Here, performance expectancy, effort expectancy, social influence and facilitating conditions were considered as influencing factors and amended with moderating effects of age, gender, voluntariness of use and experience. The model was further extended to "UTAUT 2" with the elements hedonic motivation, price value, and habit were added to the previous model (Venkatesh et al., 2012).

The literature analysis has not accentuated relevant developments in the field of technology acceptance in the last years. The presented models by Venkatesh et al. and Davis were instead applied to current business cases.

Information and knowledge as an influencing factor in the acceptance process

Information and knowledge are believed to have an influence on the acceptance forming process. In the model of Venkatesh et al. (2012), "experience" was included as one of the influencing variables. According to the authors of this paper, non-existent innovations are still measurable regarding user acceptance. As experience cannot be measured in this regard, information and knowledge on the innovation are believed to influence the process.

The terms "information" and "knowledge" are in close relation, nevertheless distinguishable by definition: "Information" is defined as knowledge regarding an object, a person or circumstances (Springer Gabler Verlag, n.d.). Knowledge however can be gained in an active or passive manner and is characterized by extensive information.

III. METHODOLOGY FOR DEVELOPING A CHANGED INNOVATION ACCEPTANCE MODEL

The derivation of a modified acceptance model for the applicaton on innovations in general and in particular for self-driving cars in a car sharing model, is based on qualitative and quantitative analysis. In a first step, the literature analysis was extended to a comparative analysis of the presented acceptance models and theories. In a second step, the investigated model was put into relation to each other to form the basis for a modified acceptance model. In addition to this derivation of relations, the influencing factors of information and knowledge are investigated, based on their definition.

The literature analysis revealed three key components (Geldmacher et al., 2017a):

- external influencing factors, e.g. macro-economic influences
- individual influencing factors, e.g. subjective knowledge, and
- stages of use (e.g. trial).

The variables of each model were designated to one of the three previously mentioned components. This assignment is based on the most recently developed UTAUT 2 for consolidating existing models.

Table 1. Allocation of variables to elaborated acceptance models and theories (own table) (Source: Geldmacher et al., 2017b)

		TRA	TPB	TAM	TAM 2	TAM 3	Degen-hardt	Schlag	Koll-mann
External influencing factors	Voluntariness				●	●			
	Image				●	●			
	Output quality				●				
	Usability					●			
	Objective				●	●		●	●
	System configuration						●		
	Political-legal influences								●
	Macro-economic influences								●
	Social-cultural influences							●	●
	Technological influences								●
Individual influencing factors	Attitude	●	●						
	Subjective Norm	●	●		●	●			
	Confidence					●			
	Job relevance				●	●			
	System anxiety					●			
	Perceived effectiveness						●	●	
	Perceived enjoyment					●			
	Perceived usefulness			●	●	●	●		●
	Perceived ease of use			●	●	●			●
	Perception of external control					●			
	Perceived behavioral control		●						
	Perceived fairness							●	
	Income							●	
	Individual/user characteristics						●		
	Subjective knowledge							●	
	Responsibility attribution							●	
Stages of process	Problem awareness							●	
	Interest								●
	Trial								●
	Experience				●	●			
	Behavioral intention	●	●	●	●	●			
	Use/behavior	●	●	●	●	●	●		●

While TRA, TPB and TAM exclude external influencing factors, all other investigated models incorporate both external and individual affecting elements. Particularly the individual affecting components are of high significance in the investigated models. However, the model by Kollmann is practically identical to a renowned promoting model by Lewis: AIDA display (Lewis, 1903). The significance of joining the diverse stages from consideration regarding interest, want and activity into innovation acknowledgment models has been featured by Geldmacher et al. (2017a). Contrasting the diverse segments (variables and influencing factors) of each model and its birthplace, UTAUT is obviously a mix of existing models with underneath clarified roots, represented in figure 2 (Venkatesh et al., 2003):

- Performance expectancy: perceived usefulness (TAM, TAM 2, TAM 3)
- Effort expectancy: perceived ease of use (TAM, TAM 2, TAM 3)
- Social influence: subjective norm (TPB)
- Facilitating conditions (playful use of the system, system anxiety, perceived enjoyment, perception of external control (TAM 3)
- Experience (TAM 3)
- Voluntariness of use (TAM 3)

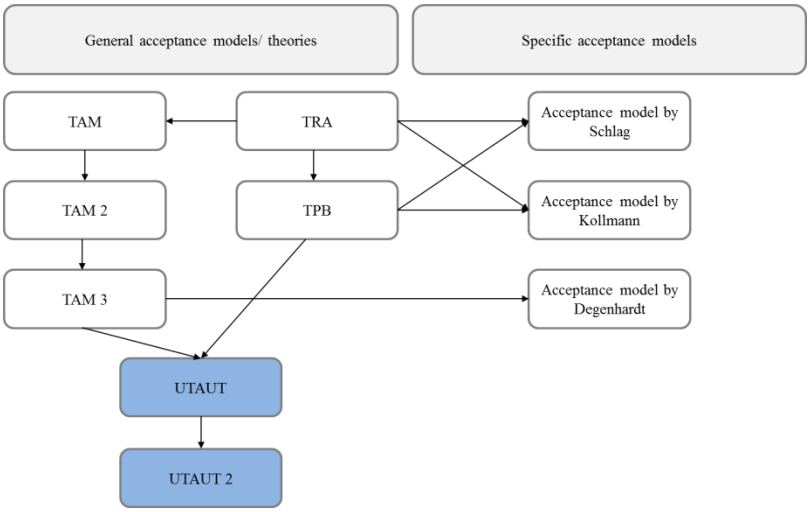

Figure 2 - Relation of elaborated acceptance models and theories (Source: Geldmacher et al., 2017b)

Gotten from the above broke down models, two sorts of hypotheses can be recognized, in view of internal and external influencing factors: for the most part relevant acceptance models and subject particular acceptance models.

While the introduced models all allude to existing developments that are dissected and estimated concerning the level of acceptance, new advancements that are not yet discharged are not considered in any case with these models (e.g. technical know-how).

In view of the meaning of information, knowledge and acceptance, information is portrayed as an essential for knowledge that creates all through time. (cf. figure 1).

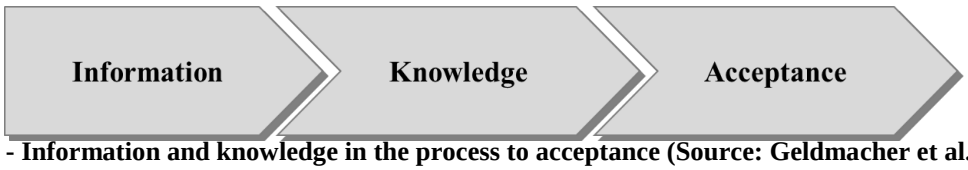

Figure 3 - Information and knowledge in the process to acceptance (Source: Geldmacher et al., 2017c)

Acceptance is a result of knowledge or information, a definition for "acceptance" is necessary: Acceptance portrays a mental procedure that is described as an aggregation of assessment and influence (Geldmacher et al., 2017c). Equations can be used to determine the connection of information, knowledge and acceptance:

$$I * x = K$$
$$A = EV + AF$$
$$\text{Theory: } K + x = EV + AF$$

A = Acceptance, K = Knowledge, I = Information, EV = Evaluation, AF = Affect, x = Amount

The accompanying investigation depends on effectively looking for information estimated by Google Trends (period under survey: mid-2012 until mid-2017). In any case, this kind of investigation has its constraints as it does exclude latently picked up gained information or generated knowledge. This confinement can be kept away from by evaluating the level of information and knowledge, paying little respect to the frame (effectively or latently) through a survey and connect their effect on the level acceptance.

IV. DERIVATION AND DEVELOPMENT OF A MODIFIED ACCEPTANCE MODEL FOR SELF-DRIVING CARS IN A CAR SHARING MODEL

The application of acceptance models and theories to non-existing innovation

The application of the investigated models and theories to non-existent innovations and self-driving cars in a car sharing model in particular, is explored in this chapter. The investigation is considered to be a prerequisite in the product or service development cycle. Product resistance and its origin can be detected in this stage and lead to adjustments in the product and service design and the general business model even before product roll-out (Arnold and Klee, 2016).

In order to evaluate the different models and theories, the different variables and components are considered in regard to their application for non-existing innovations. The application of each model variable is evaluated on a three-stage scale: full transferability, part-transferability and no transferability. The explored models and theories were thereby evaluated by their transferability, revealing required adjustments in the definition of variables in most cases. An example for such an adjustment is the variable "image" that would only apply for companies that are already in the market with a different product or else people would not be able to evaluate the product's image.

In addition to this analysis of application to non-existent innovations, the models and theories were generally evaluated, based on defined evaluation criteria (Geldmacher et al., 2017b):

- Content (C1): Modeling the process of acceptance
- Content (C2): Transferability of the model to non-existent innovations
- Methodology (M): Allowing for a detailed evaluation, e.g. correlations

Based on these defined criteria, the explored acceptance models and theories were evaluated on a five-point scale (high numbers = criteria is met to a high extent). Implying, that the three defined evaluation criteria are equally evaluated (no weighting factor) by their maximum score of 5 (C1, C2 and M), the maximum score equals 15. The evaluation of each criteria for the respective models is based on a subjective evaluation. Further research, e.g. expert interviews, is recommended for a full evaluation of the models with an extended criteria catalogue (Geldmacher et al., 2017b):

Table 2. Evaluation of acceptance models (Source: Geldmacher et al., 2017b)

	C1	C2	M	Sum
TRA	1	3	1	5
TPB	2	3	2	7
TAM	2	3	2	7
TAM 2	3	3	3	9
TAM 3	3	4	3	10
Degenhardt	2	2	3	7
Schlag	3	3	3	9
Kollmann	4	3	4	11
UTAUT	4	4	4	12
UTAUT 2	**5**	**4**	**5**	**14**

As the evaluation shows, UTAUT 2 represents the highest score in regard to the defined criteria. The result is explainable through the fact that UTAUT 2 was the latest developed model of the above considered ones and therefor describes a compilation of the previous developed models and theories. In addition, the approach of UTAUT is generally more detailed with its amount of external influencing factors and the inclusion of different temporal stages. The model is therefore more complex than e.g. the first theories in this regard (TRA, TPB).

It is notable, that this comparison of models and theories for explaining acceptance were mostly created for a specific purpose. The application of these models to non-existent innovations is limited through the fact, that many of the comprised variables are not transferable, as most models require full knowledge and use of the product. However, most recent models (Kollmann, Schlag, Degenhard, UTAUT) show the possible transferability to non-existent innovations with adjustments of some variables, elimination of few and inclusion of further variables. The inclusion of further variables is proposed in the next sub-chapter.

UTAUT (2), with its high evaluation score, showed the highest compliance to the application to non-existent innovations. A modification of the explored models is therefor based on UTAUT (2). The authors suggest a modified acceptance models below.

The relevance of information and knowledge in the acceptance forming process

The explored technology acceptance models and theories do not include the variables of information and knowledge. However, information and knowledge is believed to play a relevant role in regard to innovations and their acceptance. This correlation is demonstrated by an analysis, operationalizing both information/knowledge as well as the two elements of acceptance (evaluation and affect):

Information / Knowledge: Google searches on the topic of self-driving cars

Evaluation: Evaluation of particular events (subjective evaluation: positive or negative connotation)

Affect: Reactions on the stock market of respective companies (positive or negative trend)

The research was conducted regarding the years of mid-2012 until mid-2017 and elaborated on five noticeable peaks throughout this time. These noticeable peaks were traced back to major events such as the

announcement of new technologies in regard to self-driving cars, presentation of particular car brands with self-driving technologies, accidents of test cars, etc.

The analysis of the evaluation (subjective positive or negative connotation) of each of these events was then compared to the affect or the reaction on the stock market. Positive developments generally lead to a positive stock market trend and vice versa (Schnobrich and Bartz, 2013). The analysis of each event in regard to evaluation and affect showed a clear match between event, evaluation and affect for all of the analyzed events. This research therefore shows the correlation between information/knowledge and acceptance based on the chosen method: K + x = EV + AF

As the stock market trend has its limitations in regard to interpretation due to further influences, the authors recommended to verify the result through practical research on the based example.

For this purpose, the same questions, aiming at measuring the acceptance was asked within the scope of a consecutive profound study. This study supports the hypothesized theory of correlation, as "survey 1" (conducted in July/August 2017) shows lower results for consent as "survey 2" (conducted in February 2018). Meanwhile, it is believed that media increase the level of information and knowledge and thereby the level of acceptance.

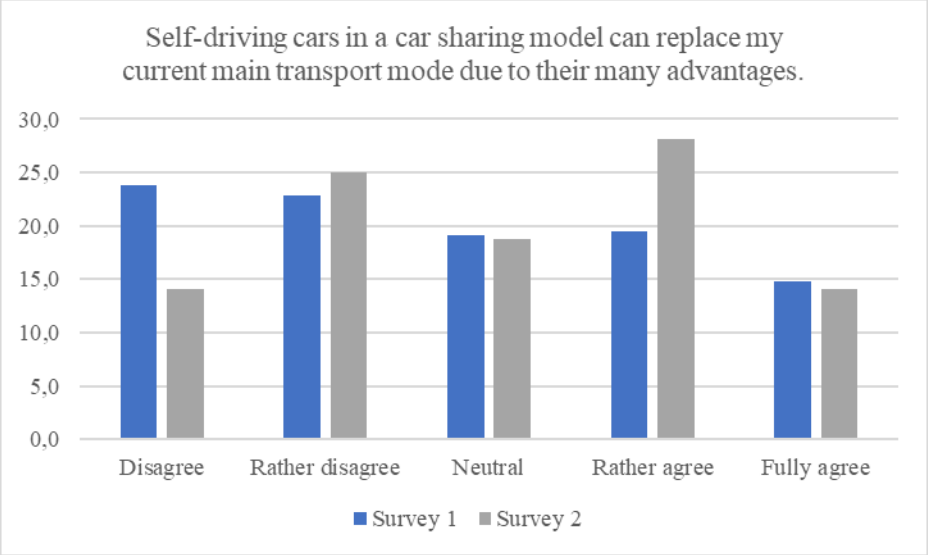

Figure 4 - The acceptance of self-driving cars (Source: own figure)

The derivation of a modified acceptance model

Based on this research of existing acceptance models and theories and the examination of correlation between information/knowledge and acceptance, supplemented by the analysis of motives for choosing a particular transport mode, a modified acceptance model can be derived. For this purpose, motives of individual motorized transport modes (car) and public transport (bus, train, tram, etc.) are compared in a simplified network diagram with the seven core motives, using a nominal scale (6: high motive, 1: low motive). The data for evaluation is based on studies that analyzed motives for choosing particular transport modes (Geldmacher et al., 2017b).

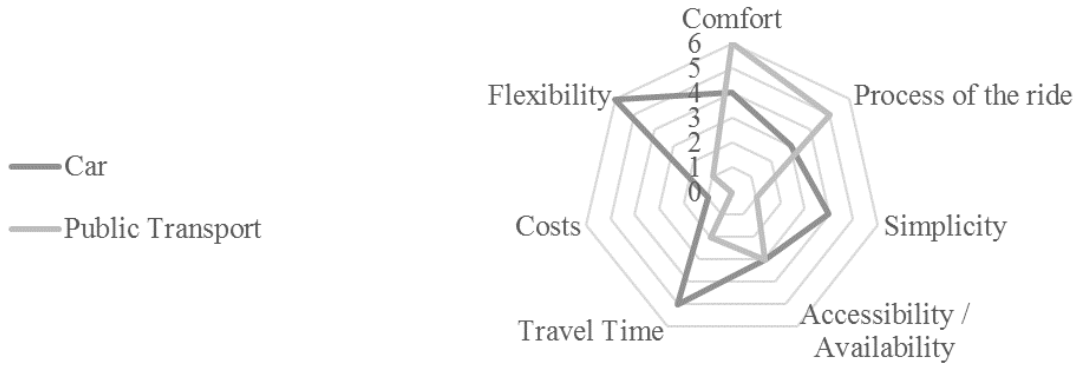

Figure 5 - Motives for the choice of different transport modes (Source: Geldmacher et al., 2017b)

The motives for choosing the car as the preferred transport mode are traced back to its characteristics of allowing high flexibility, low travel time and thereby high simplicity. Public transport in contrast is known for high comfort and easy process of ride. In this research, the authors assigned each of the above identified motives to one of the variables of UTAUT, thereby confirming their application to self-driving cars in a car sharing model. In addition to the variables of UTAUT, the modified acceptance model incorporates different temporal stages similar to Kollmann's acceptance model (1998), emphasizing the phases a customer passes through. These stages are also known as the AIDA model: attention, interest, desire and action (Koschnick, 1983; Walker, 2014).

In the phase of attention and interest, the potential customer was not yet able to test the product but was put into a confrontation with it (e.g. via media). This phase simultaneously highlights the relevance of information and knowledge as described above. In the phase of desire, the customer has a desire to use the product (intention) until the action phase where the actual usage takes place.

The integration of these phases in the modified acceptance model also imply the influence of time on acceptance in general. The modified acceptance model is therefore suggested as a three-dimensional model with the elements (Geldmacher et al., 2017b):

- Influencing factors (internal and external)
- Time (attention and interest, desire, action)
- Acceptance (intent for usage, acceptance)

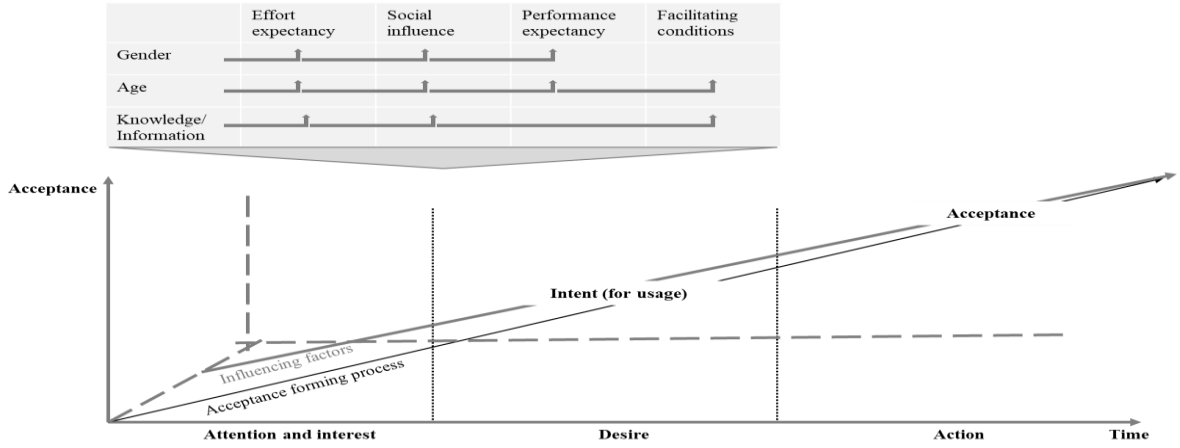

Figure 6 - Modified acceptance model (Source: Geldmacher et al., 2017b)

V. CONCLUSIONS

In times of changing mobility solutions this paper summarizes not the general trends but respective acceptance models or theories for new businesses, technologies and innovations. This research focuses on innovations, which do not exist yet but have to develop over a period of time. Respective acceptance models and theories need to be adapted slightly in order to match the specific characteristics of innovations such as autonomous driving cars in shared mobility solutions. After analyzing different types of acceptance models and theories UTAUT has served as a basis for further adjustments, as it suits the aspect of non-existent innovation best according to the authors.

Next to the choice of acceptance modeling research shows that there are several relevant factors for the acceptance itself. In specific knowledge and information have been identified as preconditions of acceptance and the connection is described in a formula. Evaluation and verification of connections or correlations of acceptance to information and knowledge are conducted based on stock market observations and afterwards reconfirmed by surveys.

For the specific example of self-driving cars in a shared mobility environment the authors adapted and extended existing acceptance models. An important aspect of this model is the factor of time, which represents one axis of the three-dimensional model and which also considers the aspects of knowledge and information. The other aspects of increasing acceptance and therefore ensuring success of the innovation are internal and external influencing factors. Through this model further hypothesis can be derived. In a subsequent step research based on empirical data needs to be obtained in order to validate the hypothesis. Furthermore, interdependencies between variables can be revealed. While in a last step, the overarching hypothesis regarding the acceptance of self-driving cars can be proofed or neglected in line with the answer on main factors for acceptance.

VI. REFERENCES

Journal article

1. Davis, F.D., Bagozzi, P., Warshaw, P. (1989). User acceptance of computer technology - a comparison of two theoretical models. Management Science, 35(8), 982–1003.
2. Davis, F.D., Venkatesh, V. (1996). A critical assessment of potential measurement biases in the technology acceptance model: Three experiments. In: International Journal of Human-Computer Studies, 45 (1), 19–45.
3. Geldmacher, W., Just, V., Kopia, J., Kompalla, A. (2017a). Development of a modified technology acceptance model for an innovative car sharing concept with self-driving cars. BASIQ International Conference. New Trends in Sustainable Business and Consumption - 2017, edited by Rodica Pamfilie, Vasile Dinu, Laurențiu Tăchiciu, Doru Pleșea, Cristinel Vasiliu, Proceedings of BASIQ, Vol. 01.
4. Geldmacher, W.; Marquardt, K.; Just, V.; Golowko, N. (2017b). A comparative study on technology acceptance models and the application to non-existent innovations. IBIMA - Vision 2020: Sustainable Economic development, Innovation Management, and Global Growth, Madrid, Spain, 08/11-09/11/2017, pp. 56-67.
5. Geldmacher, W.; Just, V.; Kirschner, K.; Buchmüller, M.; Marquardt, K. (2017c). The correlation of information and knowledge in regard to the acceptance level and their implication on self-driving cars in Germany, Ecoforum, Vol. 6, Issue 3.
6. Gibert, M. G. (2004). The Meaning of Technology. Selected Readings from American Sources.
7. Schlag, B. (1997). Road pricing-Maßnahmen und ihre Akzeptanz. Fortschritte der Verkehrspsychologie. 36. BDP-Kongreß für Verkehrspsychologie. Bonn: Deutscher Psychologen Verlag, S. 217–224.
8. Venkatesh, V., Morris, M.G., Davis, F.D. and Gordon, B. (2003). User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly 23(3), pp.425–478.
9. Venkatesh, V., Bala, H. (2008). Technology Acceptance Model 3 and a Research Agenda on Interventions. Decision Sciences 39. Vol. 2, pp. 273–315.
10. Venkatesh, V., Thong, J. Y. L., Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology

Book and book chapters

11. Arnold, C., & Klee, C. (2015). Akzeptanz von Produktinnovationen. Eine Einführung. Wiesbaden: Springer Fachmedien.
12. Degenhardt, W. (1986). Akzeptanzforschung zu Bildschirmtext. Methoden und Ergebnisse. München: Reinhard Fischer.
13. Fishbein, M., & Ajzen, I. (1975). Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research. Reading. MA: Addison-Wesley.
14. Fitzgerald, M., & Arnott, D. (2000). Marketing Communications Classics: An International Collection of Classic and Contemporary Papers. Business Press. Available at: https://books.google.de/books?id=D87AXudMvFwC. Accessed 16 June 2016.
15. Jockisch, M. (2010). Das Technologieakzeptanzmodell. Das ist gar kein Modell, Bandow/Holzmüller. Wiesbaden: Springer.
16. Kollmann, T. (1998). Akzeptanz innovativer Nutzungsgüter und Nutzungssysteme Konsequenzen für die Einführung von Telekommunikations- und Multimediasystemen. Wiesbaden: Springer.
17. Koschnick, W.J. (1983). Standard Dictionary of Advertising, Mass Media and Marketing/Standard Worterbuch Für Werbung, Massenmedien und Marketing: English-German/Englisch-Deutsch. W. de Gruyter. Available at: https://books.google. de/books?id=taeCA9_Hl2IC.Accessed 17 June 2016.
18. Lewis, E.S.E. (1903). Catch-Line and Argument. The Book-Keeper. Vol. 15. February 1903.
19. Lucke, D. (1995). Akzeptanz. Legitimität in der "Abstimmungsgesellschaft". Wiesbaden: Springer Fachmedien.
20. Rogers, E. M. (1962). Diffusion of innovations. New York: Free Press of Glencoe.
21. Schnobrich, S., Barz, M. (2013). Die Business AG — Aktiengesellschaft für den Mittelstand: Ein Praxisleitfaden zur Kleinen AG, Springer.
22. Walker, R. (2014). Strategic Management Communication for Leaders, Cengage Learning. Available at: https://books.google.de/books?id=YMQTCgAAQBAJ .Accessed 17 June 2016.

On-line documents

23. Forbes (Ed.) (2011). Five Dangerous Lessons to Learn From Steve Jobs. https://www.forbes.com/sites/chunkamui/2011/10/17/five-dangerous-lessons-to-learn-from-steve-jobs/#70adaf093a95. Accessed 23 February 2018.
24. Springer Gabler Verlag (Ed.) (n.d.): Gabler Wirtschaftslexikon. Stichwort: Information. Available at: http://wirtschaftslexikon.gabler.de/Definition/ information.html. Accessed 15 July 2017.