Bachelor Thesis

The adoptability of Spinner Technology in the car retail industry

International Business Administration

1st supervisor: Dr. M. De Visser

2nd supervisor: Dr. M.L. Ehrenhard

Julian Bos

S1847058

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1. Introduction

Background

In today's economy, brick and mortar is being overtaken by click and order. Worldwide e-commerce sales have been growing for over 15% (J. Clement, 2019)[1]in the last decade, e-commerce has been outperforming the offline retail market by 10% (F. Ali, 2019)[2] on average during this last decade. The driver of this phenomena is digitalization. Digitalization can be found in almost every market, from nutrition, to fashion, to real estate. Online business is inevitable.

Products that can be defined as 'low involvement' according to John. J. Rossiter (1991)[3] were the first to move to click and order. These are products that require less attention, only a basic understanding of needs is required, and these products have a low post-consumption evaluation, these factors lead to fast decision making, and therefore, were the first products to move to a click and order system.

Nowadays, the high involvement products are also shifting towards a click and order system. These are the products that require more attention, require an advanced understanding of needs and have a higher post-consumption evaluation, consequently leading to slower decision making.

The automotive industry consists of predominantly high involvement products, for example the economy and family car. Purchasing a car is a process that used to happen at a car dealership or reseller. But, in 2018, Tesla has sold 78% (Dr. M. Holland, 2019)[4] of its model 3 vehicles online. Showing that also the high involvement car industry has high potential to move from brick and mortar to click and order. Obviously, this ratio does not represent the entire automotive retail market, but it does show the potential of selling automobile vehicles online. In order for the automotive industry to take advantage of this, car dealerships must increase their customer experience of their online showroom (e.g. website).

Online surveys have shown that over 50%[5] of current car buyers would consider buying a car fully online. Showing that online customer experience is of increasing in importance. Spinner technology is a technology that has proven to significantly improve online customer experience and have a positive influence on sales. However, as of today, few car dealerships have adopted spinner technology, many have yet failed to do so.

Research Question

This leads us to the following main research question:

What can spinner technology manufacturers do to increase the likelihood of spinner technology adoption?

This research question will be answered through the following sub-questions:

1. *What is the technology acceptance level of spinner technology?*
2. *What are the main barriers to not adopt the spinner technology and what can be done to overcome these barriers?*

Scope of thesis

This research will give an in-dept understanding of how the current state of spinner technology is accepted in the car retail industry and how to improve the current state, so that more dealerships can adopt this technology and ultimately improve the online customer experience. Registered car dealerships throughout the Netherlands are listed on autokopen.nl, from there, a sample is selected consisting of car dealerships that have not yet adopted the spinner technology.

Outline

The first step of the research will be to create a framework capable of testing the technology acceptance of the spinner technology. After that, barriers and hurdles can be identified why the technology is not yet widely adopted. Once these are identified, recommendations can be made how to solve these barriers and hurdles. Based on the outcome, a recommendation will be made towards the spinner technology manufacturers, how to increase the likelihood of spinner technology adoption by the car retail industry.

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1 J. Clement, (2019), Retrieved from: https://www.statista.com/statistics/288487/forecast-of-global-b2c-e-commerce-growt/

2 F. Ali, (2019), Retrieved from: https://www.digitalcommerce360.com/article/e-commerce-sales-retail-sales-ten-year-review/

3 J. J. Rossiter, (1991), *Emotions and Motivationa in Advertising*, NA – Advances in Consumer Research Volume. 18, 100-110

4 Dr. M. Holland, (2019), Retrieved from: https://cleantechnica.com/2019/03/03/78-of-teslas-2018-model-3-sales-were-online-musk-email-sheds-light-on-new-sales-strategy/

5 Accenture, (2015), *Automotive Survey: What Digital Drivers Want*, Retrieved from: https://timedotcom.files.wordpress.com/2015/04/auto_digital_survey_2015_executive_summary.pdf

2. Literature review

Before discussing technology adoption, we need to define spinner technology. Spinner technology is an online interactive presentation tool which enables (potential) customers to view 360-degrees around a product. According to research by Park, J., & Stoel, L., & Lennon, J. (2008)[6] spinner technology has a positive relation with customer satisfaction, and consequently purchasing intentions. Spinner technology has also proven to improve sales. In the current car retail industry, the decision whether or not to adopt spinner technology is causing high levels of uncertainty. In order to understand where this uncertainty is coming from, Kano's model (figure 1) is used.

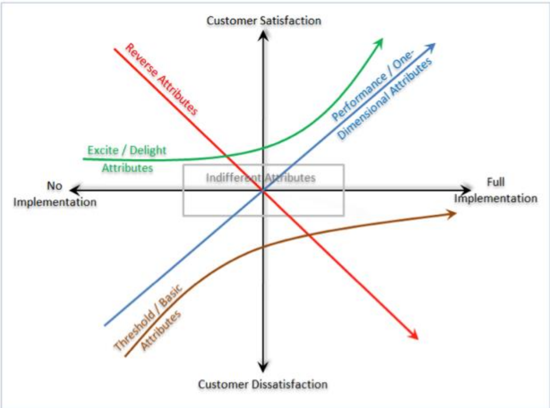

Figure 1 – Kano's Model

In its current form, spinner technology is categorized as a 'delighter', meaning that, if a car dealership/retailer adopts the technology, it will positively influence customer satisfaction, but not having it does not have any negative influences (yet). Therefore, the decision to adopt the technology becomes very difficult. History has shown that 'delighters' over time become 'performance' factors. Meaning that today, not implementing spinner technology would not harm business performance, but it will in the future, at the moment when spinner technology becomes market standard. Not having adopted the technology would in that case lead to customer dissatisfaction.

To understand the process of technology adoption, a technology acceptance model will be used. A model helps us to understand the variables of technology adoption. With that understanding, barriers can be identified, and possible solutions can be presented to overcome these barriers. There are a large number of theories and models that have been used in the past to analyse the acceptance and adoption of technology. Before reviewing these models, we need to define "Acceptance" and "Adoption". Simon (2001)[7] defines acceptance as:

"An antagonism to the term refusal and means the positive decision to use an innovation".

And adoption, in a technology context, is defined as:

"The choice to acquire and use a new technology."

Technology adoption models have been applied in various domains as a predicter of user behaviour. For example, for occupation, education, voting, dieting, but also in technology acceptance. A recent study by Van Oorschot (2018)[8] provided great detail on innovation adoption literature. This research included 1260 articles within this topic and classified them into four different categories of scientific articles. These four categories are:

1. Institutional theory
2. Theory of reasoned action
3. Theory concerning the determinants of adoption
4. Diffusion theory

These four classifications are used as the foundation of the literature review. All four classes are considered to find the best applicable model for this research.

2.1 Institutional Theory and the legitimization of innovative behaviour

The first classification consists of articles that address forces that dictate how firms behave, how firms innovate, and which innovations are adopted. A popular theory in the first class is the Institutional Theory. This classification includes literature that focusses on predicting a firms behaviour at an aggregate level, and not at innovation adoption level. Therefore, theories and models in this classification will not be useful to predict spinner technology adoption, as this research is focusing on the adoption of one technology in particular, and not a firms' aggregate behaviour.

2.2 Theory of Reasoned Action and the Technological Acceptance Model

The second classification focusses on literature on innovation adoption at the innovation level. Ajzen and Fishbien developed their first model in 1975[9], The Theory of Reasoned Action, later decomposed as the Theory of Planned Behaviour, which together form the foundations of the Technology Acceptance Model. These three models have all been used to predict technology acceptance on innovation level, which is what this research requires.

2.2.1 Theory of Reasoned Action (TRA)

The Theory of Reasoned Action aims to predict the relation between attitudes and behaviours within human action. This model was the first model developed by Ajzen and Fishbein (1975), originating from the field of social psychology. The model links relations between attitudes, beliefs, norms,

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[6] Park, J., Stoel, L., & Lennon, S. J., (2008). *Cognitive, affective and conative responses to visual simulation: The effect of rotation in online product presentation.* Journal of Consumer Behaviour, *7*(1) 72-87.

[7] B. Simon, (2001). *Knowledge media in the education system: acceptance research in universities*, WU Vienna University of Economics and Business: Wien, p. 179

[8] Oorschot, J.A.W.H., Hofman, E., Halman, J.I.M., (2018). *Technological Forecasting & Social Change.* Journal of Business Research.

[9] Fishbein, M., Ajzen, I., (1975), *Belief, Attitude and Behavior: An Introduction to Theory and Research.* Addison-Wesley, Reading, Mass.

intentions and behaviours of individuals (Figure 2). According to TRA, the behaviour of a person can be determined by its behavioural intention to perform it. This intention is then determined by the attitude of a person and his subjective norms. These two factors are influences by beliefs and evaluations, and, normative believes and motivation to comply, respectively.

Fishbein and Ajzen originally developed TRA within the field of health in order to predict health behaviour. Though, Fishbein and Ajzen asserted that TRA can be applied in any given context as predictor of human behaviour. Many studies in the field of communication behaviour, consumer behaviour and health behaviour have used TRA.

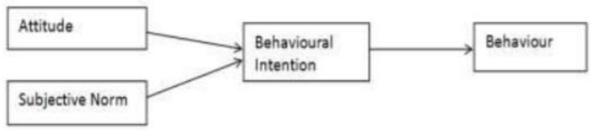

Figure 2 – Theory of Reasoned Action

2.2.2 Theory of Planned behaviour (TPB)

A few years after TRA was introduced, Ajzen (1980)[10] proposed a new model, the Theory of Planned Behaviour. It was an extension of the TRA model by incorporating an additional factor, perceived behavioural control (Figure 3). This factor was added to account for situation where an individual lacked substantial control over its behaviour. According to Ajzen, adding this factor improves the predictive power of the theory. This model has been applied to various fields such as healthcare, advertising, sustainability, etc.

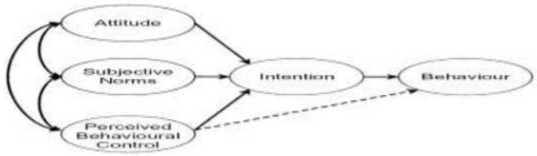

Figure 3 – Theory of Planned Behaviour

2.2.3 Technology Acceptance Model (TAM)

TRA and TPB lay the foundations for the Technology Acceptance Model (TAM), which was originally proposed by Davis (1986)[11] and is the most widely applied model to predict adoption of technology. TAM explains how a new technology and the various aspects of it are received and used by the user. According to the model, technology acceptance is based on two factors. These are:

- Perceived Usefulness, refers to how much the user believes that the technology will help to improve the performance/efficiency
- Perceived Ease of Use, refers to what extent the user is comfortable in using the features of the technology

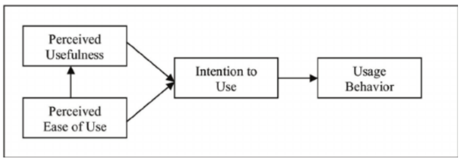

Figure 4 – Technology Acceptance Model

These two factors determine a person's Attitude towards Using, which consequently, influences the Behavioural Intentions to use the Technology, which ultimately influences Actual Use of the technology.
Unlike the TRA and TPB, TAM allows to include external variables that contribute to the predictive power of the technology adoption, such as, situational involvement, prior use, task technology fit, compatibility, trainability, etc.

Limitations

All three models are relatively similar, according to Ajzen, TPB was an improved version of TRA, because a new factor was added, which was perceived behavioural control. TAM is, again, according to Ajzen, an improved version of TPB, due to its ability to include external variables.
Agarwal and Prasad (1997)[12] criticized these models for the reason that these models do not itself explain the diffusion of innovation, instead, it explains the perception of applying an innovation.
Bogazzi (1989)[13] argues that behaviour is not in every case preceded by strong intent, which is assumed in the models. He argues that attitudes and behaviours are not always linked by intentions. Especially when a particular behaviour does not require much cognitive effort.
Olushola (2017)[14] continues to argue that individuals not always have complete control over their behaviour in some conditions. He also argued that in TRA and TPB, there is no clear distinction made between direct and indirect effects of attitude on subjective norms and therefore are hard to measure.

2.3 Determinants of innovation adoption, an econometric perspective

The third class includes articles applying unidirectional causation in order to determine the impact of determinants on adoption of innovation within different fields. In this cluster, one article is addressed by all publications encompassed in this cluster. Which is the article by Downs and Mohr (1976)[15], addressing the critique on the generalizability of research findings on innovation adoption. Downs and Mohr argue that, at that time, innovation adoption models are too simplistic. Two frameworks to study innovation adoption are frequently

10 Ajzen, I., Fishbein, M., (1980), *Understanding Attitudes and Predicting Social Behavior.* Prentice-Hall

11 Davis, Jr, F.D., (1986), *A Technology Acceptance Model for Empirically Testing New End-user Information Systems: Theory and Results.* Massachusetts Institute of Technology.

12 Agarwal, R., Prasad, J., (1997), *The role of innovation characteristics and perceived voluntariness in the acceptance of information technologies.* Decis. Sci. 28, p. 557-582.

13 Bagozzi, R.P., (1989), *An Investigation into The Role of Intentions as Mediators of the Attitude-Behavior Relationship.* Journal of Economic Psychology, volume 10, no. 1, p. 35-62

14 Olushola, T., (2017), *The Efficacy of Technology Acceptance Model: a review of applicable theoretical models in information technology researches.* Journal of Research in Business and Management. Volume 4, no. 11, p. 70-83

15 Downs, Jr, G.W., Mohrm L.B., (1976), *Conceptual issues in the study of innovation.* Adm. Sci. Q. p. 700-714

used in this class, the Technology, organization, and environment framework, and the Iacovou model.

2.3.1 Technology, Organization, and Environment (TOE)

The TOE framework was developed by Tornatzky and Fleischer (1990)[16]. The framework is used to identify three aspects of the context of an organisation that influence how it adopts and implements innovation. These three aspects are:

- Technology, the relevant internal and external technologies to the organization (I.e. practices, equipment).
- Organization, the scope, size and structure of the organization.
- Environment, the environment includes the industry, competition, government, the arena in which an organization conducts its business.

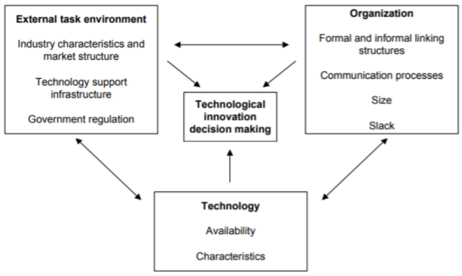

Figure 5 - Technology, Organization, and Environment model

2.3.2 Iacovou model

The Iacovou model is relatively similar to the TOE framework. Organizational readiness combines the technology and organization factor from TOE, and perceived benefits is an additional factor. The Iacovou model (1995) [17]is well suited for adoption of interorganizational systems.

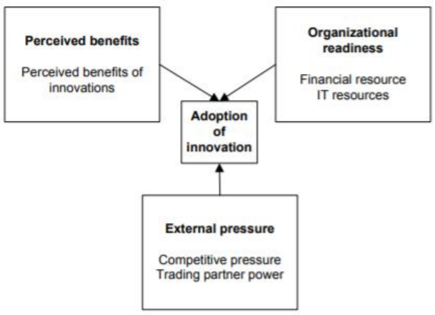

Figure 6 – Iacovou Model

Limitations

The TOE framework and the Iacovou model have very limited proof to prove its empirical validity.

2.4 Diffusion theory

The diffusion theory class includes articles that mainly focus on modelling of diffusion processes, for example the Bass model (2004)[18]. In this class, articles focus predominantly on at what rate new innovations and technologies spread. A popular study by Evernett Rogers (2003)[19] classified the successive groups of when new technology is adopted. Though, in this research, we are not trying to determine if an organisation is an innovator, early adopted or a laggard. Which is not needed for this research. Though, the diffusion theory also discusses attributes to enhance the TAM model from the second classification, such as trialability, compatibility, image, etc.

Literature conclusion

For this research, a model is required that can provide insight on the relations between variables that have influence on innovation adoption, a model that can show where an innovation needs to improve to enhance its usage. The second class included models that are most applicable for this research. Reason being is that TRA, TPB and TAM all three analyse the technology on the technology level, on the spinner technology level in this case, opposed to the first class, which predominantly focusses on how firms behave on aggregate level. Another major advantage of TRA, TPB and TAM over the other discussed models is the fact that they have a lot of research supporting its ability to predict technology acceptance.
Out of these three models, the Technology Acceptance Model is, according to Ajzen, a further developed and improved version of the TRA and TPB models. TAM is also the most widely applied model across fields. The fact that TAM allows for external variables is another major benefit from TAM over TRA and TPB. These external variables can lead to a better understanding of the technology acceptance level and how variables are related to one another. Based on these arguments, the TAM will be used for this research, as this model has the highest probability to help identify barriers for not adopting spinner technology in its current state and give insight in how technology acceptance variables are related. Though, Olushola argument against TRA, TPB and TAM still stands for individuals, in this research the model will be used on an organisation wide level, assuming to significantly reduce the influence of the individual not being in complete control, as technology adoption decisions in this case will not be made by an individual, but by the organisation as a whole. Next to that, Downs and Mohr argued that innovation acceptance models in general are too simplistic. Which would also apply to the original TAM model. However, researchers have added external variables to the original TAM, such as the diffusion theory variables, to enhance its predictability. These external variables will be introduced in the Methodology section.

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[16] Tornatzky, L.G., Fleischer, M., Chakrabarti, A.K., (1990), *Processes of Technological Innovation.* Lexington Books

[17] Iacovou, C.L., Benbasat, L. Dexter, A.S., (1995), *Electronic data interchange and small organizations: adoption and impact of technology.* MIS Q. p. 465-485

[18] Bass, F.M. (2004), *Comments on "A new product growth for model consumer durables". The Bass Model.* Management Science, p . 1833-1840

[19] Rogers, E., (2003), *Diffusion of Innovations, 5th Edition.* Simon and Schuster.

3. Methodology

In order to answer the main research question: *"What can spinner technology manufacturers do to increase the likelihood of spinner technology adoption?"*, the barriers of not adopting spinner technology must first be identified. Based on these barriers, recommendations can be made to overcome these barriers and with that, increase the likelihood of spinner technology adoption. To identify these barriers, a deeper understanding between the technology acceptance variables is required and how these are interconnected. So, the first step is to test the relationships between variables of technology adoption from the TAM model, through a regression and correlation analysis.

Sample

The population in the study consists of car dealerships within the Netherlands that have not yet adopted spinner technology. These are dealerships that are official brand dealers for their respective brand and BOVAG certified, listed on autokopen.nl. There are 1008 (168 pages, 6 car dealers listed per page) car dealerships in the Netherlands, that are listed on autokopen.nl. As sampling method, the first dealership listed on each page (on three occasions, the first car dealership of the page had already implemented spinner technology in their organisation, in those cases the second on the list was chosen, this also proves the low adoption rate in its current state, only 3 of 168 randomly selected already implemented the technology), a total of 168 car dealerships were included in this research.

Research instruments

To answer the research question, a survey was distributed to the sample. The survey consisted of two parts, in order to acquire data to answer the sub-questions.

- Part 1 consists of questions covering the attributes from the TAM model (see: Research Design). The measurement for these attributes is a five-point Likert scale.
- Part 2 consists of an open question where the respondents were asked to state the main reason(s) why they chose not to adopt the spinner technology in its current state yet.

Research Design

In order to answer the research question, "*What can spinner technology manufacturers do to increase the likelihood of spinner technology adoption?"* the main barriers for not adopting spinner technology must be identified, followed by recommendations to overcome these barriers. The TAM model helps us to identify these barriers. As discussed in the literature, the TAM model allows for external variables. Many scholars have introduced external variables either in the field of diffusion of innovation (Agarwal and Prasad, 1997; Karahanna et al., 1999; Rogers, 2003)[20,21,22] or personality traits and demographic characteristics (Venkatesh, 2000; Venkatesh and Morris, 2003)[23,24]. For this research we assume the decision towards adoption of the technology to be an organization wide decision, and therefore have little influence from individuals personality and demographics. These attributes will therefore not be included in this research. The diffusion of innovations on the other hand, are assumed to be more likely of influence, as trialability, for example, may provide valuable information. Therefore, the diffusion of innovation attributes are used for this research:

Attribute	Definition
Image	The degree to which adoption/usage of the innovation is perceived to enhance one's image or status in one's social system
Compatibility	The degree to which adopting the innovation is compatible with what people do
Trialability	The degree to which one wants to experiment with an innovation on a limited basis before making an adoption or rejection decision
Visibility	The degree to which the innovation is visible in the organisation
Result Demon-strability	The degree to which the results of adopting/using the innovation are observable and communicable to others.

Table 1 - External Variables

This leads to the following framework (Figure 7), including the external attributes as presented in Table 1.

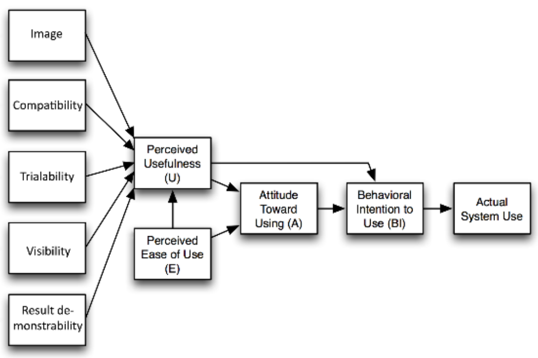

Figure 7 – TAM plus variables

Each of the attributes presented in figure 7 will be tested through their respective measurement instruments as shown in

[20] Agarwal, R., Prasad, J., (1997), *The role of innovation characteristics and perceived voluntariness in the acceptance of information technologies.* Decis. Sci. 28, p. 557-582.

[21] Karahanna, E., Straub, D.W., Chervany, N.I., (1999), *Information technology adoption across time: a cross-sectional comparison of pre-adoption and post-adoption beliefs.* MIS Q. p. 183-213.

[22] Rogers, E.M., (2003), *Diffusion of Innovation, 5th ed.* Free Press, New York.

[23] Venkateshm V., Davis, F.D., (2000), *A theoretical extension of the technology acceptance model: four longitudinal field studies.* Manag. Sci. 46, p. 186-204

[24] Venkatesh, V., Morris, M.G., Davis, G.B., Davis, F.D., (2003), *User acceptance of information technology: toward a unified view.* MIS Q. p. 425-478.

table 2. These attributes lay the foundation for the survey that will be conducted amongst the previously discussed sample.

Attribute	**Measurement instrument**
Perceived Usefulness	- Spinner technology would increase productivity - Spinner technology would increase our digital presentation
Perceived Ease of Use	- Spinner technology (seems) easy to use - Learning to use spinner technology will be easy for me
Attitude Towards Using	- I am positive towards using Spinner technology
Behavioural Intention to Use	- I intend to use Spinner technology in our organisation
Image	- Spinner technology would increase our social status
Compatibility	- Spinner technology (would) fit(s) into our organisation
Trialability	- Being able to try out Spinner technology is/was important in the decision to buy it - Being able to try out Spinner technology is/was important in the decision to use it
Visibility	- Others like using the Spinner technology - I would have no difficulty in telling others how Spinner technology improves our online presentation
Result Demonstrability	- Others are likely to notice if we implement Spinner technology
Likelihood of adoption	- I would adopt Spinner technology into our organisation

Table 2 – Measurement instruments

TAM - Hypotheses

For this research, the TAM model assumes the following relationships as shown in table 3. For this research it is very relevant to test if these relationships hold for this particular technology. Doing a regression analysis for these hypotheses will also provide insight in the strength of these assumed relationships, which ultimately will help to identify potential barriers.

Construct	**Hypothesis**
Perceived Usefulness	Users' "perceived usefulness" of Spinner technology has positive influence on the "attitude towards using" the technology (H1) and "behavioural intention to Use" the technology (H2).
Perceived Ease of Use	Users' "perceived ease of use" of Spinner technology has positive influence on "perceived usefulness" (H3) and "attitude towards using" (H4) the technology.
Attitude Towards Using	Users' "Attitude towards Using" Spinner technology has positive influence on their "behavioural intention to use" (H5).
Behavioural Intention to Use	Users' "behavioural intention to use" has positive influence on "actual system use"* (H6).
Image	Users' "image" for using Spinner technology has positive influence on "perceived usefulness" (H7).
Compatibility	Users' "compatibility" for using Spinner technology has positive influence on "perceived usefulness" (H8).
Trialability	Users' "trialability" for using Spinner technology has positive influence on "perceived usefulness" (H9).
Visibility	Users' "visibility" for using Spinner technology has positive influence on "perceived usefulness" (H10).
Result Demonstrability	"Result demonstrability" of Spinner technology has positive influence on users' "perceived usefulness" (H11) of the websites.

Table 3 - Hypotheses

**Actual system use is tested as likelihood of adoption*

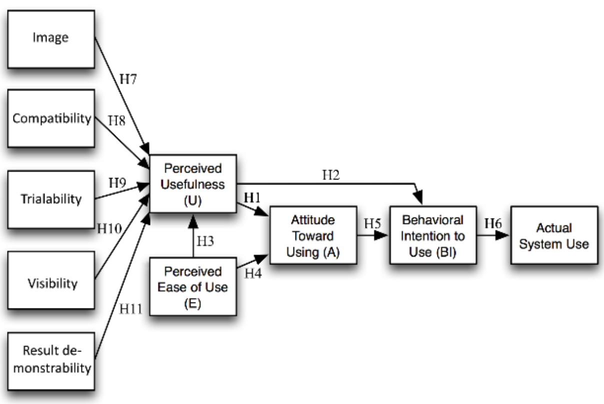

Figure 8 – Hypotheses

4. Analysis

For the first part of the research, the TAM model was used. The first step was to analyse the current technology acceptance level of Spinner Technology.

Descriptive Analysis

Data was collected through an online survey, with a response rate of 32,14% (54 respondents out of 168). Aside from location, the survey was completely anonymous in accordance with the BMS Ethical Committee.

Province	Percentage
Drenthe	7,4%
Flevoland	3,7%
Friesland	5,6%
Gelderland	9,3%
Groningen	7,4%
Limburg	5,6%
Noord Brabant	11,1%
Noord Holland	13,0%
Overijssel	11,1%
Zuid Holland	11,1%
Utrecht	9,3%
Zeeland	5,6%

Table 4 - Sample

As shown in table 4, the sample has a fairly even distribution throughout the Netherlands.

Hypothesis test

The hypothesis are tested through a regression analysis as shown in figure 8 (example: for H1, perceived usefulness is the independent variable, and attitude towards using is the dependent variable). We tested the relationships which were assumed in the TAM model through a regression analysis.

Hypothesis	Beta	Significance (t-value)	Result
H1	0,81	9,2**	Supported
H2	1,33	10,8**	Supported
H3	0,51	6,3**	Supported
H4	0,91	7,9**	Supported
H5	0,57	14,4**	Supported
H6	1,04	7,8**	Supported
H7	-0,01	-0,3	Unsupported
H8	0,27	2,75*	Supported
H9	0,42	4,0**	Supported
H10	0,09	1,8	Unsupported
H11	0,02	0,3	Unsupported

*Table 5 - Hypothesis test * denotes t-value > 2,58, p < 0,01;*
*** denotes t-value > 3,29, p < 0,001.*

As you can see in table 5, hypothesis 7 (Image on Perceived usefulness) is the only variable to not have a positive influence (negative beta). This means, that the assumed positive influence that Image has on perceived usefulness is a wrongful assumption in this case. Hypothesis 7 is also insignificant, meaning that there is no significant evidence that image has a negative influence on perceived usefulness. Therefore, hypothesis 7 is unsupported. Hypothesis 10 and 11 (Visibility and Result demonstrability on perceived usefulness) have a positive influence, however, their results are insignificant and therefore, there is not enough evidence to say that visibility and result demonstrability have a positive influence on perceived usefulness. The remaining eight hypothesis have shown significant evidence and are supported.

The betas show the strength of the relationships according to the hypothesis. Hypotheses 2 (beta: 1,33) shows that there is a very strong relationship between perceived usefulness and behavioural intention to use. Hypothesis 9 (beta: 0,42) has the strongest relationships (trialability) with perceived usefulness from the external variables. This hypothesis test helps to understand how important certain variables are to ultimately adopt the technology.

Correlation

For this research the strength between the variables was also analysed through a correlation analysis (table 6)

	Perceived Usefu	ived Ease o	de towards	ural Intentic	Image	ompatibilit	Trialability	Visibility	Demonstr	ood of ado
Perceived Usefulness	1									
Perceived Ease of Use	0,655937	1								
Attitude towards using	0,787841	0,738319	1							
Behavioural Intention to use	0,832747	0,79956	0,894236	1						
Image	0,029632	0,203352	-0,06893	0,068083	1					
Compatibility	0,566078	0,492213	0,491525	0,552536	0,027969	1				
Trialability	0,721666	0,780148	0,808645	0,703535	-0,1992	0,475385	1			
Visibility	0,405892	0,468305	0,444285	0,494219	-0,03277	0,195485	0,330586	1		
Result Demonstrability	0,439814	0,433861	0,428587	0,418144	0,025211	0,25211	0,602624	0,154198	1	
Likelihood of adoption	0,824494	0,716245	0,832715	0,735492	-0,03921	0,501667	0,911827	0,38894	0,561862	1

Table 6 - Correlation

The likelihood of adoption is the dependent variable here. As assumed by the model, perceived usefulness (82,4%) perceived ease of use (71,6%), attitude towards using (83,3%) and behavioural intention to use (73,5%) are strongly correlated with likelihood of adoption. What stands out is the strong correlation between trialability (91,1%) and likelihood of adoption. Based on the correlation and regression analysis, one could argue that improving on trialability would improve actual system usage, based on the beta scores provided in table 5, and the correlation with actual system usage as provided in table 6. However, this requires more research to determine for certain.

Results

For each construct, the five-point Likert scales provided the following mean and standard deviation (SD) as shown in table 7.

Construct	Mean	SD
Perceived Usefulness	4,31	0,72
Perceived Ease of Use	4,22	0,92
Attitude Towards Using	4,50	0,75
Behavioural Intention to Use	4,30	1,16
Image	2,87	1,34
Compatibility	4,17	0,75
Trialability	4,43	0,86
Visibility	3,11	1,42
Result Demonstrability	3,89	1,00
Likelihood of adoption	3,57	1,66

Table 7 - Mean and Std. dev.

Based on table 7**,** it can be said that the average likelihood of spinner technology adoption across the sample was 3,57, with a standard deviation of 1,66. The mean of 3,57 tells us that the respondents were positive towards adopting the new technology, though, the standard deviation of 1,66 tells us that there was a relatively wide spread within the given answers. There are two things that stand out, first is the low scores for both image (2,87) and visibility (3,11). First thing that comes to mind is that this indicates room for improvement, which will ultimately improve the likelihood of adoption. However, from the regression analysis we see that hypothesis 7 (image on perceived usefulness) and hypothesis 10 (visibility on perceived usefulness) are both unsupported. This means that even if scores for image and visibility would be significantly higher, perceived usefulness is not likely to be different, and if perceived usefulness will not change, likelihood of adoption is ultimately also unlikely to change just by improving the scores for image and visibility. The second thing that stands out immediately is the high scores for "Attitude Towards Using" (4,50) and "Behavioural Intention to Use" (4,30), whilst the likelihood of adoption is much lower (3,57). Based on the numbers of "Attitude Towards Using" and "Behavioural Intention to Use", you would assume the likelihood of adoption to be higher, which is not the case. This could indicate to a new variable that is not yet discussed in the first part of the data analysis. The new variable is most likely to be the reason why the score for likelihood of adoption is much lower. This leads us to the second sub-questions: "*What are the main barriers to not adopt the spinner technology and what can be done to overcome these barriers?"*

Spinner technology barriers

The second part of the research instrument consisted of an open question, where the respondents were given the opportunity to state the main reason(s) for not adopting the spinner technology in its current state. Many respondents discussed similar items. Out of the given responses, there are a few recurring barriers to not adopt spinner technology in its current state. The most recurring barrier that the respondents mentioned had to do with the price of the technology. "At the moment, it is too expensive for us, perhaps in the future." Others were more explicit about their opinion: "It is definitely of better quality compared to what we use now. We would very much like to implement it into our organisation, but for now, the technology is too expensive, as we have four dealer locations, which makes it even more complicated." A total of 30 out of 54 respondents mentioned the price of the technology as one of the main barriers to not adopt spinner technology. Does that simply indicate that the price of the technology is too high? That could be the case, but other respondents were able to give more insight in why the price was being an issue. "We like the technology; however, we are unsure how the implementation of this technology will increase our revenue/sales. Therefore, ROI cannot be calculated, which makes it very difficult to come to a decision." This elaborate quote shows why the price of the technology is such an issue. The underlying issue is that potential customers are unable to calculate their ROI, because there are no numbers available to make calculations in terms of revenue/sales/leads increase. A trend across the respondents is a high level of uncertainty towards the decision whether or not to adopt the technology. There is another factor that contributed to this high level of uncertainty, which also came forward in the first part of the research. The ability to experiment, or, trialability. "We are not sure if it fits into our organisation, we are currently looking into ways to test it." The acquisition of spinner technology is a relatively large investment. With any large investments, organisations want to be certain that it will fit into their organisation and that it will benefit them. Respondents mentioned that they would like to be able to experiment with the technology itself, but also experiment with the spinner technology rendered 360-degree images on their website, compared to their standard images. 17 out of 54 respondents discussed the issue of trialability. This tells us that there is room for improvement on adoption rate if we are able to let customers experiment with the technology.

If we combine these open question answers to the results from the Technology Acceptance Model, we learn the following. The responses from part two of the research instrument confirm that potential customers agree that spinner technology can be very useful for their organisation, as also shown in the high score for perceived usefulness in part one. We also learn that pricing is currently holding back potential customers from acquiring spinner technology. This could be the reason, that the likelihood of adoption scores in part one of the data analysis, are much lower than its preceding variable scores as discussed in the 'Results' earlier.

Overcoming barriers

As we have learned from the data analysis, not being able to calculate ROI, and not being able to experiment with the technology contribute to a high level of uncertainty concerning the adoption decision. Though, not being able to calculate ROI is very common in investment analysis, it is often very difficult to make accurate predictions about the future revenues, costs, etc. Spinner technology manufacturers could facilitate potential customers in making these calculations. There is a small number of car dealerships that already adopted spinner technology, from these cases, data (sales increase, leads, conversion rates, etc.) can be collected in order to provide potential customers more information on what can be expected as a direct result from implementing spinner technology into their organisation. However, making ROI easier to calculate still leaves a high investment cost up front, especially difficult for the smaller dealerships. However, if we look at the practical side of the technology, these smaller dealerships will use much less of the capacity of the technology. Therefore, this could offer an opportunity for a new 'business model'. This business model is a pay per use system, where the spinner technology studio is located in a central spot close to multiple smaller dealerships. This would mean that these smaller dealerships do not have to invest into this technology themselves, but rather pay for the capacity they require. Obviously, this would require top tier logistics and planning, but could be a very attractive business model to both the smaller car dealerships and the spinner technology manufacturers. The spinner technology manufacturers will have to take the risk of investing the money themselves, instead of selling the technology, however, this will create returning customers, instead of one-time purchases. Whether this solution works would require additional research, but the potential is there.

Trialability is the next challenge for the spinner technology manufacturers. If we, again, briefly look at the practical side of the technology, we learn to understand that the technology takes up a relatively large space (9x5x2m) and requires multiple days of setup time. This could very well explain the limited access to experimentation with the technology. Respondents mentioned they would like to experiment with both the technology itself, and the effect the 360-degree images have on their online showroom. Both require access to the technology first, without the technology, there is no experimentation with the technology itself, and not with the output, as this requires access to the spinner technology. In order to provide this access to a large number of potential customers without having the multiple day set up time for each potential customer, spinner technology manufacturers should develop a mobile version of the technology. Private owned companies such as Expandable B.V.[25] have a proven expandable trailer/container (able to expand up to (13x5x2,5m) which is easily movable, and very quick to set up. This would allow potential customers to try out the technology for a given time period, without having to fully install the studio in one spot, making trialability more accessible. Another side benefit is that a mobile studio could be used as a service, only pay for the required capacity. Making the technology more accessible for smaller customers that otherwise could not afford the technology.

5. Conclusion

In this article, a two-part data analysis was performed to determine what spinner technology manufacturers can do to improve the adoption rate of spinner technology. Part one of the data analysis showed how variables are interconnected and how spinner technology scored on the technology acceptance model. Based on these scores, it is assumed that there is a variable which was up until this point not accounted for, as the attitude towards using spinner technology has a high score, the actual usage of technology scored much lower. The second part of the data analysis gave the most likely cause of this lower score. Which is the price of the technology, 54% of the respondents mentioned that the price of the technology is the main reason that they have not yet adopted the technology. The underlying reason for price being one of the main barriers, is the difficulty of calculating the ROI. Though we cannot be certain, and this would require further research, it is very likely that this caused the significant difference between attitude towards using and actual usage of technology. From the data analysis we also learn that respondents would very much like to experiment with the technology before making the adoption decision. However, in practice, there is very limited to no room for experimentation prior to adopting spinner technology. This shows a mismatch between customer need and what spinner technology manufacturers offer. Therefore, the following two recommendations were made. The first recommendation is to share pre and post adoption data with potential customers. Give these potential customers insight in how their organisation will be affected by the implementation of spinner technology. Based on the scores of the first part of the analysis (perceived ease of use and perceived usefulness) we can say that the average respondent was aware of the added value of spinner technology compared to standard image presentation, though it remains difficult to estimate what will happen post adoption in monetary terms. To facilitate potential customers with this issue, data from prior cases should be provided to make ROI easier to estimate. The second recommendation is meant to create opportunity for experimentation. As from the practical side, the spinner technology studio takes multiple days to set up or take down, a very expensive process, a mobile spinner technology studio was recommended. To make experimentation more accessible. Minimizing setup times to make experimentation affordable. This also allows for potential customers to experiment with the output, the 360-degree generated images, in order to find out themselves how much their organisation benefits from this type of digital presentation.

6. Discussion

For further research it could be interesting to compare spinner technology to other promising technologies such as VR and AR, and how these technologies could influence the online presentation of automotive vehicles. Furthermore, another group could be added to the sample, including car dealerships that have adopted the spinner technology. What barriers they ran into and how the technology influenced their digital showroom.
For the operationalization of the measurement instrument for trialability there is already an assumed relation between trialability and likelihood of adoption. Unfortunately, this mistake was identified post data collection. The correct operationalization should be closer to: “Testing/experimenting with the technology is important to us”, without assuming that it would have a positive influence on likelihood of adoption, as this is the dependent variable.
Furthermore, if the same experiment was carried out again, it would be very interesting to add price as variable to the Technology Acceptance Model. For this research it was assumed that price would be the variable that caused the lower than expected actual usage in comparison to attitude towards usage of spinner technology. Further research must be done in order to validate this assumption.
A risk of doing surveys as in this research, is the common method bias. The common method bias refers to the bias that is introduced with the research instrument itself, rather than the actual predispositions of the respondents, which is that the instrument actually attempts to uncover. For further research, including a Harman’s single factor score should be able to determine whether the study is affected by the common method bias. The Harman’s single factor measures all latent variables which are loaded into one common factor. If the amount of variance for an individual factor is lower than 50%, this would suggest that the common method bias does not affect the data. Another way to avoid the common method bias is to use triangulation, using more methods to collect data on the same topic, to assure the validity of the research. Both of these could be included in further research.

[25] Expandable B.V. (2019), Retrieved from: https://www.expandable.nl/

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