When Handing out Presents is not Enough! –

Influencing Factors on the User´s Willingness to Share Data for Connected Car Services

Problem Definition

The automotive industry is facing fundamental technological and economic upheavals. Besides of the technological transition to emission-friendly power units the car becomes a platform, where existing and new companies will compete to offer refined and new services. In this already growing market, data is the fuel for future business models either by digital start-ups or established companies. Especially connected car services (CCS) (e.g. predictive maintenance, entertainment services etc.) promise to generate mayor revenue streams in the future (Seiberth & Gruendinger, 2018). While opportunities to collect vast amounts of data through state-of-the-art technologies are already available, data privacy protection laws aim at giving the user full control of his data at all times. Therefore the availability of essential high-quality contextual data is mainly limited by the user´s willingness to provide their data voluntarily to companies. Companies who want to gain a competitive advantage need to understand the influencing factors that contribute to the user´s willingness to share data. This knowledge enables companies to take adequate management measures to gain data access. The research guiding question of this study is: What influences the user´s willingness to share data with a company for CCS?

Theoretical Foundation

As digitization fuels servitization and vice versa (Baines & Lightfoot, 2014), car manufacturers have already stopped to imagine themselves as companies that just develop, produce and sell cars. In the medium- to long-term, digital transformation turns the car increasingly into a cyber-physical-system with a multitude of sensors and processing power (Karnouskos & Kerschbaum, 2018). Ultimately, in a time horizon of 8 to 15 years, fully autonomous and connected vehicles have the potential to transform the driving experience by increasing traffic efficiency, reducing pollution, and eliminating up to 90% of traffic accidents (Bonnefon & Shariff, 2016). As the “driver” can spend his time otherwise it is highly likely that the demand for additional services like CCS, especially entertainment offerings, will grow profoundly. A

somewhat underestimated challenge every competitor needs to face is the legal compliance in gathering and processing data to offer high-class services. The user´s preferences and influencing factors for sharing data is of high interest for existing or potential service providers to ensure that they have access to high-quality data that fuels their business models. This study fills a gap in the literature on the willingness to share data by users for CCS.

Methodology

The sample stems from an EU-wide survey in August 2017. 5006 persons (2430 male, 2576 female) from Germany, Great Britain, France, Italy and Spain (at least 1.000 persons per country, 18 years or older) participated in an online survey. To answer the research guiding question we test our research model with a multinomial logistic regression. All variables are presented in table 1. The dependent variable consists of 3 categories. The internal construct consistencies for the independent variables, measured by Cronbach's alpha, reach very satisfying levels.

Table 1: Dependent and independent variables.

No.	Name	Items	Cronbach´s Alpha
A.	Dependent Variable		
1	Openness to share data (Categories: Open to share data; Indifferent; Negative on sharing data)	1 (Question 55) 5 point Likert scale	/
B.	Independent Variables		
1	Demographic information	gender (male, female) age	/
2	Personal preferences for different areas	5 questions with 5 point Likert scale	,810
3	Perceived personal added value by different services	5 questions with 5 point Likert scale	,846
4	Knowledgeability about the amount of shared data	3 questions with 5 point Likert scale	,838
5	Trust in the data recipient	6 questions with 5 point Likert scales	,927

Results

Regarding the dependent variable 1488 (29,7%) participants qualified themselves as open for data sharing, 1477 (29,5%) as indifferent and 2041 (40,8%) as negative on data sharing. The overall model proves to be significant (2-Log Likelihood: 8987,666; Chi-squared 1868,732, Sig.

,000). The pseudo R-squared measures reach acceptable levels (Cox and Snell: ,312; Nagelkerke: ,352; McFadden: ,172).

Table 2: Classification table.

	Predicted			
Observed	Open to share data	Indifferent	Negative on sharing data	Valid percent
Open to share data	1001	150	337	67,3%
Indifferent	389	248	840	16,8%
Negative on sharing data	308	181	1552	76,0%
Total	33,9%	11,6%	54,5%	56,0%

Overall the model classifies 56% of all cases correctly. Compared to a random classification of cases to the largest individual group (2041/5006=40,77%) the model performs 37,35% (56,0%/40,77%) better.

Table 3: Parameter estimates.

Negative on sharing data [a]		**B**	**Std. Error**	**Wald**	**df**	**Sig.**	**Exp (B)**
Open	Intercept	-1,490	,343	18,846	1	,000	
	Age	-,019	.003	45,557	1	,000	,982
	Male	,691	,084	66,969		,000	1,996
	Female	0[b]					
	Personal preferences for different areas	,152	,088	2,961	1	,085	1,164
	Perceived personal added value by different services	,477	,089	28,932	1	,000	1,612
	Knowledgeability about the amount of shared data	-1,312	,063	435,853	1	,000	,269
	Trust	,877	,053	275,862	1	,000	2,404
Indifferent	Intercept	-1,760	,292	36,429	1	,000	
	Age	-,010	,002	16,766	1	,000	,990
	Male	,437	,073	35,782		,000	1,549
	Female	0[b]					
	Personal preferences for different areas	-,031	,075	,177	1	,674	,969
	Perceived personal added value by different services	,387	,074	27,650	1	,000	1,275
	Knowledgeability about the amount of shared data	-,284	,049	33,241	1	,000	,753
	Trust	,433	,044	95,395	1	,000	1,542

[a]The reference category is: Negative on sharing data

[b] set to zero because of redundancy.

Regarding the willingness of users to share data for CCS the main influential factors are knowledgeability about the amount of shared data, trust and perceived personal added value by different areas.

Implications for Entrepreneurship Research and Practice

This study demonstrates that the user´s willingness to share personal data is determined by different factors, like trust, knowledgeability about the amount of shared data and perceived personal added value, that can all be potentially influenced by management measures. It becomes clear that simply handing out a "present" like an app for CCS is not sufficient to ensure the long-term availability of data from users.

Start-ups who want to enter the CCS market might gain a competitive advantage if they follow a nuanced management approach. On the one hand, they need to educate those who are critical of sharing their data and seize measures to build trust. On the other hand, they need to point out the advantages of CCS to those who are already willing to share personal data.

Understanding the influencing factors on the user´s willingness to share their data in a fast growing data-driven market will force new and existing companies to attach greater importance to transparency and communication strategies.

This study is based on data from the five largest EU economies. It is possible that in other markets (USA, China), in particular due to different legislation and general attitude to privacy and data protection, the results might turn out differently. Also other factors, which were not accounted for in this study, may also play a major role regarding the user's willingness to share data. All variables in this study stem from the same questionnaire so common method bias might be an issue. Because of the rather large sample and the clear results we have no indication that the results are distorted.

Literature

Baines, T. & Lightfoot, H. W. (2014). Servitization of the manufacturing firm. *International Journal of Operations & Production Management,* Vol. 34(1), pp. 2-35.

Bonnefon, J.F. & Shariff A.R.I. (2016). The social dilemma of autonomous vehicles, *Science,* Vol. 352(6293), pp. 1573–1576.

Karnouskos, S. & Kerschbaum, F. (2018): Privacy and integrity considerations in hyperconnected autonomous vehicles, Proceedings of the IEEE, Vol. 106(1), pp. 160–170.

Seiberth, G. & Gruendinger, W. (2018). Data-driven business models in connected cars, mobility services and beyond, Berlin: BVDW Research, electronically available: https://www.bvdw.org/fileadmin/bvdw/upload/publikationen/connected_mobility/20180418_data_driven_business_models_Seiberth_Gruendinger.pdf.