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Impact of Connected Remote Services on Car Servicing Loyalty

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Abstract
This paper aims to study the effect of connected remote services (CRS) and its key factors on car servicing loyalty within the automotive aftersales business. The definition of CRS as service innovation captures the special particularity of connectedness as attribute, providing simultaneous connectivity to a service object (e.g. car), manufacturer (brand) and a car dealership. Relevant key factors of CRS and its individual consequences were identified by an exploratory qualitative study using the means-end chain method. The derived research model was measured using partial least-squares (PLS) path modelling. It was empirically tested by an online survey among 331 German automobile customers considering six different brands. The results show evidence of a relationship between CRS and car servicing loyalty. Mediated by customer value, trust and CRS reuse intention, the key factors convenience, safety, reliability and connectedness positively influence car servicing loyalty. However, the influence of comfort, identified as relevant key factor within the exploration of CRS, is empirically not supported. This research adds new knowledge to the present body of customer retention management literature by providing a definition of CRS and a model to describe the influence towards car servicing loyalty, which hasn´t been subject to research yet. It explores the characteristics of CRS and explains how to increase car servicing loyalty and economic success resulting from it. The findings of this research help managers of car dealerships and vehicle manufacturers to enhance existing beneficiary and, trust building functions of CRS and the development of new features.
Keywords: Automotive aftersales, car servicing loyalty, connected remote services, service innovation.

1. Introduction

One general trend in the automotive industry is that the isolated focus on car-sales is replaced by a wider view, considering the initial car sale more of an enabler for beginning relationships with customers. Hence, car sales become the starting point for relationship management based on additional services expanding the traditional aftersales business, which today mainly consists of maintenance and repair services. (Confente, Russo 2016, p. 59) At the same time, the need for service innovation has never been greater to ensure and expand market share and profits. One challenge to systematic service innovation is to combine technology, business, social, and customer needs in the creation process. (Spohrer, Maglio 2008, p. 238) However, there is little research and knowledge on developing and designing new services. While customers are more and more competent in articulating their needs, and expressing their demands, the success of service innovation becomes more and more dependent on the use and integration of Information Technology and digitization of information processes into the service delivery system. (Bouwman *et al*. 2008, p. 3) The acceptance of a new service is one of most important aspects regarding success. The more knowledge about customer needs is collected within the firm´s innovation process, the better these needs can be used to design the service. This research aims to investigate the impact of a companies' customer retention management measures based on the provision of service innovation such as connected remote services on car servicing loyalty. The main finding of this paper is the first empirical evaluation of the research model describing the interrelationship between key factors of CRS and car servicing loyalty. The novelties of the model are twofold. For once it contains the conceptualization of CRS based on an explorative qualitative research approach. As second, it picks up existing theories from the fields of customer behavior, technology acceptance and customer loyalty research. These findings are reflected in the underlying research model to be empirically tested. The results of the present research can be a foundation for the automotive industry to guidelines for the enhancement of existing and development of new CRS functions, which significantly affect user intentions regarding CRS reuse and car servicing loyalty alike.

2. Literature review

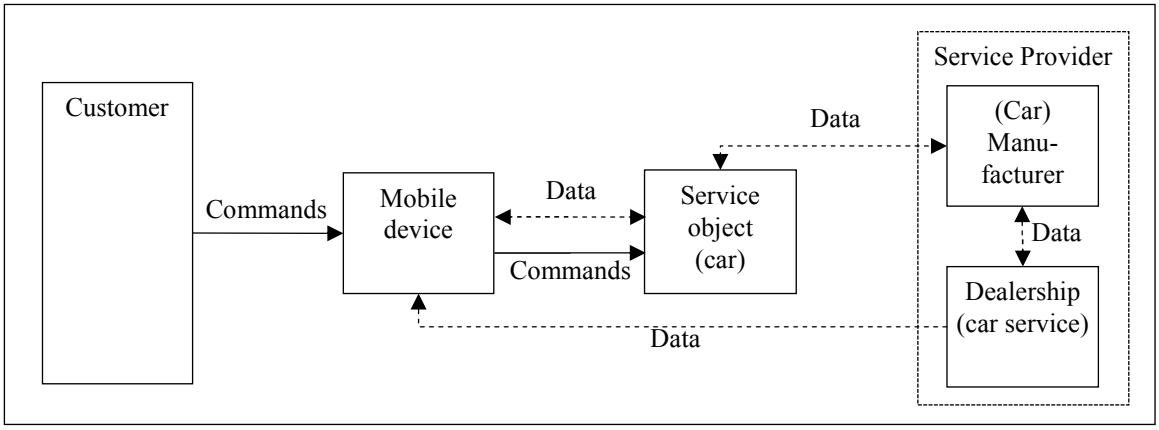
2.1 Connected remote services

As a subset of mobile services, recently remote services as an additional type of services has developed, describing a separate kind that can be delimited from traditional services because a technological interdependence occurs within the delivery process of the service. The definition of service innovation in conjunction with the definitions of remote services of Wünderlich *et al*. (2007, p. 7) and connected services of Hiraoka (2009, p. 16) are the foundation for the proposed definition of "connected remote services" by the author of this paper: *Connected remote services are innovative mobile remote services that enable customers to interact with the service object as well as the service provider by using mobile infrastructure independently of the spatial distance. This infrastructure enables the bidirectional exchange of information and the control of the*

service object via data channels.

CRS require several control elements. Information and communication technology (ICT) enables the service provider to access the service object as well as the customer's mobile device. The customer needs access to ICT that makes it possible to query data and to control and modify the service object. The service object must be able to feed the system via ICT with data of its own status. This enables the customer and the service provider to access the service object to monitor, to perform diagnostics and to control it. (Wünderlich *et al*. 2007, p. 13) Figure 1 describes the information and communication flows within the system architecture.

Figure 1. Schematic system-architecture overview of CRS (Authors' illustration, extended from Wünderlich *et al*. 2007, p. 13)



2.2 Car servicing loyalty

Early investigations on customer loyalty solely focused on the behavioral aspect, e.g. by examining the factual repeat purchase behavior of customers. This behaviorist measurement approach was built on proportions or sequences of purchase assumed to reveal underlying brand preference. (Cunningham 1956, p. 116) Conventional wisdom suggests that the best predictor of future behavior is factual behavior a customer performed in the past once or in terms of repeat purchases. (Kumar *et al*. 2003, p. 667) This approach was criticized for its lack of explanatory power and its isolated focus on factual behavior neglecting attitudinal aspects of customer loyalty. According to Jacoby and Chestnut (1978) attitudinal loyalty encompasses beliefs, affections and intentions. Concretizing these emotions, Oliver (1999, p. 34) defines customer loyalty as: "a deeply held commitment to rebuy or repatronize a preferred product/service consistently in the future, thereby causing repetitive same-brand or same brand-set purchasing, despite situational influences and marketing efforts having the potential to cause switching behavior." Corresponding to the attitudinal approach of Jacoby and Chestnut, Zeithaml, Berry and Parasuraman (1996, p. 34) operationalize loyalty as behavioral intentions with five items including (1) saying positive things about the company to others, (2) recommending the company to someone who seeks advice, (3) encouraging friends and relatives to do business with the company, (4) considering the company to be the first choice to buy services, and (5) doing more business with the company in the next few years. Applied to the context of this research, the understanding of the term car servicing loyalty is stated as follows: *Car servicing loyalty describes a future-oriented positive attitude of a customer towards the dealership which provides connected remote services, manifested by the customer's intentions, of using the same dealership's car service offerings for future maintenance and repair service demands, positive word-of-mouth and the resistance towards another person's persuasion attempts regarding switching to another car service provider.* Precisely, repurchase intentions, willingness to recommend, resistance to persuasion by third parties are considered to represent suitable indicators for the measurement of car servicing loyalty.

3. Research methodology

3.1 Exploration of key factors of connected remote services

The conceptualization of CRS is based on an explorative, qualitative research approach using the method of means-end chain (MEC) analysis. The means-end theory posits that linkages between product attributes consequences produced through consumption, and personal values of consumers underlie their decision-making processes. (Gutman, 1991, p. 143) Means are products or services, and ends are personal values considered important to consumers. Transferred to the context of this research, the mechanism of a means-end chain makes it possible to track back perceived consequences towards certain attributes or functions of a product or service. (Gutman, 1982, p. 60-62) Functions of CRS correspond to attributes that lead to attribute-specific consequences, which again lead to relevant values from the customers' perspective. The consequences, located in between attributes and values are of special interest for the identification of key factors of CRS.

For the survey, conducted during the period of April and May 2017 in Germany, customers of four different brands, were addressed while waiting at the service counter or in the waiting lounge of the dealership. As a prerequisite, the participants should have owned and used a version of CRS in the past 6 months. The participants are also referred to as users of CRS. The sample size for the written surveys in person consists of 18 participants. The identified consequences convenience, connectedness and safety showed the highest numbers of connections and thus substantially determine the construct of connected remote services. The consequences comfort and reliability show lower levels of connections but still on a significant level and are also considered as key factors for the further process of research. In summary, the explored concept of CRS consists of five key factors, namely convenience, connectedness, comfort, safety and reliability. Next, the identified key factors are classified.

Berry, Seiders and Grewal (2002), define service convenience as the customers´ "time and effort perceptions […] using a service", considering the specific context of necessary activities that customers carry out while using a service or performing a specific task. The key factor convenience is therefore defined as follows: *Convenience describes the degree of simplification and increased promptness a user experiences by use of CRS.*

Wamba and Akter (2016) use the term perceived connectivity describing it as the ability of a technology to link people to people or other objects. The second aspect of simultaneous connectedness towards a car dealership is reflected in the definition developed by the author of this paper: *Connectedness describes the degree a customer feels connected to a specific service object in terms of receiving or query information and sending commands to the service object and simultaneous connectedness towards the dealer.*

In the automotive context, Hess (1924) defines comfort "as the transportation of an automobile passenger in so easy manner that the trip will be a pleasure and not a hardship." In this research comfort is defined as: *The degree the customer perceives physical relaxation (increased comfort) and the degree of stress avoidance (decreased discomfort) while driving the vehicle.*

Within the context of automotive transport, Joewono and Kubota (2006) describe safety as "the actual degree of safety from accidents and the feeling of security resulting from that". It comprises the aspects of safety from accidents, the presence of help, the avoidance of hazards as well as active safeguarding. Hence, in this paper safety is defined as: *The subjective feeling of minimizing the individual risk of harming their physical integrity or to increase the probability to ensure their physical integrity.*

According to Bracke and Haller, (2011) reliability is defined as the degree of increase of sustainability, e.g. by the avoidance of repair efforts by enhanced possibilities of monitoring the condition of the service object. The key factor of reliability is therefore defined as follows: *Reliability describes the degree of availability of the service object a user experiences by use of CRS.*

3.2 Definitions of the latent endogenous variables

The definition of customer value used, is based on the work of Gwinner *et al*. (1998, p. 110), who defined customer value as: "benefits customers receive from long-term relationships above and beyond the core service performance." with positive effects on the loyalty dimensions positive word of mouth and continue in relationship.

Trust was found to have a significant influence on loyalty in the scope of relationships between a customer and the service provider employee. (Gremler and Brown 1996, p. 176) In their study, Aydin and Özer (2005) reveal that trust also is an important driver of customer loyalty within an employer independent setting in the mobile service sector. Considering the definition of Moorman *et al*. (1992, p. 315) as suitable to the context of this work, trust is defined as: "A customer's willingness to rely on an exchange partner in whom one has confidence."

Literature review on the technology acceptance of services in the mobile context provides the insight that the often-used concept of perceived usefulness shows similarities to the concept of customer value. Based on empirically tested results, this usefulness leads to reuse intention of information and communication technology. (Davis, 1989; Hiraoka, 2009; Park *et al*., 2014) In consequence, the concept of reuse intention of CRS shall be added to the research model in the assumption that there exists a mediating interrelation between customer value and car service loyalty.

Car servicing loyalty as the subject of the research and main target of manufacturers introducing CRS, is defined as the: *future-oriented positive attitude of a customer towards the dealership which provides connected remote services, manifested by the customer's intentions, of using the same dealership's car service offerings for future maintenance and repair service demands, positive word-of-mouth and the resistance towards another person's persuasion attempts regarding switching to another car service provider.*

3.3 Research model and hypotheses

Based on the theoretical considerations and the qualitative results of the exploration of CRS, the research model is designed as follows: (1) dependent variables are car serving loyalty, CRS reuse intention, customer value and

trust; (2) moderating variables are enjoyment and innovativeness; and (3) key factors of CRS form the independent variables convenience, connectedness, comfort, safety and reliability, to test significance of the hypothesized relationships in the framework of CRS users. Based on the research model and the purpose of this study, five hypotheses are formulated to answer the research questions. The research hypotheses are summarized in Table 1.

Table 1: Summary of postulated research hypotheses. (Source: Author)

H_i	**Formulation**
Research hypotheses of the model constructs	
H_{1a-e}	Customer value positively mediates the effects of connected remote services' key factors on CRS reuse intention and car servicing loyalty.
H_{2a-e}	Trust positively mediates the effects of connected remote services' key factors on customer value, CRS reuse intention and car servicing loyalty.
H_3	CRS reuse intention positively mediates the influence of customer value and trust on car servicing loyalty.
Research hypotheses of the moderating effects	
H_4	Enjoyment heightens the positive influence of customer value on CRS reuse intention.
H_5	Innovativeness heightens the positive influence of CRS reuse intention on car servicing loyalty.

The research model is illustrated in Figure 2.

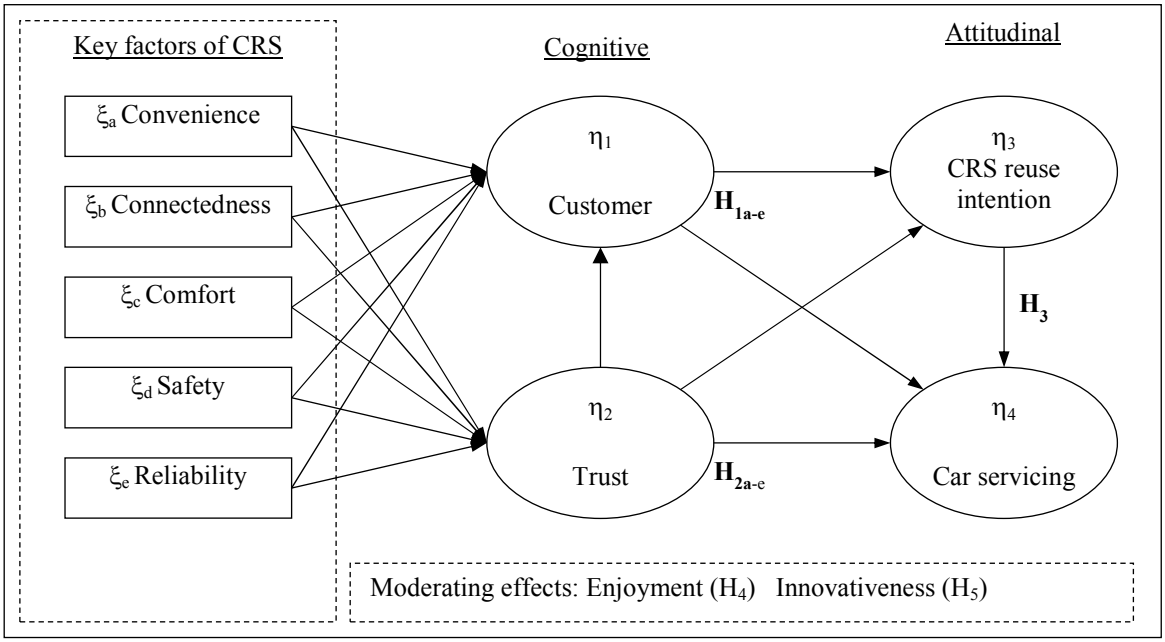


Figure 2. Research model of the impact of CRS key factors on customer value, trust, CRS reuse intention and car servicing loyalty. (Source: Author)

3.4 Research design, pre-test and data collection

In accordance with the developed hypotheses, an online-questionnaire was designed. The purpose of the questionnaire was to capture customer perceptions of CRS and their various effects addressed to the defined dependent variables. The questionnaire contained a total of 53 questions. A two-phase pre-test was conducted to assess validity of the indicators and to ensure that the wording of the questionnaire was clear. In the first step, an item-sort task among 11 selected CRS users was performed to assess the indicators addressed to the five CRS key factors according to Anderson and Gerbing (1991). Based on the results, three out of 19 indicators were reformulated and improved regarding clearness. One of four indicators from the key factor comfort was deleted from the questionnaire, because it didn´t unambiguously load on one factor. In the second step, the complete questionnaire was pre-tested in an online-survey setting. Thirty-four questionnaires were completed by the intended target group of active CRS users. Results showed that the developed questionnaire and survey design is suitable regarding the research targets.

The main study questionnaires were collected, using a quantitative research design to: (1) investigate the most influential CRS key factors in gaining customer value and trust and (2) investigate the relationships between customer value, trust and reuse intention of CRS towards car servicing loyalty. The target population of

this study were customers from six car brands, required to be active CRS users. Data was collected through an online survey, conducted between September 1st and October 13th, 2017. The survey was addressed towards customers of CRS. Participants were instructed to answer all latent variables on a 5-point Likert scale. (1 = ‘‘strongly disagree’’, 5 = ‘‘strongly agree’’)

4. Results

4.1 Data screening

In total 701 responses were gained. From this sample, 266 questionnaires were defused from the population because the necessary requirement of active CRS use was not fulfilled, captured by filter-questions. After further proceeded data-cleaning of invalid responses, 331 samples were used for data analysis. Descriptive statistics were analyzed using SPSS 24.0. The demographic data included information on gender, age, model year, CRS application used, frequency of use and annual mileage. Gender split of the sample was 197 males (59.5%) and 134 females (40.5%). In terms of CRS application used, the breakdown was 24.5% Audi Connect, 23.6% BMW Connected Drive, 21.5% Mercedes Me, 16.6% Volkswagen Car-Net, 7.3% Opel OnStar and 6.7% Skoda Connect, indicating a largely even distribution. Respondents were divided into four levels of usage: seldom (41.4%), regularly (45.3%) and often (13.3%), whereas users that stated to never use CRS were excluded from evaluation.

Data analysis included the determination of descriptive statistics, frequency distribution analysis as well as the assessment of reliability and validity. SEM was applied to assess the proposed hypotheses. SEM is particularly appropriate for the study of multiple dependent relationships as to be investigated in this research. SEM was performed using the software Smart-PLS 3.2.7, because the partial-least-squares (PLS) approach is particularly suitable for the consideration of both, reflective and formative measurement in one model.

4.2 Evaluation of connected remote services key factors and latent endogenous variables

To verify the measurement items of the CRS key factors, an exploratory factor analysis (EFA) was performed. The five-factor model initially fits the data with total variance explained at 58.8%, which confirms an appropriate level of explanatory power. The Kaiser–Meyer–Olkin criterion rates the adequacy of the sample size for model assessment. The value of 0.908 confirms that the number of responses (n = 331) is sufficient. The indicator pool initially contained 18 indictors addressed towards 5 factors. The factor analysis confirms that the factors convenience, connectedness, comfort, safety and reliability represent independent constructs. Each factor of the CRS construct displays good levels of reliability. Indicator loadings are throughout above 0.7. Test of corrected-item-total correlations (CITC) underpins the reliability of the measurement, since all values are above the threshold of 0.5. Significance is achieved by t-values clearly above 1.96 (two-tailed). Values of Cronbach's α are above the threshold as per Nunally (1978, p. 245), who requires its value should be equal to or exceed 0.7. Average variance extracted (AVE) is sufficient for all factors as well as composite reliability (CR).

Within the evaluation of the construct customer value, indicator reliability (IR = 0.375) of the indicator VAL_1 violates the threshold of 0.4. Further the CITC-value was below the threshold of 0.5 (0.420). For these reasons, the indicator was eliminated. Adjusted results are shown in Table 2. The kept indicators all show significant loadings, CITC and t-values clearly above the respective thresholds. CR (0.855) and Cronbach’s α (0.745) are adequate, the AVE is 0.663. Loadings and t-values of the indicators of the construct trust are all above the corresponding thresholds. On the factor level, composite reliability (0.897), Cronbach’s α (0.829) and AVE (0.745) are adequate. For CRS reuse intention all loadings, CITC and t-values of the indicators are above the thresholds. Composite reliability (0.880), Cronbach’s α (0.796) and AVE (0.710) are adequate. Loadings, CITC and t-values of the indicators of the construct car servicing loyalty are all above the corresponding thresholds. On the factor level, composite reliability (0.881), Cronbach’s α (0.820) and AVE (0.650) are adequate.

Table 2: Reliability and validity of research model variables. (Source: Author)

Construct	ID	Loading	CITC	t-value	CA	CR	AVE
Convenience	COV_1	0.825	0.683	38.135	0.853	0.900	0.693
	COV_2	0.841	0.707	44.462			
	COV_3	0.842	0.702	49.402			
	COV_4	0.822	0.679	38.526			
Connectedness	CON_1	0.840	0.695	36.707	0.813	0.877	0.640
	CON_2	0.809	0.656	31.777			
	CON_3	0.774	0.616	26.289			
	CON_4	0.777	0.566	33.566			
Comfort	CFT_1	0.848	0.655	41.572	0.800	0.882	0.714
	CFT_2	0.859	0.660	43.837			
	CFT_3	0.828	0.617	33.743			
Safety	STY_1	0.733	0.553	22.223	0.793	0.865	0.616
	STY_2	0.805	0.626	34.900			
	STY_3	0.795	0.628	28.754			
	STY_4	0.804	0.602	36.705			
Reliability	REL_1	0.827	0.628	38.867	0.806	0.886	0.721
	REL_2	0.841	0.636	46.517			
	REL_3	0.878	0.697	63.490			
Customer value	VAL_1 (Eliminated)	-	-	-	0.745	0.855	0.663
	VAL_2	0,809	0.567	33.048			
	VAL_3	0,833	0.615	33.851			
	VAL_4	0,873	0.530	28.042			
Trust	TRU_1	0.837	0.667	37.443	0.829	0.897	0.745
	TRU_2	0.873	0.690	57.278			
	TRU_3	0.878	0.704	63.881			
CRS reuse intention	REU_1	0,841	0.633	41.211	0.796	0.880	0.710
	REU_2	0,833	0.625	37.746			
	REU_3	0,855	0.659	45.608			
Car servicing loyalty	CSL_1	0,835	0.678	44.152	0.820	0.881	0.650
	CSL_2	0.808	0.644	35.457			
	CSL_3	0,799	0.635	33.687			
	CSL_4	0,783	0.616	26.849			

Analysis of discriminant validity is conducted under use of the Fornell-Larcker (1981, p. 46) criterion. According to this discriminant validity is present, if the AVE of a factor is higher than the squared correlation of this construct with another construct. Diagonal elements presented the square roots of the average variance extracted. As shown in Table 4, all five factors are distinct from each other. Table 5 summarizes the evaluation of discriminant validity for the endogenous constructs.

Table 4: Results of the evaluation of discriminant validity of the of CRS key factors. (Source: Author)

CRS key factor	Convenience	Connectedness	Comfort	Safety	Reliability
Convenience	0.833				
Connectedness	0.572	0.800			
Comfort	0.455	0.435	0.845		
Safety	0.451	0.413	0.397	0.785	
Reliability	0.530	0.441	0.401	0.529	0.849

Table 5: Results of the evaluation of discriminant validity of the endogenous constructs. (Source: Author)

Endogenous construct	Customer value	Trust	CRS reuse intention	Car servicing loyalty
Customer value	0.814			
Trust	0.678	0.863		
CRS reuse	0.687	0.606	0.843	
Car servicing loyalty	0.721	0.635	0.736	0.806

4.3 Assessment of the postulated research hypotheses

The constructs CRS reuse intention, customer value and trust, have a highly significant influence on car

servicing loyalty at the 1% and 0.1% significance levels, and their path coefficients ($\lambda_5 = 0.327$; $\lambda_7 = 0.164$; $\lambda_8 = 0.412$) confirm that the three antecedents have a relevant influence.

Moreover, customer value and trust have a highly significant influence on CRS reuse intention at the 0.1% significance level, with path coefficients ($\lambda_4 = 0.511$; $\lambda_6 = 0.260$), which confirm that both antecedents reliably predict CRS reuse intention. The influence of trust on customer value, is also highly significant at the 0.1% level. The corresponding path coefficient ($\lambda_3 = 0.389$).

The analysis of CRS key factors reveals varying outcomes. The influence of convenience on customer value is significant at the 1% level. Convenience shows the highest path coefficient ($\lambda_{1a} = 0.185$), followed by safety ($\lambda_{1d} = 0.148$) and connectedness ($\lambda_{1b} = 0.110$). Impacts of connectedness and safety on customer value, are significant at the 5% level. The effect sizes for these key factors are all above the threshold. The influences of comfort and reliability, are not classified as significant. Path coefficient ($\lambda_{1c} = 0.023$; $\lambda_{1e} = 0.076$), t-values (0.474; 1.283), p-values (0.636; 0.200), and effect sizes (0.001; 0.007) are all below their corresponding thresholds.

For trust, the impacts of reliability ($\lambda_{2e} = 0.273$), connectedness ($\lambda_{2b} = 0.266$) and safety ($\lambda_{2d} = 0.242$) all meet the requirements for significance at the 0.1% level. The impacts of convenience and comfort on trust are not classified as significant. Their respective path coefficients ($\lambda_{2a} = 0.081$; $\lambda_{2c} = 0.042$), corresponding t-values (1.471; 0.825), p-values (0.142; 0.410) and the effect sizes (0.007; 0.002) are clearly below the minimum thresholds. Table 6 summarizes the interpreted results in detail.

Table 6: Results of evaluation of the overall research model. (Source: Author)

Antecedent	**Descendent**	**Path coefficient**	**t-value**	**p-value**	**VIF**	**Effect size**	**R^2**	**Q^2**
Convenience	Customer value	0.185**	3.272	0.001	1.851	0.042	0.556	0.340
Connectedness		0.110*	2.121	0.034	1.783	0.015		
Comfort		0.023$^{n.s.}$	0.474	0.636	1.416	0.001		
Safety		0.148*	2.096	0.037	1.654	0.030		
Reliability		0.076$^{n.s.}$	1.283	0.200	1.823	0.007		
Trust		0.389***	5.612	0.000	1.978	0.173		
Convenience	Trust	0.081$^{n.s.}$	1.471	0.142	1.838	0.007	0.494	0.344
Connectedness		0.266***	4.519	0.000	1.643	0.085		
Comfort		0.042$^{n.s.}$	0.825	0.410	1.413	0.002		
Safety		0.242***	4.074	0.000	1.539	0.075		
Reliability		0.273***	4.571	0.000	1.676	0.088		
Customer value	CRS reuse intention	0.511***	9.455	0.000	1.849	0.287	0.508	0.342
Trust		0.260***	3.937	0.000	1.850	0.074		
Customer value	Car servicing loyalty	0.327***	5.809	0.000	2.380	0.126	0.644	0.389
Trust		0.164**	3.211	0.001	1.986	0.038		
CRS reuse intention		0.412***	7.853	0.000	2.033	0.234		

*Legend: VIF: Variance inflation factor; R^2: Coefficient of determination; Q^2: Stone-Geisser criterion; n.s.: not significant; *: significant on 5% level; **: significant on 1% level; ***: significant on 0.1% level.*

All constructs of the model show valid VIF values, which exclude the presence of multicollinearity. In terms of its explanatory power, it can be assumed that the evaluated model is adequate-to-good. R^2 varies from 0.494 (trust), 0.556 (customer value), 0.508 (CRS reuse intention) to 0.644 (car servicing loyalty). It can be stated that 64% of the variance of the target construct car servicing loyalty, can be explained by the antecedent constructs customer value, trust and CRS reuse intention. Furthermore, the Stone-Geisser criterion shows values > 0 throughout the model. Therefore, the postulated interrelations are appropriate for evaluating the constructs. Figure 3 contains the illustration of the research model evaluation.

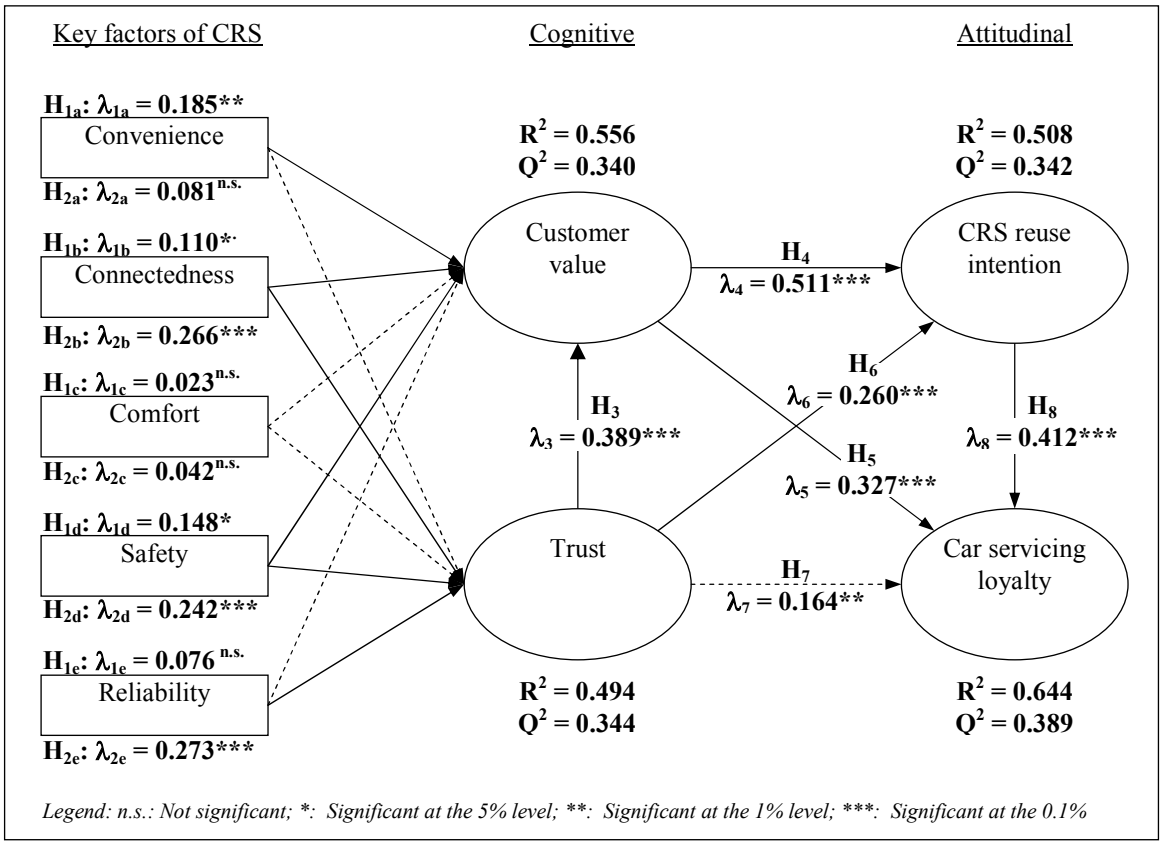


Figure 3: Results for the research model on the impact of key factors of connected remote services on customer value and car servicing loyalty. (Source: Author)

In summary, the tested research model can be deemed to be suitable for evaluating the postulated research hypotheses. However, based on the evaluation of the research model, not all of the postulated research hypotheses can be confirmed unreservedly.

The evaluation of hypotheses $H_{1a\text{-}e}$ must be differentiated. For the factor convenience (H_{1a}), the hypothesis is confirmed at the 1% significance level; for connectedness (H_{1b}) and safety (H_{1d}), at the 5% level. The hypotheses for the factors comfort (H_{1c}) and reliability (H_{1d}), are rejected.

The evaluation of hypotheses $H_{2a\text{-}e}$ is performed similarly. For the factors convenience (H_{2a}) and comfort (H_{2c}), the hypotheses are rejected. The hypotheses for the factors reliability (H_{2e}), connectedness (H_{2b}) and safety (H_{2d}), are confirmed at the 0.1% level of significance.

Hypothesis H_3 can be confirmed at the 0.1% significance level, leading to the conclusion that the developed research model measures the impacts of certain connected remote services key factors on car servicing loyalty reliably.

The evaluation of the moderating effects enjoyment and innovativeness, is conducted using multi-group causal analysis. The generation of groups is based on the median split concept, (Iacobucci 2015, p. 691) which delivers two groups for each concept, covering the high-level and the low-level ratings. By item-parceling, each concept, measured by three indicators, is reduced onto one variable. This method generates the following sub-samples:

- “Enjoyment low” (n = 157) and “Enjoyment high” (n = 174)
- “Innovativeness low” (n = 110) and “Innovativeness high” (n = 221)

Subsequently, the SEM was tested for each group using the same conditions as for the full sample. Each group generated a new path coefficient as an output, which will be compared. To determine whether the differences identified are significant, the p-values were calculated. According to the overall model requirements, the threshold for significance requires a t-value ≥ 1.96. Table 6 shows the comparison of path coefficients for each group and the corresponding calculated p-values.

Table 6: Test of hypotheses of moderating effects. (Source: Author)

Moderator	Formulation	λ low	λ high	p-value	Effect
Enjoyment	Enjoyment heightens the positive influence of customer value on CRS reuse intention.	0.383	0.455	0.502	n.s.
Innovativeness	Innovativeness heightens the positive influence of CRS reuse intention on car servicing loyalty.	0.359	0.401	0.691	n.s.

The hypothesis that enjoyment heightens the positive influence of customer value on CRS reuse intention, is not supported. The group comparison demonstrated that participants with a high level of enjoyment, do not exhibit a significantly higher level of CRS reuse intention. Likewise, the hypothesis that innovativeness heightens the positive influence of CRS reuse intention on car servicing loyalty, cannot be confirmed. The comparison of the groups revealed no statistically significant difference in the effect of innovativeness on the relationship between CRS reuse intention and car servicing loyalty. A summary of the research hypotheses tested, is presented in Table 7.

Table 7: Test of the research hypotheses. (Source: Author)

H_i	Formulation	Effect	*Limitation
Research hypotheses of the model constructs			
H_{1a-e}	Customer value positively mediates the effects of connected remote services' key factors on CRS reuse intention and car servicing loyalty.	(✓)*	H_{1c}; H_{1d}: Rejected. Comfort and reliability have no significant influence on customer value.
H_{2a-e}	Trust positively mediates the effects of connected remote services' key factors on customer value, CRS reuse intention and car servicing loyalty.	(✓)*	H_{2a}; H_{2c}: Rejected. Convenience and comfort have no significant influence on trust.
H_3	CRS reuse intention positively mediates the influence of customer value and trust on car servicing loyalty.	✓	
Research hypotheses of the moderating effects			
H_4	Enjoyment heightens the positive influence of customer value on CRS reuse intention.	X	
H_5	Innovativeness heightens the positive influence of CRS reuse intention on car servicing loyalty.	X	
Legend: H_i: Hypothesis; ✓: Confirmed; X: Rejected; (✓): Partially confirmed with limitations.*			

5. Conclusions

The empirical findings of this thesis contribute greatly to clarity and structure in respect of the key factors of connected remote services. The key factors identified in the exploration of CRS, are mainly confirmed by the empirical evaluation. However, comfort was demonstrated to have no significant influence on customer value and trust. Consequently, it can be stated that the concept of connected remote services consists of four key factors: convenience, connectedness, safety, and reliability. Especially connectedness, as identified in the exploration and statistically confirmed in the empirical part, constitutes a particularity of connected remote services which hasn't been described previously in literature. The findings in this thesis confirm that connectedness is relevant and needs to be acknowledged as a fundamental characteristic of CRS. It therefore supplements the body of knowledge as a driver for ICT based service innovation in a mobile service context, and describes an important aspect for future research in this field, which is also addressed in the conclusions and recommendations chapter.

Further, the results about the moderating effects, have shown that a higher perception of enjoyment does not lead to increased CRS reuse intention. It can be concluded that hedonic aspects are not relevant for CRS. This finding can be explained by the fact that CRS are instead perceived as a utility and additive service which supplements the core service. The customers' self-assessment of their innovativeness revealed that it has no measurable impact on the interrelationship between CRS reuse intention and car servicing loyalty. Whether a customer is open to innovation, does not increase car servicing loyalty. It can therefore be concluded that CRS do not only appeal to innovative customers, but also have the potential for broad acceptance.

Finally, even though a large and varied number of drivers of customer value are discussed in academic literature, this study recommends a sharply reduced number of key factors which are supportive to customer value and trust, to managers of car dealerships and vehicle manufacturers, if they are focusing on the creation of car servicing loyalty. These comprise convenience, connectedness, safety and reliability. The combination of customer value and trust as drivers for car servicing loyalty, agrees with the findings of Bansal, Irving and Taylor and Meyer. Basically, all connected remote services functions can be attributed to these four key factors, which managers should focus on, if they want to improve the effectiveness of their connected remote services offerings.

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