Information Technology and Management
https://doi.org/10.1007/s10799-023-00404-z

Acceptance of online customer channels for damage claims in Germany

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Accepted: 4 June 2023

Abstract
The digital transformation with its new technologies and customer expectation has a significant effect on the customer channels in the insurance industry. The objective of this study is the identification of enabling and hindering factors for the adoption of online claim notification services that are an important part of the customer experience in insurance. For this purpose, we conducted a quantitative cross-sectional survey based on the exemplary scenario of car insurance in Germany and analyzed the data via structural equation modeling (SEM). The findings show that, besides classical technology acceptance factors such as perceived usefulness and ease of use, digital mindset and status quo behavior play a role: acceptance of digital innovations, lacking endurance as well as lacking frustration tolerance with the status quo lead to a higher intention for use. Moreover, the results are strongly moderated by the severity of the damage event—an insurance-specific factor that is sparsely considered so far. The latter discovery implies that customers prefer a communication channel choice based on the individual circumstances of the claim.

Keywords Technology acceptance · Customer channel · Online services · Damage claims · SEM · Insurance

1 Introduction

The digital transformation is rearranging customer channels and communication. The insurance industry is not an exception: while classical insurance communication channels are home visits, telephone calls, and letters, customers expect nowadays new digital channels—be it video calls, instant messaging, apps and platforms, or chatbots [1]. This leads to multi-channel approaches, as the old communication channels continue to exist, which represents new challenges for the organization and management of all contact points to the insurance providers [2]. Besides service quality, cost reduction is a major motivation for insurance companies, e.g., automation of claims might reduce costs by 30% [3].

Adhering to claims, the event of damage is an essential moment for insurance providers: although the claims handling is a classical back-office process, the customers are only in the fruition phase able to form an opinion about the quality and service of their provider—it is the “moment of truth” [4]. The event of damage is a pivotal time in which the customers experience the service quality of their insurance. The emotionality of the claims process and the importance of the customer’s opinion-making distinguishes claim notification from other self-service activities like, e.g., address update, bill management, or contract change. This makes it a crucial and insurance-specific touchpoint to the customer [5]. The resulting perception of the service quality can heavily influence the client’s future decisions like, e.g., discontinuing, prolonging, down-, or upgrading their insurance and, hence, have a major impact on the economic success of insurance providers.

Despite the aforementioned new expectations of insurance clients concerning new technologies, the standard channel for claim notification in Germany is still the telephone though, as the single telephone-dominated step of the customer journey—whereas all other steps usually take place digitally or in person [5]. The change toward digital services can yield substantial advantages in this field. On the one hand, it can provide speed and comfort for the customers by, e.g., less paper bureaucracy or instant quotation. On the other hand, it can enable automated processing or artificial intelligence solutions such as the estimation of the extent of loss as a result of image recognition of a photo of the

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Published online: 06 July 2023

damage [2]. As previous studies have shown, German clients have particular concerns about innovations regarding technical risks, i.e., Germany is culturally more risk-conscious. On the other hand, German clients are more responsive towards the perceived value of an innovative service or good compared to other European countries [6].

This study deals with the digitization of the customer interface for claim notifications. As a logical next step, claim notification will likely migrate from telephone to an online service—be it a mobile app or a website. Our research aim is to understand if and why insurance clients are willing to use such technology. These insights can help insurance providers and managers to create better and more targeted solutions for their clients. In this research, we will take a deeper look at Germany where the telephone still represents the status quo of claims communication in the traditional insurance business. Derived from these goals, our central research question is:

RQ. Which factors influence the intention to use an online channel for claim notification?

Consequently, this work covers the question of how individuals adopt information systems—which has been a central research direction in IS research [7]—in the insurance industry. To answer the research question, we draw on a variety of theoretical considerations in the field of technology acceptance, especially the technology acceptance model (TAM), its successors, and related theories (e.g. [8, 9],). Although the problem of online claims adoption is highly relevant for insurance companies and managers, it is little studied in literature—only one paper could be identified that deals with this specific issue (see next section). Based on the literature, we develop ten hypotheses that directly or indirectly explain behavioral intention to use (BI) of such an online customer channel for damage claims. To test these hypotheses, we create a research design for a cross-sectional survey and analyze the collected data by means of structural equation modeling (SEM) based on a data set with 416 records.

Concluding, we develop and show different aspects of the adoption of online channels for claim notification that will partly substitute telephone claim services. The empirical evidence contributes to the understanding of the specifics of claim management from a customer perspective as well as of the insurance business in general.

The remainder of this study is structured as follows: after this introduction, related work is discussed before hypotheses for the research question are developed. Subsequently, the research design is introduced and the results of the empirical survey are presented. Finally, we discuss these findings, managerial recommendations, and limitations of the study before we conclude the paper.

2 Related work

In our literature search, we could just identify one empirical study regarding the acceptance of online claims conducted by Gebert Persson et al. [10]. In this paper, the authors conclude and test three main determinants for this issue with online users of an online claim service of an insurance company: technology-related factors, trust-related factors, and knowledge-related factors—whereby the latter has no or barely any impact on the usage. Furthermore, they find technology-related factors like perceived usefulness as well as perceived ease of use as substantially more important than trust-related factors such as trusting beliefs. The conceptual model is based on their earlier work [11] which is theoretically oriented without testing the resulting hypotheses.

More generally, Hartmann et al. [12] do not focus on online claims but analyze the user acceptance of a newly introduced customer self-service portal of an insurance company. As stated in the introduction, self-service is a broader scope disregarding the insurance-specific particularity of claim notification as a crucial moment of truth in the customer journey [4, 5]. The study shows that the attitude towards innovation can influence the attitude towards using such a technology. Furthermore, they show that the status quo of communication—here it is paper forms—can be of value from the customer's perspective and can also have an impact.

Similarly, the study of Juric et al. [13] investigates a universal internet-based self-service technology of an insurance company. In the study, the issues of privacy and technology risks are addressed with the former being significant in contrast to the latter. Notably, the study also does not find perceived usefulness as an empirically relevant factor which contradicts the findings on the research of the technology acceptance model and its extensions (see next section).

Moreover, Rodríguez Cardona et al. [14] study the acceptance of chatbots in the insurance business from a trust perspective. Contrary to Juric et al. [13], they do not find any relation between privacy as well as perceived ease of use and intention to use for the case of chatbots. Furthermore, they find very strong evidence of perceived usefulness influencing intention to use.

Also related to the industry, the study of Kumar and Telang [15] analyzes the customer behavior regarding the usage of web-based channels compared with call center interactions. Their field study took place from 2005 to 2007 with data from a health insurance company. In their quasi-natural experiment, the findings imply that the severity of the health event as well as monetary factors of the underlying contract or case are relevant impact factors on online self-service usage.

Just partly related to insurance, the paper of McKechnie et al. [16] analyzes online retailing in the financial service industry. Besides product-related factors and technology experience, they focus on demographic variables such as age and gender. However, they do not find substantial effects originating from these variables. Generally, the findings of the study have to be considered critically, since the environments and internet usage have changed in the past 15 years.

One of the most researched topics within the financial service industry is the acceptance of online banking. For this banking self-service technology, Montazemi and Qahri-Saremi [17] conducted a meta-analysis of 81 studies in this research direction. Their results revealed the strongest total effects for trust in the physical bank and perceived usefulness.

From a more fundamental perspective, the paper of Blut et al. [18] presents a meta-analysis of 96 articles on the acceptance of self-service technologies in general. Their research design and findings are in line with the acknowledged universal technology acceptance theories that we will discuss in the next section.

In conclusion, there is little research that covers the specific issue of online claim notification. We could just identify a single study that narrowly deals with this topic. There are just a few studies even for the broader approach of universal self-service technologies in insurance. Consequently, the specifics of the insurance industry do not appear to be completely examined in this context—contrary to, e.g., online banking in the related banking industry. Furthermore, the identified insurance-related studies are usually conducted with customers from a single insurance company and tailored to the specifics of the concrete technology artifact. Finally, as noted earlier, some of the results are contradictory, especially concerning the determinants of use (perceived usefulness and perceived ease of use), and need more research for clarification.

Our work contributes to the little-studied understanding of online claims understanding, especially in the German context which has been shown to be different from other countries [6]. At this, we draw on a cross-sectional approach with clients from many insurance companies that is not limited to the specific technological implementation of a single insurance provider. Not being limited to one insurance company also reduces the selection bias: For instance, the sample from the market leader with a brick-and-mortar business diverges from the sample from an insurance that is managed online or via a mobile app exclusively.

A comparison of the related works with our study is given in Table 1.

3 Hypotheses development

In this section, we present the development of our research hypotheses. For this purpose, on the one hand, we consulted the relevant research literature and, on the other hand, held background talks with experts from a partnering insurance company. As a central measurement for acceptance, we make use of the concept of behavioral intention to use (BI) which is not only the most used measure in empirical studies [19] but also highly associated with actual usage in theory and shown empirically on a broad basis [8, 20–23].

3.1 Technology acceptance model (TAM)

For the analysis of technology acceptance, there are several reference models and theories such as the theory of planned behavior (TPB [20],), the technology acceptance model (TAM [8, 24],) and several extensions (TAM2, [25]; TAM3 [26],), as well as the unified theory of acceptance and use of technology (UTAT [9],) combining several acceptance models and theories.

We have based the fundamental structure of our conceptual model on the original TAM after Davis et al. [24]. In this seminal model, user acceptance is influenced by the determinants of use, i.e., perceived usefulness (PU) and perceived ease of use (PEOU). These determinants are

Table 1 Comparison of identified related studies

Study	Focus	Industry	Sample population
Gebert Persson et al. [10]	Online claims	Insurance	Clients of a Swedish insurance company
Hartmann et al. [12]	Self-service	Insurance	Clients of a German insurance company
Juric et al. [13]	Self-service	Insurance	Clients of a German insurance company
Rodríguez Cardona et al. [14]	Chatbots	Insurance	German insurance clients (cross-sectional)
Kumar and Telang [15]	Self-service	Insurance	Clients of a US health insurance company (non-survey)
McKechnie et al. [16]	Online retailing	Fin. Service	UK consumers
Montazemi & Qahri-Saremi [17]	Online banking	Banking	Meta-analysis
Blut et al. [18]	Self-service	General	Meta-analysis
This work	Online claims	Insurance	German insurance clients (cross-sectional)

themselves influenced by external variables, which are not concerned with the technology use itself, as shown in Fig. 1.

In most of the above-mentioned theories, the PU and the PEOU play a major role regarding technology acceptance as determinants of use. Concerning this, the models from the TAM family theorize that PU and PEOU influence the intention to use [25]. Furthermore, the models suggest that technologies that are free of effort are perceived as more useful [24]. Consequently, PEOU also affects BI by means of a moderation effect via PU. All above-mentioned relationships have also been shown to be applicable for online insurance claims [10] and insurance self-service technology [13].

Therefore, we derive the following hypotheses:

H1a Perceived usefulness (PU) affects behavioral intention to use (BI) positively.

H1b Perceived ease of use (PEOU) affects behavioral intention to use (BI) positively.

H1c Perceived ease of use (PEOU) affects perceived usefulness (PU) positively.

3.2 Risk attitude

The risk appraisal of a customer is one of the most central parameters for insurance providers although it is hardly assessable for the insurance. This information asymmetry is a central characteristic of insurance. Based on their risk attitude, customers can often differentiate themselves in different coverages classes that cover more or less damage types and amounts. This insurance-related or actuarial risk should not be confused with the perceived risk of a technology that is frequently used in the context of technology acceptance [27, 28]. Individual insurance risk coverage is of special importance since the policy price is tailored accordingly [29]. Therefore, higher coverage is associated with higher expected claim settlements and equipped with an extra premium to be paid. This balancing between premium and coverage based on the clients' risk attitudes is a crucial part of insurance providers' pricing strategies and, consequently, an influencing factor for providers' economic success. As Kumar and Telang [15] have shown, monetary factors can play a role in technology acceptance in the insurance industry. In the context of pricing, insurance companies market their online contracts for a lower rate than their policies with personal interactions that customers rather associated with higher quality [2]. Therefore, clients with higher insurance premiums might associate online claim services with an inferior low-budget solution—although their rate, provider, and policy stay exactly the same—and, thus, might perceive less usefulness in an online system. Concerning this, the TAM2 includes the external variable of image, i.e., the degree to which someone perceives an enhancement of his or her social status, as a positive factor of influences for the perception of usefulness [25]. Consequently, besides higher expectations, customers with pricier policies and higher premiums might associate online claim solutions with a worse image and, hence, diminish the perception of usefulness:

H2 The insurance premium (IP) affects perceived usefulness (PU) negatively.

3.3 Status quo behavior

For years, telephone calls have been the status quo for claim notifications and still play a key role in the damage regulation process and for customer contact [2, 5]. Hartmann et al. [12] have shown that the status quo (in their case: paper forms) can be of value for the customer and can influence technology adoption. Regarding phone calls, waiting times strongly affect the perception of the service [30]. As shown experimentally by Hui and Tse [31], waiting times can result in affective responses—such as being annoyed or hanging

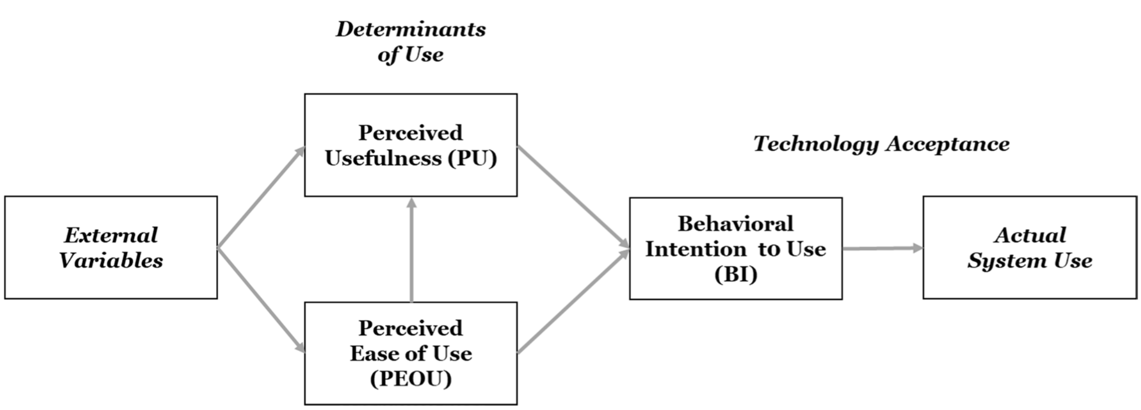

Fig. 1 Fundamental structure based on the TAM [24] (Slightly altered by subsuming attitude towards using with behavioral intention to use)

up—that influence the service evaluation significantly. Consequently, we hypothesize that customers who are frustrated very quickly on the phone might be more willing to accept an online notification:

H3a Call frustration (CF) affects perceived usefulness (PU) positively.

Furthermore, Hui and Tse [31] also show that the acceptability of the waiting time significantly influences the affective response. People with a larger endurance on the phone might be less affective or frustrated:

H3b Call endurance (CE) affects call frustration (CF) negatively.

3.4 Digital mindset

Although online self-service is standard in some other industries, the status quo for damage claims is calling by telephone. In this regard, self-service technologies like online claims are a technological innovation, as in most service production and delivery [18]. Accordingly, Juric et al. [13] propose the analysis of the influence of innovativeness on the acceptance of insurance self-service technologies as a potential refinement of their work.

Related work has already shown that the attitude towards innovation can influence the attitude towards using a technology [12, 32]. Personal technology commitment is influenced by attitude towards acceptance, technology competence, and technology control conviction [33]. Consequently, people with a high technology commitment see themselves as more competent in such issues and more capable of controlling technology. Accordingly, the study of Lewis et al. [34] shows that innovativeness regarding technology leads to a more positive perception of ease of use.

Hence, we suppose that people with a high acceptance of digital innovations (ADI) perceive the usage of an online channel as easier:

H4 Acceptance of digital innovations (ADI) affects perceived ease of use (PEOU) positively.

3.5 Damage circumstance

During the journey of the insurance customer, the damage event is a crucial moment of truth for the insurance provider since claims handling is emotionally charged [5]. Additionally, not every damage circumstance is equal; some damages could lead to a higher desire for a personal consultation—as more than a third of German insurance customers still prefer face-to-face interactions with their insurance broker [35]. Especially cases with serious irreversible damages might be perceived as more complex due to their imponderables. The need for personal interaction or consultation increases as the case severity can potentially lead to serious emotional, health, or job crises [36]. In line with that, Kumar and Telang [15] show that health insurance customers tend to use the telephone for high-severity cases but are willing to use a web portal for medium-severity cases. Finally, liability issues such as perpetration or contributory negligence also play a role in this context [37]. For instance, if another party is involved in the damage event, it might complicate the case since it raises, e.g., questions of compensation for the third-party damage and may increase the risk of a legal dispute. Thus, the case complexity (CC)—especially in terms of the combination of case severity, the resulting emotional involvement, and personal liability—could lower the acceptance of using an online claim service:

H5a Case complexity (CC) affects behavioral intention to use (BI) negatively.

Furthermore, since an online channel can merely provide a sufficient personal consultation, the perception of the usefulness and handling can also be affected. In general, the complexity of insurance products has been shown to influence the choice of communication channel and moderate the need for personal consultation [11]. Therefore, we hypothesize the following moderating effects of case complexity:

H5b Case complexity (CC) moderates perceived usefulness (PU) negatively.

H5c Case complexity (CC) moderates perceived ease of use (PEOU) negatively.

3.6 Conceptual model

In this section, we argued and derived five key hypotheses groups resulting in ten hypotheses in total. Figure 2 shows a summarizing overview of the conceptual model with its hypotheses.

As indicated by the gray boxes in the background of the figure, the conceptual model revolves around the general TAM in which the determinants of use (PU and PEOU) predict the technology acceptance (here measured by BI). The determinants of use are influenced by a group of external variables which are not associated with the technology or system [24]. In this study, these consist of the insurance-specific risk attitude (represented by IP), status quo behavior (represented by CF and CE), and digital mindest (represented by ADI).

A special case of this model is the damage circumstance (upper right in the figure) that is distinct and unique for the insurance industry and is represented by the case complexity.

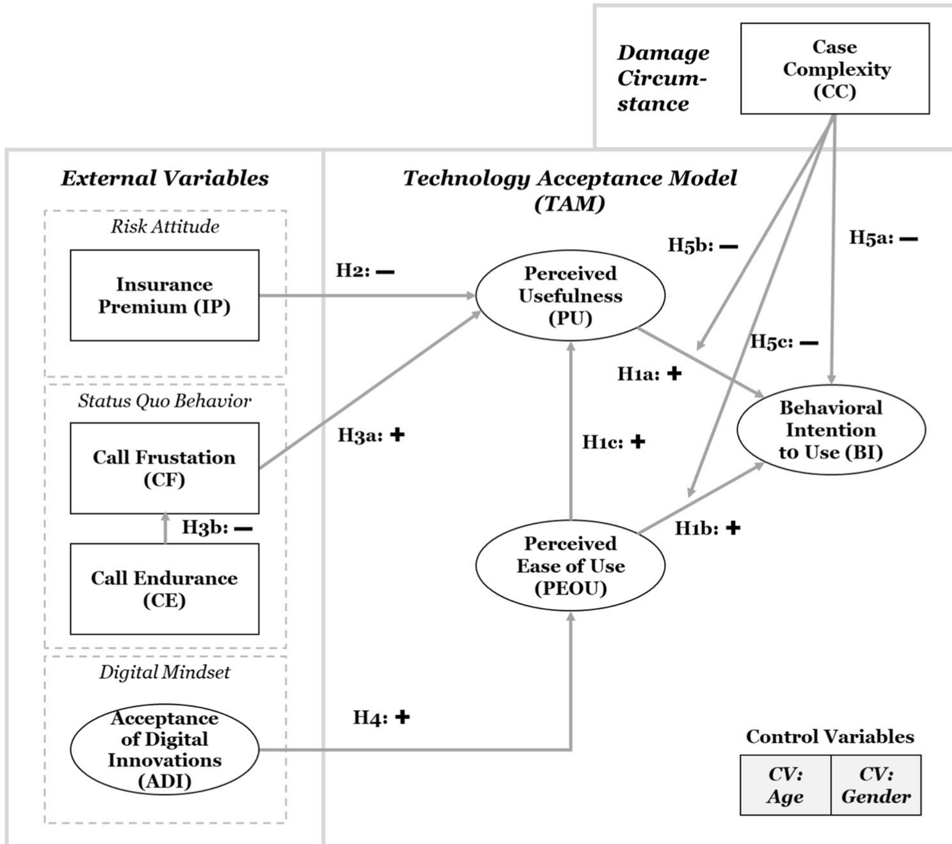

Fig. 2 Conceptual model of this study

Due to its insurance-specific nature, it is a key component of our model and analysis.

Finally, we make use of the demographic variables age and gender as control variables to prevent influencing the outcomes of the analysis.

4 Research design

In this section, we establish our research design including the methodological approach, the survey design, the sample, and the quality of measurements.

4.1 Methodological approach

To test our hypotheses, we chose the approach of a quantitative cross-sectional survey. At this, we created a car insurance scenario that is considered to be one of the most suited insurance kinds for online interactions [38] and explained online claim notification by means of examples and screenshots of real-world systems. Before surveying, the questionnaire was pretested with a subsequent second pretest confirming the modifications. Moreover, the survey was designed by four-eye-principle and challenged within the aforementioned background talks with experts from a partnering insurance company.

The survey data was analyzed via a structural equation modeling (SEM) in which we map our conceptual model from Fig. 2 to a statistical structural equation model. The statistical analysis was conducted with the statistical software *R* (version 4.0.3) and, in particular, the extension package *lavaan* for the SEM (version 0.6-8) (see [39]).

4.2 Survey design

The operationalization of the constructs into variables is summarized in Table 2. The original questionnaire (in German) is presented in the supplementary material. Since respondents might be unfamiliar with online damage claim systems, we introduce the functionality, requirements, and usage of such a system at the beginning of the survey. Moreover, an exemplary screenshot of a real online damage claim system is provided as well as two weblinks to real-world systems that can be directly tried out by the respondents without registration. In this way, we have ensured that every survey participant had at least a fundamental understanding of the technology and the opportunity to gain some first-hand experiences with it.

Table 2 Operationalization of constructs

Construct	ID	Range	Items
Behavioral intention to use	BI	1–5	Adapted from Cheng et al. [40]
Perceived usefulness	PU	1–5	Adapted from Yoon and Barker Steege [41] and Aldás-Manzano et al. [27]
Perceived ease of use	PEOU	1–5	Adapted from Lee et al. [42]
Case complexity	CC	Binary	Two scenarios (coded: not complex = 0, complex = 1)
Insurance premium	IP	Metric	Estimated premium in EUR based on coverage class
Call frustration	CF	Metric	Estimated number of redial attempts (inverted)
Call endurance	CE	Metric	Estimated maximum call waiting time in min
Acceptance of digital innovations	ADI	1–5	Adopted from Neyer et al. [33]
Age	AG	Metric	Age in years
Gender	GD	Binary	Male or female (coded: male = 0, female = 1)

Fig. 3 Visualization of the two case scenarios (Left picture by Flickr Fender Bender Dave Lauretti (CC BY 2.0); right picture by D. Schröder (https://www.soester-anzeiger.de/lokales/soest/lange-schlange-roter-ampel-zwei-verletzte-auffahrunfall-arnsberger-strasse-soest-13223792.html))

The three items of BI are based on Cheng et al. [40] that study technology adoption of internet banking. We adopted these items of Cheng et al. [40] for the context of online claims addressing (on a five-point Likert scale of approval) (1) the preference for online over the traditional telephone alternative, (2) lack of imagination of online notification usage (inverted item), and (3) pictorial visualization of doing so. Likewise, we adapted the applicable items of Yoon and Barker Steege [41] for PU (addressing practical utility and convenience) and extended it with an additional item by Aldás-Manzano et al. [27] (addressing facilitation)—both studies are concerned with online banking as well. Analogously, we took over the applicable items of Lee et al. [42] (addressing easiness of learning, lack of mental effort, difficulties to understand, and general ease of handling) that originally analyze mobile application services for PEOU and slightly altered them to fit our context.

To describe CC, we developed two car accident scenarios: firstly, slight material damage, no personal damage, both cars are roadworthy, and the accident was the fault of the other party (see Fig. 3, left). Secondly, strong material damage, the other driver is hospitalized, both cars are not roadworthy, and the accident was caused by the respondent (see Fig. 3, right). In other words, the complexity is enhanced regarding the financial amounts of material damage and damage to persons. Furthermore, due to the reversed responsibility for the accident, the liability is also reversed, making it more complex for the client that additionally has to deal with the opponent's damages as well in scenario 2 compared to scenario 1.

All characteristics inducing ambiguity are purposely left out in the two scenarios because the corresponding uncertainty could lead to a justified additional demand for personal counseling beyond the intrinsic desire. Since the focus of this study is on the notification of claims, uncertainty could bias the findings in this regard. The differentiation between the two scenarios is coded as a dichotomous categorical variable.

For the IP, we expected that the respondents do not know their premium amount. Therefore, we asked for their coverage class. In Germany, where the survey took place, there are typically three types of coverage classes in car insurance: (1) the legally required third party liability insurance, (2) the non-mandatory partial first-party coverage, and (3) the full first-party coverage. Based on average data from the German Insurance Association (GDV) [43], we estimated approximate premiums in EUR representing the risk attitude (concerning the insurance coverage). For CF, we used the manifest self-evaluation of the number of redial attempts if a call is not answered and inverted its number, i.e., a high CF means a little number of attempts (e.g., 4 means no attempt at all). Further, we used the manifest self-evaluation of maximal waiting time before hanging up as a proxy for CE. The operationalization of ADI is adopted from Neyer et al. [33]. For AG and GD, we applied the age in years and a dichotomous male/female choice, respectively.

The questionnaire was created in German as the sample population is from Germany. Consequently, all English questions from the literature were translated into German beforehand.

4.3 Sample

The online survey was open for participation from May 4th, 2020, until June 5th, 2020. Participants were invited personally via e-mail and text messages or publicly via open calls on platforms and social networks. We directly approached an estimate of around 500 people (friends, family, students, colleagues, etc.) intending to obtain a preferably heterogeneous sample—e.g., in contrast to studies that just surveyed university students. Two weeks after the initial mailing, we reminded them with a second message about the survey.

In total, 310 people started the questionnaire and 262 finished it. Due to the additional open calls, a response rate cannot be calculated seriously. Of these 262 respondents, 35 stated that they do not have access to a car and 19 showed a very monotonous responding pattern. After excluding those, there were 208 respondents left. Since we considered two different scenarios (case complexity) and, thus, measured the target variable twice, this leads to 416 applicable records in the data set for the analysis.

In the sample, there are 46.2% female and 53.8% male respondents which is a good fit in terms of gender ratio (in background talks with experts, we learned that more men have car insurance than women). The age of the respondents ranges from 18 to 81 with an average of approx. 40 which appears to be younger than the average car insurance customer. 67.3% of the respondents already have experience with car damage claim notification (38.9% had one in the last five years, whereas 33.7% had none yet).

Table 3 Reliability of multi-item variables & qualitative descriptor after Taber [44]

$n=416$	BI	PU	PEOU	ADI
Cronbach's alpha	0.93	0.89	0.81	0.91
Qualitative descriptor	"Excellent"	"Reliable"	"Robust"	"Strong"
Congeneric Reliability	0.93	0.89	0.81	0.91

4.4 Quality of measurement

To check for the reliability of the measurement, we calculated Cronbach's alpha (tau-equivalent reliability) and the congeneric reliability (CR) for the multi-item factors (see Table 3). As the calculations verify, the measurements are classified as at least "robust" and partly as "strong" or "excellent", since all factors clearly are above 0.7 [44]. Further, the congeneric reliabilities [45] come to the same outcomes from 0.81 to 0.93. Concluding, we can verify the reliability of the measurement.

To further rule out cross-loadings between the individual multi-item variables, we conducted an exploratory factor analysis (EFA). The parallel analysis suggested that there are four factors. The results of the EFA are depicted in Table 4. There are no cross-loadings in the data and the items can be clearly assigned to independent factors. All loadings are above the required value of 0.5 and all—except for PEOU2—even qualify as high loading above 0.7 [46]. The total cumulative explained variance is 71%. The Kaiser–Meyer–Olkin (KMO) factor adequacy is 0.82 and, hence, considered meritorious [47]. Based on the results of the Cronbach's alpha calculations and the explanatory factor analysis, we can conclude that the reliability of the measurement is given.

Table 4 Results of the factor analysis

$n=416$	Factor 2	Factor 4	Factor 3	Factor 1		Explained variance (%)	AVE (CFA) (%)
BI1	0.93	0.19	0.11	0.13	Factor 1	21	71
BI2	0.85	0.18	0.00	0.12	Factor 2	18	81
BI3	0.83	0.15	0.09	0.14	Factor 3	16	74
PU1	0.21	0.77	0.15	0.11	Factor 4	16	52
PU2	0.12	0.86	0.19	0.18			
PU3	0.23	0.78	0.20	0.17			
PEOU1	0.01	0.13	0.75	0.10			
PEOU2	0.08	0.08	0.59	0.15			
PEOU3	0.08	0.21	0.75	0.07			
PEOU4	0.03	0.09	0.73	0.19			
ADI1	0.09	0.13	0.20	0.88			
ADI2	0.12	0.20	0.19	0.87			
ADI3	0.10	0.10	0.11	0.84			
ADI4	0.13	0.09	0.10	0.70			

Besides construct validity by external challenges with industry experts, an additional confirmatory factor analysis (CFA) was run. The results show that the average variance extracted (AVE) is above 0.5 for all factors (see Table 4) which is a criterion for convergent validity. Furthermore, the AVE values are larger than the squared correlations of the factors (see Table 6) which verifies discriminant validity [48]. Concluding, the measurement is not only reliable but also valid.

5 Results

The descriptive statistics are shown in Table 5. As the results show, an online channel for claim notification would be generally perceived as easy to use (PEOU: 4.50) and useful (PU: 4.35) on average. Nevertheless, the behavioral intention to use such a service is moderate (BI: 3.45). At this, the case complexity must be considered: for the small accident scenario, BI is 3.94, whereas for the complex accident scenario it is just 2.96 which is the reason for the relatively large standard deviation (SD) and coefficient of variation (CV). The average appraised insurance premium (IP) is 417.50 EUR. The call frustration score is 1.61 on average which translates to a little more than two unsuccessful call attempts before changing to another contact channel. In the waiting line, the respondents stated they are willing to wait approx. 8 min. (CE: 8.01) with a very high variance. The respondents are moderately open-minded towards digital innovations (ADI: 3.37) and, as mentioned, approx. 40 years old on average (AG: 39.73).

Regarding bivariate correlations (see Table 6), the largest correlations of BI appear to be with PU (+0.40), CC (−0.37), ADI (+0.29), and AG (−0.20). The assumed (moderating) connections of PU and PEOU/IP/CF/ADI (+0.35/−0.12/+0.28/+0.35), as well as CF and CE (−0.19), are also indicated in the bivariate correlations. The multivariate analysis of the SEM will take a closer look at the relations later.

Regarding the goodness-of-fit of the applied SEM, Table 7 shows different measures.

Virtually all measures (χ^2/degrees of freedom [χ^2/df], p-value [p], root mean square error of approximation [RSMEA], standardized root mean square residual [SRMR], normed fit index [NFI], comparative fit index [CFI], goodness-of-fit index [GFI], Adjusted goodness-of-fit-index [AGFI]) satisfy their cutoff clearly except for non-normed fit index [NNFI] that misses the cutoff after Schermelleh-Engel et al. [49] by a very small margin of 0.01. However, it must be considered that other authors define the decision rule for

Table 5 Descriptive statistics of the variable (dichotomous variables excluded)

n=416	BI	PU	PEOU	IP	CF	CE	ADI	AG
Min	1.00	1.00	2.00	260.00	0.00	0.00	1.00	18.00
Mean	3.45	4.35	4.50	417.50	1.61	8.01	3.37	39.73
Max	5.00	5.00	5.00	574.00	4.00	60.00	5.00	81.00
SD	1.32	0.82	0.56	144.24	0.97	8.69	1.08	14.78
CV	38.26%	18.95%	12.55%	34.55%	60.16%	108.62%	32.03%	37.21%

Table 6 Correlation matrix

n=416	BI	PU	PEOU	IP	CF	CE	ADI	AG	GN
BI	1.00	0.40	0.17	−0.02	0.28	−0.02	0.29	−0.20	−0.03
PU		1.00	0.35	−0.12	0.28	−0.10	0.35	−0.15	0.12
PEOU			1.00	0.01	0.10	0.06	0.33	−0.21	−0.02
IP				1.00	0.05	−0.02	−0.07	0.26	−0.08
CF					1.00	−0.19	0.20	−0.05	0.00
CE						1.00	0.04	−0.16	0.07
ADI							1.00	−0.40	−0.12
AG								1.00	0.01
GN									1.00

Table 7 Model evaluation (without control variables) with cutoff criteria after Schermelleh-Engel et al. [49]

n=416	χ^2/ df	p	RSMEA	SRMR	NFI	NNFI	CFI	GFI	AGFI
Measure	2.75 df	0.00	0.07	0.07	0.92	0.94	0.95	0.90	0.87
Cutoff	≤3 df	≤0.05	≤0.08	≤0.1	≥0.9	≥0.95	≥0.95	≥0.9	≥0.85

NNFI at ≥ 0.9 or even at ≥ 0.85 (see, e.g. [46], [50]) which would, thus, satisfy the cutoff criterion here as well. Since "rule of thumb cutoff criteria are quite arbitrary and should not be taken too seriously" [49, p. 52], we find the NNFI as still acceptable given that, firstly, the other measures are methodologically sound and, secondly, the measures should be considered not in isolation but rather in combination with other measures [51].

The results of the SEM are shown in Fig. 4 (this model includes the control variables; the results for the model without control variables are very similar and congruent in the final analysis). The strongest standardized coefficients are PU → BI ($\beta = 0.87$, $p = 0.00$), PEOU → PU ($\beta = 0.40$, $p = 0.00$), and the moderation effect of CC × PU ($\beta = -0.45$, $p = 0.00$). There is, at least some, evidence for nearly every path except for PEOU → BI ($\beta = 0.05$, $p = 0.75$). Furthermore, the connection IP → PU ($\beta = -0.07$, $p = 0.08$) shows suggestive, but not sufficient, evidence. We will discuss the meaning of these findings in detail in the following section.

Finally, based on the statistical model, we can calculate the (standardized) total effects of the constructs on the BI as shown in Table 8. The total effect, combining the indirect and direct effect, represents the importance of the variables [52]. In the small accident case, nearly every variable within the mediations has a very significant total effect on BI (except for IP with a $p = 0.10$). However, the total effect of every construct is reduced when considering the complex accident case compared with the small accident (e.g., PU is reduced from 0.87 to 0.42). At this, the case complexity has the strongest demonstrable total effect on BI with − 1.08.

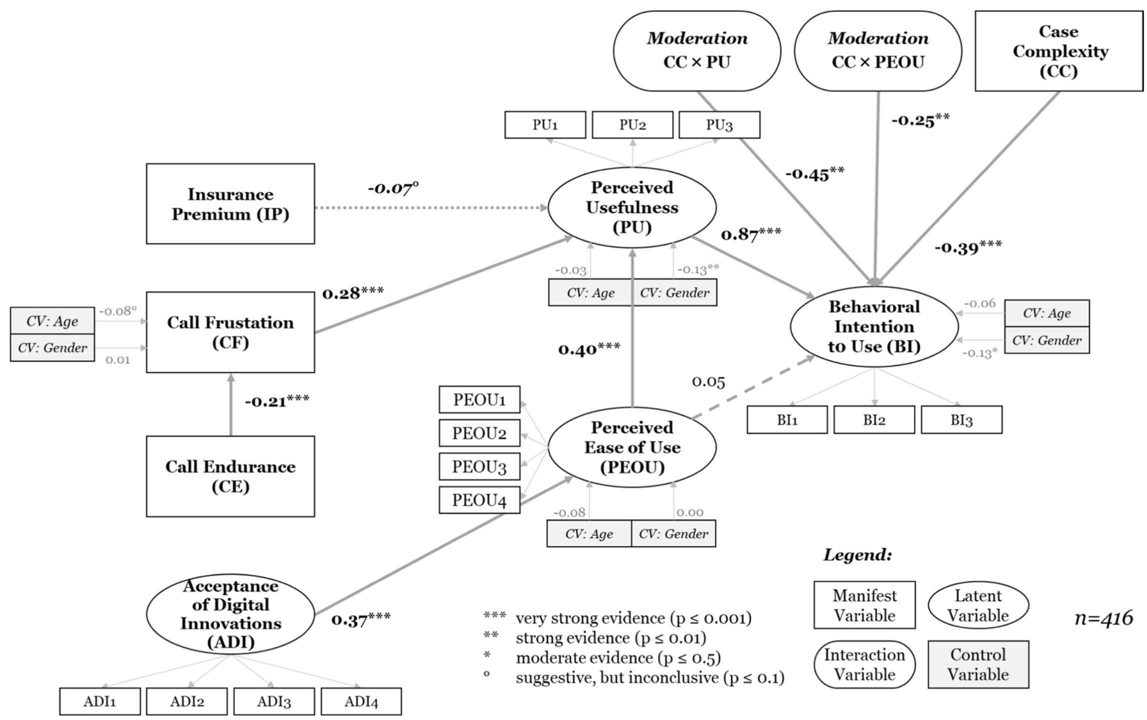

Fig. 4 Completely standardized solution of the SEM

Table 8 Total effects of the construct on BI and impact of the moderating CC (controlled by age and gender)

Construct	ID	CC: small accident Standardized total eff.	CC: complex accident Standardized total eff.
Case complexity	CC	–	− 1.08***
Perceived usefulness	PU	0.87***	0.42***
Perceived ease of use	PEOU	0.40***	− 0.03
Insurance premium	IP	− 0.06°	− 0.03°
Call frustration	CF	0.24***	0.12***
Call endurance	CE	− 0.05***	− 0.02**
Acc. digital innovations	ADI	0.15***	− 0.01

***$p \leq 0.001$, **$p \leq 0.01$, *$p \leq 0.5$, °$p \leq 0.1$, others $p > 0.1$

Notably, when comparing the two scenarios, the total effect of PEOU has no statistical significance in the more complex case. Consequently, ADI also loses significance for the more complex case, since PEOU is the only mediator for ADI.

6 Discussion

In this section, we discuss our findings, conclude managerial recommendations, and show the limitations of our study.

6.1 Discussion of the findings

Based on the evidence from the results, we draw our conclusions on the hypotheses. The decisions on the hypotheses are summarized in Table 9.

The statistical analysis of the survey can confirm that PU has a positive effect on BI (H1a). This finding is in line with the related works regarding the insurance industry [10, 12, 14] (see Table 10) that all find significant relations except for Juric et al. [12] which is a special case (the related work of Kumar and Telang [15] is not relevant in this context since they draw on a fundamentally different theoretical approach). The study of Juric et al. [12] which deals with internet-based self-service technology in a single insurance company does not identify a significant effect of PU on the attitude towards using which they utilize as a measure of use. According to the meta-analysis of technology acceptance research by Yousafzai et al. [19], only 4% of the studies do not find a significant positive effect on attitude while 10% find an insignificant (or negative) correlation between PU and BI, i.e., research can confirm this effect more often for attitude than intention.

Concerning PEOU, our results do not show sufficient evidence for a direct effect of PEOU on BI (H1b). Meta-analyses of TAM-related papers report that between 33 [19] and 45% [23] of the papers cannot establish a significant positive connection to BI at an $\alpha = 0.05$ level. For the specific context of insurance, Rodríguez Cardona et al. [14] also could not identify sufficient evidence for PEOU and intention to use in the case of chatbot services in insurance. This study is in line with our findings, is the only identified cross-sectional survey study in related work, and draws on German insurance clients as well. Similarly, Juric et al. [12] find inconclusive evidence for PEOU: Albeit they accept the corresponding hypothesis at an $\alpha = 0.1$ level, they cannot establish a significant connection at an $\alpha = 0.05$ level, i.e., their evidence is suggestive but fails to reach the acceptance criterion defined in this study. In contrast, Gebert Persson et al. [10] find a significant effect of PEOU on technology attitude that is shown to have an effect on BI and, hence, mediates the positive effect of PEOU on BI. Similarly, Hartmann et al. [12] also identify a significant effect of PEOU on attitude towards using. One explanation for this variance is that papers addressing attitude instead of intention are more likely to

Table 9 Summary of outcomes of the hypotheses

Hypothesis		Conclusion	Hypothesis		Conclusion
H1a	PU → BI	Accepted	H5a	CC → BI	Accepted
H1b	PEOU → BI	Rejected	H5b	CC × PU → BI	Accepted
H1c	PEOU → PU	Accepted	H5c	CC × PEOU → BI	Accepted
H2	IP → PU	Inconclusive	→ influence pos./neg. °suggestive evidence found, but not sufficient for accepting ($0.05 < p \leq 0.1$)		

Table 10 Comparison of determinants of use hypotheses with related works

	This work	Gebert Persson et al. [10]	Hartmann et al. [12]	Juric et al. [13]	Rodríguez Cardona et al. [14]
Focus	Online claims	Online claims	Self-service	Self-service	Chatbots
Sample	German ins. clients (cross-sec.)	Clients of a Swedish ins. company	Clients of a German ins. company	Clients of a German ins. company	German ins. clients (cross-sec.)
Use Measure (UM)	Behavioral intention to use	Technology attitude (as mediator for intention to use)	Attitude towards using	Attitude towards using	Intention to use
PU → UM	sig., $p < 0.001$	sig., p < 0.001	sig., p < .01	**n.s., $p > 0.1$**	sig., $p < 0.001$
PEOU → UM	**n.s., $p > 0.1$**	sig., $p < 0.001$	sig., $p < .01$	**inc., $p > 0.05$**	**n.s., $p > 0.1$**
PEOU → PU	sig., $p < 0.001$	sig., $p < 0.001$	sig., $p < .01$	sig., $p < 0.01$	sig., $p < 0.01$

sig.: significant with $p \leq 0.05$; n.s.: not significant with $p > .1$; inc.: inconclusive with $0.05 < p \leq 0.1$

find a significant effect of PEOU than papers addressing intention, as meta-analyses state [19]. Moreover, the correlation between PEOU and attitude/intention is usually substantially lower than between PU and attitude/intention [19, 21, 23]. This is also the case for our work as well as all related works from the insurance industry except for Juric et al. [13].

In line with all insurance-specific related works, we have found a highly significant influence of PEOU on PU (H1c), i.e., there is still a mediating or indirect effect of PEOU via PU on BI. According to the meta-analysis of King and He [23], this is the major effect of PEOU on BI—larger than its direct effect. Another meta-analysis [19] finds that 84% of TAM-related studies identify this positive effect as significant. However, as our analysis of the total effects shows, the total effect of PEOU on BI is strong for the less complex accident scenario but there is no significance in the more complex case scenario. Thus, the moderation effect appears just in the simpler case scenario and in the SEM combining both case complexities. This indicates that the damage circumstance might have a great important and special role in the insurance context.

An overview of our findings regarding the determinants of use compared with the related works regarding insurance is shown in Table 10.

Considering the antecedent factors influencing PU and PEOU, we usually can accept the hypotheses except for one: The hypothesis H2 (IP → PU) appears to be inconclusive. From a statistical perspective, a significance threshold is neither consistently defined (in social science 0.05 and 0.1 are arbitrarily used) nor is its strict (binary) application reasonable as "a conclusion does not immediately become 'true' on one side of the divide and 'false' on the other" [53, p. 131]. The *p*-value does not imply a probability but is a continuous measure of evidence against the null hypotheses [54]. Thus, the range of $0.05 < p \leq 0.1$ can be described as "suggestive, but inconclusive" [54, p. 613]. On that note, we acknowledge that there is some evidence for the hypothesis but not sufficient for evidentially accepting them. This means more research and data are needed to obtain a decisive conclusion, especially in the case of IP where we estimated the premium based on categorical information. A more elaborated estimation or the real cost of the insurance might lead to stronger evidence.

For telephony-related factors, we can confirm both hypotheses H3a (CF → PU) and H3b (CE → CF). Regarding the differentiation of the case complexity, CF is significant in both scenarios but the total effect in the complex case is substantially smaller, i.e., the respondents are more tolerant on the phone if they have a complex insurance claim. Similar results were found for self-service usage of health insurance clients [15]. As supposed, endurance on the phone leads to smaller frustration. However, the total effect of CE on BI is rather small but significant for both, simple and complex claims.

Regarding the digital mindset, ADI is found to be a significant influence factor on PEOU (H4). This finding confirms related studies that have shown an impact on PEOU by related concepts such as personal innovativeness towards technology [34] or computer playfulness [26]. Looking at the total effect, ADI's influence is not only considerably smaller for the complex case but also becomes insignificant. Since ADI is mediated via PEOU, this is presumably caused by the insignificant total effect of PEOU in the more complex scenario. ADI has the second-highest bivariate correlation with BI (0.29) which is substantially larger than the correlation between PEOU and BI (0.17). From a causal point of view, a direct effect of the digital mindset is conceivable. Nonetheless, an attempt to model this effect in a structural equation model for explorative analysis failed as a model could not be identified; this is presumably a case of empirical under-identification (see [55]) which is not caused by lacking structure but by lacking information. Consequently, the role of ADI should be analyzed further in the future.

As we have been discussing, the complexity of the damage event is a very important factor. We can not only confirm hypotheses H5a (CC → BI) but also the hypotheses H5b (CC × PU → BI) and H5c (CC × PEOU → BI) testifying the moderation effects of CC. Regarding the moderation, the total effects clearly show that every factor of influence has a smaller effect on BI for the complex accident than for the small accident. The total effect of the complex case itself is the strongest impact that we have measured. The importance of the damage circumstance or complexity is a peculiarity of the insurance business that needs special consideration. In the related work, we could just identify a single study [15] that genuinely considers this factor within a health insurance environment. This study analyzes telephone and web usage based on operational data from an insurance company and estimates the severity based on parameters such as the number of claims or claim compensation amount. In this study, we create unambiguous damage severity scenarios and survey data on an individual level leading to a clearer separation of complexity classes. In so doing, there is still a potential for a more differentiated multi-graded measurement than the used binary variable indicating a lesser or greater case complexity based on scenarios. Additionally, in our two scenarios, the material and personal damage as well as the responsibility for the accident were simultaneously manipulated such that the collected data cannot explicate how these sub-factors influence the adoption individually. Some sub-factors such as the responsibility might have a stronger impact than the others. While Kumar and Telang [15] reveal this relationship of case complexity for the field of health insurance, this very relevant concept is not acknowledged in the field of insurance of property so far.

6.2 Managerial implications

For insurance companies and practitioners, we can conclude three key managerial recommendations:

Firstly, insurance companies that introduce an online channel for claims should highlight its advantages and benefits for the clients and, by doing so, improve the perception of the usefulness of the service. The frequently used advertising promise that the channel is easy to use or foolproof might also be persuasive but it is not expected to be as effective and convincing as emphasizing the usefulness. The perceived usefulness appears to be the key pathway for service adoption.

Secondly, one key finding of this study is that the complexity of the damage event has a substantial impact on the behavior of the client. The claim process is the moment of truth for the insurance, i.e., the moment in which the customer makes up his or her mind about the provided service quality. Especially in fields with a strong cost competition, it might be tempting to aim at a preferably universal migration of the clients to an online claim channel. However, in case of severe damages, clients might need direct interaction with a customer service representative, since the damage might discomfort the customers (e.g., due to financial worries, personal dismay, or uncertainty of the coming process). Thus, insurance providers should keep a door open to give those clients an opportunity to circumvent a widely automated and standardized online channel—otherwise, it might be a reason for the clients to look for another provider. An omnichannel strategy appears to be highly reasonable for claims to offer a tailored service experience.

Thirdly, as we have discussed, an online notification service appears to be a useful communication channel alternative for customers that are not fond of telephone calls. The promise of, e.g., no waiting times on the phone or constant accessibility might be further aspects that might convince clients to use an online service. Furthermore, customers that are open-minded toward digital innovations seem to be a relevant target group for an online channel. Concerning the demographics, these people appear to be rather young and—with a subordinate significance—also more likely male. For example, these demographic characteristics might be promising for insurance companies in search of early adopters.

From a customer perspective, the data indicates that insurance clients consider online damage claim systems as useful and simple to use and are principally open to their usage. Nevertheless, especially in the case of complex damage events, they also appear to have a wish for concurrent alternative channels. Supposedly, this wish comes from the need for more personal interaction and the intention to clarify open questions directly. Consequently, the findings imply that an online-only strategy might not be optimal despite customers' openness towards it and that clients might benefit from a multi-channel approach.

6.3 Limitations

As in every study, there are some constraints on the generalization of the results here as well: as mentioned, there is little research regarding this specific insurance-related topic. This lack of well-founded prior research could result in overlooked concepts. Concerning the data, the surveyed data is collected in Germany and only applies to the German context. Studies in other countries might come to divergent findings due to cultural differences. Similarly, we have regarded a car insurance scenario that might diverge from other insurance types. Furthermore, as argued before, we decided against collecting data from clients of a single insurance company as many related studies did. On the downside, we needed to establish a rather supposing scenario although it was introduced, explained, and backed in the survey by real-world examples and illustrations of online claim services from different insurance companies. Therefore, an analysis of longitudinal effects such as pre-adoption and post-adoption (see, e.g. [56],) was not possible. Moreover, biases such as under-coverage and self-selection happen often in web surveys [57]. Since our study deals with an online technology under-coverage may be a lesser problem in our web survey, but potential self-selection still represents a possible bias. Finally, like most studies of technology acceptance, we could not measure actual use but rather self-reported use intention which is naturally not a perfectly precise measure [22].

7 Conclusion & future work

As the study has demonstrated, the most important pathway for the usage of online channels for claim notification is perceived usefulness. In addition to this, the case complexity is not only a key factor but also an important moderator influencing every other impact factor. The perceived ease of use as well as the acceptance of digital innovations appears to be more relevant for non-complex damage events. Finally, call frustration and endurance also has some, although minor, impact on the behavioral intention for usage.

This study develops and tests a model that explains and predicts the insurance-specific technology of online claims (theory type IV (EP theory) after Gregor [58])—this knowledge is the basis for further research on design and action referring to such artifacts [58]. In so doing, this paper makes several contributions to the literature: firstly, the study applies and tests key concepts of the technology acceptance model for the specific case of online claims–there is just a single study in this regard known to the authors. In this context, also the concepts used in this study are insurance-specific such as the status quo of telephone claims studied through call frustration and endurance or the damage circumstance represented by the case complexity. Secondly, we have revealed the previously very little regarded relevance and effect of case complexity, i.e., that clients' claim behavior is different subject to the severity of their damage event. Especially the complexity's very strong moderation effect has not been well-studied yet. Thirdly, we have shown the relationships of different characteristics regarding telephone calls as well as acceptance of digital innovations and the intention of using online claims services. Fourthly, we have derived tangible managerial recommendations based on our findings. In summary, we have provided a distinct model that contributes to a better understanding of the adoption of such services.

Future investigations are necessary to validate the conclusions that can be drawn from this study, especially with regard to other cultural environments and other kinds of claims not related to car insurance. Furthermore, some of the influence factors might be interrelated further—such as a possible connection between the acceptance of digital innovation and behavioral intention mentioned in the discussion—which has to be analyzed and validated in future research. Besides, the dimensions and components of case complexity should be refined resulting in a multi-graded measurement that can figuratively represent more shades of grey than the binary "black or white" operationalization in this work. In this context, the sub-factors of this operationalization (material and personal damage as well as liability) should be tested separately. Since the findings of this study are not exhaustive, other possible effects should be empirically studied. Here, particular issues are trust in the insurance provider and privacy concerns regarding the storage of data in an online system. For this purpose, a study with clients from a single insurance company—in contrast to our cross-sectional survey with diverse insurance clients—could provide new insights but also validate our results with a different approach. Another way of validation would be to replicate our within-subject analysis confronting an individual with two accident scenarios with a between-subject design. Future work should also consider longitudinal effects such as pre-adoption and post-adoption. Finally, the little-studied case complexity, in particular its moderating effect on other influence factors, might represent an important area that needs future research for a greater understanding.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s10799-023-00404-z.

Funding Open Access funding enabled and organized by Projekt DEAL.

References

1. Cebulsky M, Günther J, Heidkamp P, Brinkmann F (2017) The digital insurance - facing customer expectation in a rapidly changing world. In: Linnhoff-Popien C, Schneider R, Zaddach M (eds) Digital marketplaces unleashed. Springer, Berlin-Heidelberg, pp 359–370. https://doi.org/10.1007/978-3-662-49275-8_34
2. Nicoletti B (2021) Proximity to the customer in insurance 4.0. In: Nicoletti B (ed) Insurance 4.0. Benefits and challenges of digital transformation. Palgrave Macmillan, Cham, pp 101–138. https://doi.org/10.1007/978-3-030-58426-9_5
3. Catlin T, Lorenz J-T, Morrison C, Wilms H (2017) Time for insurance companies to face digital reality. In: Catlin T, Lorenz J-T (eds) McKinsey digital disruption in insurance: cutting through the noise. Digital McKinsey, Bengaluru
4. Cappiello A (2018) Technology and the insurance industry: re-configuring the competitive landscape. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-319-74712-5
5. Laakmann M, Rahlf C (2019) Customer Journey am Beispiel des Schadenprozesses in der Versicherungswirtschaft. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-662-57755-4
6. Truong Y (2013) A cross-country study of consumer innovativeness and technological service innovation. J Retail Consum Serv 20(1):130–137. https://doi.org/10.1016/j.jretconser.2012.10.014
7. Hirschheim R (2007) Introduction to the special issue 'Quo Vadis TAM—issues and reflections on technology acceptance research. J Assoc Inf Syst 8(4):203–205. https://doi.org/10.17705/1jais.00128
8. Davis FD (1989) Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Q 13(3):319–339. https://doi.org/10.2307/249008
9. Venkatesh V, Morris MG, Davis GB, Davis FD (2003) User acceptance of information technology: toward a unified view. MIS Q 27(3):425–478. https://doi.org/10.2307/30036540
10. Gebert Persson S, Gidhagen M, Sallis JE, Lundberg H (2019) Online insurance claims: when more than trust matters. Int J Bank Mark 37(2):579–594. https://doi.org/10.1108/IJBM-02-2018-0024
11. Gidhagen M, Gebert Persson S (2011) Determinants of digitally instigated insurance relationships. Int J Bank Mark 29(7):517–534. https://doi.org/10.1108/02652321111177803
12. Hartmann L, Kerssenfischer F, Fritsch T, Nguyen T (2013) User acceptance of customer self-service portals. J Econ Bus Manag 1(2):150–155. https://doi.org/10.7763/joebm.2013.v1.33
13. Juric J, Lindenmeier J, Fritsch T, Kerssenfischer F (2015) Kundenseitige Akzeptanz internetbasierter Self-Service-Technologien in der Versicherungswirtschaft: Eine kausalanalytische Studie zur Wirkung von Aspekten der Technologienutzung und internetbezogener Privatheitsbedenken. Zeitschrift für die gesamte Versicherungswissenschaft 104(2):131–149. https://doi.org/10.1007/s12297-015-0294-x
14. Rodríguez Cardona D. Janssen A, Guhr N, Breitner MH, Milde J (2021) A matter of trust? Examination of chatbot usage in insurance business. In: Proceedings of the 54th Hawaii international

conference on system sciences. https://doi.org/10.24251/hicss.2021.068.
15. Kumar A, Telang R (2012) Does the web reduce customer service cost? Empirical evidence from a call center. Inf Syst Res 23(3):721–737. https://doi.org/10.1287/isre.1110.0390
16. McKechnie S, Winklhofer H, Ennew C (2006) Applying the technology acceptance model to the online retailing of financial services. Int J Retail Distrib Manag 34(4–5):388–410. https://doi.org/10.1108/09590550610660297
17. Montazemi AR, Qahri-Saremi H (2015) Factors affecting adoption of online banking: a meta-analytic structural equation modeling study. Inf Manag 52(2):210–226. https://doi.org/10.1016/j.im.2014.11.002
18. Blut M, Wang C, Schoefer K (2016) Factors influencing the acceptance of self-service technologies: a meta-analysis. J Serv Res 19(4):396–416. https://doi.org/10.1177/1094670516662352
19. Yousafzai SY, Foxall GR, Pallister JG (2007) Technology acceptance: a meta-analysis of the TAM: Part 2. J Model Manag 2(3):281–304. https://doi.org/10.1108/17465660710834462
20. Ajzen I (1991) The theory of planned behavior. Organ Behav Hum Decis Process 50(2):179–211. https://doi.org/10.1016/0749-5978(91)90020-T
21. Turner M, Kitchenham B, Brereton P, Charters S, Budgen D (2010) Does the technology acceptance model predict actual use? A systematic literature review. Inf Softw Technol 52(5):463–479. https://doi.org/10.1016/j.infsof.2009.11.005
22. Legris P, Ingham J, Collerette P (2003) Why do people use information technology? A critical review of the technology acceptance model. Inf Manag 40(3):191–204. https://doi.org/10.1016/S0378-7206(01)00143-4
23. King WR, He J (2006) A meta-analysis of the technology acceptance model. Inf Manag 43(6):740–755. https://doi.org/10.1016/j.im.2006.05.003
24. Davis FD, Bagozzi RP, Warshaw PR (1989) User acceptance of computer technology: a comparison of two theoretical models. Manage Sci 35(8):982–1003. https://doi.org/10.1287/mnsc.35.8.982
25. Venkatesh V, Davis FD (2000) Theoretical extension of the technology acceptance model: four longitudinal field studies. Manage Sci 46(2):186–204. https://doi.org/10.1287/mnsc.46.2.186.11926
26. Venkatesh V, Bala H (2008) Technology acceptance model 3 and a research agenda on interventions. Decis Sci 39(2):273–315. https://doi.org/10.1111/j.1540-5915.2008.00192.x
27. Aldás-Manzano J, Lassala-Navarré C, Ruiz-Mafé C, Sanz-Blas S (2009) Key drivers of internet banking services use. Online Inf Rev 33(4):672–695. https://doi.org/10.1108/14684520910985675
28. Yousafzai SY, Foxall GR, Pallister JG (2007) Technology acceptance: a meta-analysis of the TAM: part 1. J Modell Manag. https://doi.org/10.1108/17465660710834453
29. Baecke P, Bocca L (2017) The value of vehicle telematics data in insurance risk selection processes. Decis Support Syst 98:69–79. https://doi.org/10.1016/j.dss.2017.04.009
30. Evers K, Körfer R (2015) Die Entdeckung des Kunden—Verbesserung der Servicequalität in einem Versicherungsunternehmen. In: Zimmermann G (ed) Change management in Versicherungsunternehmen. Springer, Wiesbaden, pp 273–290. https://doi.org/10.1007/978-3-658-05974-3_16
31. Hui MK, Tse DK (1996) What to tell consumers in waits of different lengths: an integrative model of service evaluation. J Mark 60(2):81–90. https://doi.org/10.2307/1251932
32. Venkatesh V, Thong JYL, Xu X (2012) Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. MIS Q 36(1):157–178. https://doi.org/10.2307/41410412
33. Neyer FJ, Felber J, Gebhardt C (2012) Entwicklung und Validierung einer Kurzskala zur Erfassung von Technikbereitschaft. Diagnostica 58(2):87–99. https://doi.org/10.1026/0012-1924/a000067
34. Lewis W, Agarwal R, Sambamurthy V (2003) Sources of influence on beliefs about information technology use: an empirical study of knowledge workers. MIS Q 27(4):657–678. https://doi.org/10.2307/30036552
35. Carlsen O, Dietsch T, Wollenberg S (2019) Die sechs stufen zur digitalisierung des kundendialogs im Versicherungswesen. In: Reich M, Zerres C (eds) Berlin Handbuch Versicherungsmarketing. Springer, Berlin, Heidelberg, pp 389–400. https://doi.org/10.1007/978-3-662-57755-4
36. Wolter B (2015) Schadensmanagement. In: Euteneier A (ed) Handbuch klinisches risikomanagement. Springer, Berlin, pp 329–342. https://doi.org/10.1007/978-3-662-45150-2_26
37. Njegomir V (2018) Marketing in insurance: the importance of efficient insurance claims management. Civitas 8(2):30–39. https://doi.org/10.5937/Civitas1802030N
38. Bauer HH, Sauer NE, Brugger N (2002) Die Akzeptanz von Versicherungsdienstleistungen im Internet. Zeitschrift für die gesamte Versicherungswissenschaft 91(3):329–363. https://doi.org/10.1007/bf03190769
39. Rosseel Y (2012) lavaan: an r package for structural equation modeling. J Stat Softw 48(2):1–36
40. Cheng TCE, Lam DYC, Yeung ACL (2006) Adoption of internet banking: an empirical study in Hong Kong. Decis Support Syst 42(3):1–32. https://doi.org/10.1016/j.dss.2006.01.002
41. Yoon HS, Barker Steege LM (2013) Development of a quantitative model of the impact of customers' personality and perceptions on internet banking use. Comput Human Behav 29(3):1133–1141. https://doi.org/10.1016/j.chb.2012.10.005
42. Lee C, Tsao C-H, Chang W-C (2015) The relationship between attitude toward using and customer satisfaction with mobile application services. J Enterp Inf Manag 28(5):680–697. https://doi.org/10.1108/JEIM-07-2014-0077
43. German Insurance Association (GDV) Entwicklung der durchschnittlichen Jahresprämie (2021) https://www.gdv.de/de/zahlen-und-fakten/versicherungsbereiche/ueberblick-4660#Jahrespraemie. Accessed 05 Apr 2021
44. Taber KS (2018) The use of Cronbach's alpha when developing and reporting research instruments in science education. Res Sci Educ 48(6):1273–1296. https://doi.org/10.1007/s11165-016-9602-2
45. Raykov T (2001) Estimation of congeneric scale reliability using covariance structure analysis with nonlinear constraints. Br J Math Stat Psychol 54(2):315–323. https://doi.org/10.1348/000711001159582
46. Doll WJ, Hendrickson A, Deng X (1998) Using Davis's perceived usefulness and ease-of-use instruments for decision making: a confirmatory and multigroup invariance analysis. Decis Sci 29(4):839–869. https://doi.org/10.1111/j.1540-5915.1998.tb00879.x
47. Kaiser HF (1974) An index of factorial simplicity. Psychometrika 39(1):31–36. https://doi.org/10.1007/BF02291575
48. Fornell C, Larcker DF (1981) Evaluating structural equation models with unobservable variables and measurement error: a comment. J Mark Res 18(3):39–50
49. Schermelleh-Engel K, Müller H, Moosbrugger H (2003) Evaluating the fit of structural equation models. Methods Psychol Res 8(2):23–74
50. Marsh HW, Hau KT (1996) Assessing goodness of fit: is parsimony always desirable? J Exp Educ 64(4):364–390. https://doi.org/10.1080/00220973.1996.10806604

51. Hu L-T, Bentler PM (1999) Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. Struct Equ Model 6(1):1–55
52. Ringle CM, Sarstedt M (2016) Gain more insight from your PLS-SEM results the importance-performance map analysis. Ind Manag Data Syst 116(9):1865–1886. https://doi.org/10.1108/IMDS-10-2015-0449
53. Wasserstein RL, Lazar NA (2016) The ASA's statement on *p*-values: context, process, and purpose. Am Stat 70(2):129–133. https://doi.org/10.1080/00031305.2016.1154108
54. Murtaugh PA (2014) In defense of *P* values. Ecology 95(3):611–617. https://doi.org/10.1890/13-0590.1
55. Olschewski S, Sirotkin P, Rieskamp J (2021) Empirical underidentification in estimating random utility models: the role of choice sets and standardizations. Br J Math Stat Psychol. https://doi.org/10.1111/bmsp.12256
56. Karahanna E, Straub DW, Chervany NL (1999) Information technology adoption across time: a cross-sectional comparison of pre-adoption and post-adoption beliefs. MIS Q 23(2):183–213. https://doi.org/10.2307/249751
57. Bethlehem J (2010) Selection bias in web surveys. Int Stat Rev 78(2):161–188. https://doi.org/10.1111/j.1751-5823.2010.00112.x
58. Gregor S (2006) The nature of theory in information systems. Manag Inf Syst Q 30(3):611–642. https://doi.org/10.2307/25148742