Mobile Instant Messaging for Customer Service Interaction
Preparation of a Model-based Approach Exploring Behavioral Intention

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Abstract: Mobile Instant Messaging (IM) has become a main tool for communicating with friends and family. Recent efforts are now exploring IM use in business-to-customer communication. To this end, particularly customer service settings are given a high priority. A clear understanding of the relevant customer perspective is, however, still missing. Consequently, this paper reports on a study evaluating people's behavioral intention of adopting mobile IM for customer service interaction. We used an integrated research model based on Ajzen's Theory of Planned Behavior (TPB) and Parasuraman's Technology Readiness Index. A total of 154 questionnaires were analyzed. Results indicate only small effects of technology-related personality traits on the cognitive dimensions of the TPB. Concerning TPB-internal relations, *Attitude* and *Subjective Norm* were found to have significant influences on *Behavioral Intention*. In summary, however, the study indicates that people's intention to adopt mobile IM for customer service interaction is only slightly positive.

1 INTRODUCTION

On February 1st 2016 *WhatsApp* announced their efforts in exploring alternative application areas for mobile Instant Messaging (IM)[1]. In particular, they highlighted their goal to offer users a new way of communicating with businesses and organizations. In other words, individuals and businesses should be able to exchange important information in a modern, more convenient and less complicated manner. *WhatsApp*'s intentions may be seen as an attempt to open up a new chapter in the field of customer-business interaction. Since then, first prototypical implementations of using IM for customer communication have been put in place. Yet, so far, little is know about the customers' perspective and consequent attitude towards these services. The goal of the work presented in this paper is thus to shed some light on the potential use of IM in customer service settings. Employing a model-based research approach we aim to contribute to a better understanding of the users' underlying motives and their possible reluctance factors, which play an essential role in the adoption and/or refusal of said technology for Customer Service Interaction (CSI).

[1] https://blog.whatsapp.com/ [retrieved: May 15 2016]

2 THEORETICAL BACKGROUND

With the ongoing propagation of smartphones the availability of mobile IM is constantly increasing. In contrast to the use of traditional SMS-based text messaging, the use of mobile IM is not limited to a given number of characters and is usually free of charge – provided the user has access to an internet connection via data plan or a wireless network connection (Church and de Oliveira, 2013). Furthermore, IM includes a number of positive characteristics, like different types of media content such as for example videos, photos, documents, contacts, audio files, the user's current location as well as his/her voice mails (Rennecker and Godwin, 2003). In addition, most mobile IM tools feature information about a communication partner's status, such as him/her being online/offline, busy, typing, idle or free, which mimics important characteristics of a real-time physical person-to-person conversation (Deng et al., 2010). Moreover, mobile IM applications provide numerous emoticons to convey emotions (Lancaster et al., 2007). Thus, given the variety of different transferable media types combined with the 'emotional' effect of emoticons, studies have already shown that users perceive (mobile) IM as more personalized than other means of digital communication such as for ex-

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ample email (Church and de Oliveira, 2013; Huang et al., 2008).

However, perceived (technological) advantages alone do usually not suffice to ensure the adoption of technology in a given application area. Motivational, behavioral as well as social factors also play their part. To this end, technology acceptance and/or adoption, being "conceptualized as an outcome variable in a psychological process that users go through in making decisions about technology" (Dillon and Morris, 1996), is perceived as a crucial determinant influencing the success or failure of a technology brought to market. Consequently, its underlying theoretical models have been subject to many previous studies (Ghyas et al., 2012; Venkatesh et al., 2003).

2.1 Theory of Reasoned Action

The Theory of Reasoned Action (TRA) developed by Fishbein & Ajzen (Fishbein and Ajzen, 1975) was one of the first widely applied theoretical models to explain human behavior. Until today, it is one of the most applied theories and has received substantial empirical support (Dabholkar, 1994; Püschel et al., 2010). The model is based on the assumption that a person's actual behavior is influenced by his/her intention to execute said behavior. Intention to perform behavior X can thus be characterized as an indicator "of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior" (Ajzen, 1991). Consequently, a strong behavioral intention should also increase the likelihood of actually performing the respective behavior (Ajzen, 1985; Ajzen, 1991). Intention to perform behavior X is further mutually determined by the individual's *Attitude* towards said behavior and his/her *Subjective Norm* concerning it (Fishbein and Ajzen, 1975). These two dimensions reflect on the one hand the personal impact and on the other hand the social influences on the intention to perform a behavior (Ajzen, 1985). That is, *Attitude* towards behavior X "refers to the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question" (Ajzen, 1991). *Subjective Norm* on the other hand is defined as "the person's perception of the social pressure put on him/her to perform or not perform the behavior in question" (Ajzen, 1985). At a deeper level, one may thus argue that people's salient beliefs determine their *Attitude* and *Subjective Norm* concerning behavior X. In summary the TRA therefore proposes that, individuals intend to carry out a behavior if they, for themselves, positively evaluate the behavior in question and if they think that people of their social environment would support them performing this behavior (Ajzen, 1985; Ajzen, 1991).

2.2 Technology Acceptance Model

While TRA was designed to explain human behavior and its antecedents in general, it also served as the foundation for other models aiming to explain behavior in more specific contexts. In case of technology, such particularly concerns the Technology Acceptance Model (TAM) developed by Davis (Davis, 1989). TAM focuses on explaining user acceptance of technology in the workplace by replacing the TRA element *Subjective Norm* with the dimensions *Perceived Usefulness* and *Perceived Ease of Use* (Davis et al., 1989; Davis, 1989). *Perceived Usefulness* is defined as "the degree to which a person believes that using a particular system would enhance his/her job performance" (Davis, 1989). Here the term useful is based on the assumption that a technology can be used advantageously (Davis, 1989). Consequently, a system which is characterized by high *Perceived Usefulness* "is one for which a user believes in the existence of a positive use-performance relationship" (Davis, 1989). As such it is directly connected to both *Attitude* and *Behavioral Intention* and grounded in the argument that, in a work setting, the intention to use a system may also stem directly from its assumed impact on the overall job performance, independent of the overall attitude towards using the system (Davis, 1989). *Perceived Ease of Use*, on the other hand, describes "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989), where the term ease implies the "freedom from difficulty or great effort" (Davis, 1989). In contrast to TRA, TAM has been widely applied in studies on mobile services usage; e.g. (Basgöze, 2015; Glass and Li, 2010; Godoe and Johansen, 2012; Gombachika and Khangamwa, 2013; Guhr et al., 2013; Jin, 2014; Li et al., 2005; Lu et al., 2009).

2.3 Theory of Planned Behavior

Next to TAM also the Theory of Planned Behavior (TPB) strongly builds on the basis of the TRA. Instead of replacing the component *Subjective Norm*, however, it extends the model by a third dimension. Originally TRA was created to explain volitional behavior, i.e. behavior where an individual voluntarily chooses to perform an action (Ajzen, 1985). This has been a major limitation to the TRA model, as it is not applicable to behavior which is not under full perceived or actual control (Ajzen, 1985; Ajzen, 1991). To over-

come this limitation, the TPB thus incorporates the dimension *Perceived Behavioral Control*, which is defined as the "perceived ease or difficulty of performing the behavior and it is assumed to reflect past experience as well as anticipated impediments and obstacles" (Ajzen, 1991). Except for the amendment of *Perceived Behavioral Control* and its direct impact on the actual behavior, the TPB construct is, however, identical to the TRA. In other words, the TPB essentially assumes "the more favorable the *Attitude* and *Subjective Norm* with respect to a behavior, and the greater the *Perceived Behavioral Control*, the stronger should be an individual's intention to perform the behavior under consideration" (Ajzen, 1991).

3 ACCEPTANCE OF MOBILE INSTANT MESSAGING

Lu et al. (Lu et al., 2009) as well as Glass & Li (Glass and Li, 2010) aimed at generally explaining mobile IM acceptance with an integrated TAM. Shih & Fan (Shih and Fan, 2013), on the other hand, explored IM in a more work-related context. In their case, the TPB was extended by a construct measuring technology readiness. The results showed that an optimistic view of technology also fosters a positive attitude towards applying IM for a professional purpose (Shih and Fan, 2013). Building on these results, both internet and mobile banking have been explored through applying the TRA (Nor, 2015) as well as a Decomposed version of the Theory of Planned Behavior (DTPB) (Püschel et al., 2010; Shih and Fang, 2004). Whereas the DTPB studies applied the original model almost in its pure form, Nor (Nor, 2015) integrated a technology readiness construct into the TRA. Similar study settings comparing the TRA and the DTPB are found in the educational sector. For example, Ghyas et al. (Ghyas et al., 2012) evaluated the acceptance of e-readers using DTPT whereas Jin (Jin, 2014) investigated the technology through an integrated and adapted TAM. E-learning, in particular, was subject to TAM studies with technology readiness dimension to them (Yen and Chen, 2010).

Another relevant comparison may be found in acceptance studies focusing on mobile commerce. Basgöze, for example investigated mobile shopping using TAM and a technology readiness extension (Basgöze, 2015). Similar approaches were taken to explore the acceptance of mobile payment (Guhr et al., 2013; Shin and Lee, 2014). On a more general level, the influence of gender for the acceptance of information and communication technologies was evaluated by Gombachika and colleagues (Gombachika and Khangamwa, 2013). The study strongly focused on technology readiness and again measured ICT acceptance through different TAM constructs. Finally, we have also seen the acceptance of e-service and self-service technologies being studied by integrating technology readiness into the TPB (Chen and Chen, 2008; Chen and Li, 2010).

In summary, however, we see two common characteristics inherent with previous studies. First, very few studies employ the original models such as a pure version of TRA, TPB or TAM. Instead, researchers keep integrating other behavioral theories or seemingly foreign models so as to potentially improve their research results. Second, the extension of original models often concerns an additional construct that aims at measuring people's technology readiness - an approach which is further discussed by the following section.

3.1 Technology Readiness

With technology increasingly becoming the main requirement for services and products being transported (not to say offered) to customers, technology readiness has evolved as an important facet of behavioral research. It allows to draw conclusions about people's emotional reaction to newly introduced technologies. Mick & Fournier (Mick and Fournier, 1998) found eight paradoxes which users are faced with when being confronted with a new technology. This shows certain similarities to the underlying assumptions put forward by the TPB. Dabholkar (Dabholkar, 1996), for example, highlights that people have different feelings about technology which influence their individual behavioral intention to use it. Parasuraman, on the other hand, proposes that "a combination of positive and negative feelings about technology underlies the domain of technology readiness" (Parasuraman, 2000). Furthermore, he states that "whereas positive feelings propel people towards new technologies, the negative feelings may hold them back" (Parasuraman, 2000). Building on this theory Parasuraman developed the Technology Readiness Index (TRI) as a construct which "refers to people's propensity to embrace and use new technologies for accomplishing goals in home life and at work" (Parasuraman, 2000). The TRI theory in its version from 2000 incorporates 36 items which can be assigned to the four categories *Optimism*, *Innovativeness*, *Discomfort* and *Insecurity*. They reflect the positive (*Optimism* and *Innovativeness*) and negative (*Discomfort* and *Insecurity*) perceptions of technology according to Mick & Fournier (Mick and Fournier, 1998). Accordingly, they can be interpreted as an individ-

ual's technology-related personality traits, which influence his/her technology readiness. In other words, *Optimism* and *Innovativeness* are defined as drivers of technology readiness whilst *Discomfort* and *Insecurity* inhibit technology readiness (Parasuraman, 2000).

In 2014, Parasuraman & Colby updated the initial TRI version by introducing TRI 2.0 (Parasuraman and Colby, 2014). Like the original model (TRI 1.0), TRI 2.0 consists of the four personality traits *Optimism*, *Innovativeness*, *Discomfort* and *Insecurity*, with the first two being motivators and the latter two being inhibitors of technology readiness. Also the terms and definitions of TRI 1.0 were transferred to TRI 2.0. However, the items were re-worded, so as to be less specific to one particular technology, and condensed (Parasuraman and Colby, 2014). The final TRI 2.0, which should be applicable to a wider field of technology explorations, now consists of four questions per trait, leading to a total of 16 items to be put on a questionnaire. According to Parasuraman & Colby (Parasuraman and Colby, 2014), the newly integrated TRI 2.0 may be particularity used to investigate a "moderating variable in studies involving multivariate frameworks". Following we conclude the necessary background analysis by discussing several approaches that have integrated this type of technology readiness into technology acceptance studies, leading over to the research agenda perused by our work.

3.2 Integrating TRI with TRA, TAM and TPB

Ever since Ajzen proposed that besides *Attitude* also other personality traits have a major influence on human behavior (Ajzen, 1991; Ajzen, 2005), researchers have worked on integrating technology readiness into behavioral models. As for an integration with technology acceptance, particularly TAM, we have seen a number of application scenarios; e.g. (Chen and Chen, 2008; Chen and Li, 2010; Shih and Fan, 2013). Hence, while for TAM fundamental work such as the Technology Readiness and Acceptance Model (TRAM) by Lin et al. (Lin et al., 2007) exists, the integration of TRI with TPB is less researched. Chen & Chen (Chen and Chen, 2008) were among the first to examine the effect of technology readiness on consumer behavior and may consequently be regarded as the pioneers in integrating TRI (in version 1.0) with TPB. Doing so, they examined the influence of personality traits on the antecedents of *Behavioral Intention*, finding that personality traits do indeed play an important role in the information technology adoption (Chen and Chen, 2008). Another approach to integrate TRI with TPB was undertaken when examining the adoption of e-services (Chen and Li, 2010). It was theorized that technology readiness can be interpreted as a belief and would therefore precede *Attitude*, *Subjective Norm* and *Perceived Behavioral Control*, as explained by the TPB (Ajzen, 1985; Ajzen, 1991; Chen and Li, 2010). Finally, a third study, set in the context of IM adoption by Taiwanese travel agency workers, concentrated on the influence technology-related personality traits have on the TPB element *Attitude* alone (Shih and Fan, 2013).

In summary, we have seen that in the past primarily two conceptions integrating technology readiness with acceptance have emerged. On the one hand, researchers have studied how technology readiness as a whole influences the antecedents of TAM and TPB. On the other hand, studies were aimed at a diverse set of personality traits and how they influence technology adoption, particularly focusing on relating single TRI components to TAM/TPB elements; e.g. (Chen and Chen, 2008; Godoe and Johansen, 2012; Walczuch et al., 2007). Our study aims to add to this specific research domain by investigating the acceptability/adoption of mobile IM in customer service settings. The applied research model, which builds on the work of Chen & Chen (Chen and Chen, 2008), but replaces TRI 1.0 by its successor TRI 2.0, is discussed below.

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4 RESEARCH MODEL AND HYPOTHESIS

The discussion above highlights that TRA, TPB as well as TAM are viable constructs capable of evaluating technology adoption/acceptance. Also, all three have been integrated with the TRI 1.0 measurement scale. However, with respect to the exploration of behavioral intention, TPB seems to be a better fit than TRA and TAM (and their respective derivatives). One reason for this is because TPB provides "the possibility of making further distinctions among additional kinds of beliefs and related dispositions" (Ajzen, 1991). In addition, personality traits do play an important role in human behavior (Ajzen, 1985; Ajzen, 2005). Most previous studies using a TRI-TPB integration are, however, grounded in the initial model proposed by Chen & Chen (Chen and Chen, 2008). The main reason why this initial model is preferred over other TRI-TPB integrated approaches, such as the one by Chen & Li (Chen and Li, 2010), lies in its focus on each single technology readiness dimension which does not aggregate all of the items into

one measure. Empirical results confirmed the validity of this approach as it was found that not all TRI components have an equal influence on the TPB elements *Attitude*, *Subjective Norm* and *Perceived Behavioral Control* (Chen and Chen, 2008). Shih & Fan's results (Shih and Fan, 2013) support this argumentation as well, and Godoe & Johansen (Godoe and Johansen, 2012), who employed a TRI-TAM construct also recommend the decomposition of technology readiness into its underlying technology-related personality traits instead of relating them to the TPB elements as one single measure.

The presented study aims to add to the body of knowledge in this field by integrating TPB with the updated version of TRI, i.e. TRI 2.0. As per the TPB framework, behavior is dependent on *Intention*, and *Intention* in turn is explained by its antecedents *Attitude* towards the behavior, *Subjective Norm* and *Perceived Behavioral Control*, we may theorize that technology-related personality traits can directly be related to the TPB elements. Here *Optimism* and *Innovativeness* are characterized as drivers, and *Insecurity* and *Discomfort* as inhibitors of technology readiness (Parasuraman and Colby, 2014; Parasuraman, 2000). People who hold an optimistic and innovative position towards technology are therefore expected to also have a positive attitude towards the adoption of mobile IM for Customer Service Interaction (CSI). In contrast, people who feel insecure and dis-comfortable with respect to technology are predicted to have a rather negative attitude towards the adoption of mobile IM for CSI. Consequently one may hypothesize that:

- H1(a): *Optimism* is positively related to *Attitude*.
- H1(b): *Innovativeness* is positively related to *Attitude*.
- H1(c): *Discomfort* is negatively related to *Attitude*.
- H1(d): *Insecurity* is negatively related to *Attitude*.

It is further expected that optimistic and innovative character traits make people expect support from their social environment concerning the adoption of mobile IM for CSI. Yet, feelings of insecurity and discomfort towards technology make people think that their social environment would rather constrain such ambitions. Therefore one may further hypothesize that:

- H2(a): *Optimism* is positively related to *Subjective Norm*.
- H2(b): *Innovativeness* is positively related to *Subjective Norm*.
- H2(c): *Discomfort* is negatively related to *Subjective Norm*.
- H2(d): *Insecurity* is negatively related to *Subjective Norm*.

Similar arguments should account for people's *Perceived Behavioral Control*. That is, people who have an optimistic and innovative view of technology are expected to be confident in operating mobile IM for CSI. In contrast, feelings of insecurity and discomfort towards technology should result in a low confidence concerning these operations. Consequently one may argue that:

- H3(a): *Optimism* is positively related to *Perceived Behavioral Control*.
- H3(b): *Innovativeness* is positively related to *Perceived Behavioral Control*.
- H3(c): *Discomfort* is negatively related to *Perceived Behavioral Control*.
- H3(d): *Insecurity* is negatively related to *Perceived Behavioral Control*.

Finally, according to the original TPB model, *Attitude*, *Subjective Norm* and *Perceived Behavioral Control* influence *Behavioral Intention* (Ajzen, 1985; Ajzen, 1991). Therefore, one may conclude that a positive attitude towards mobile IM for CSI results in a stronger behavioral intention to actually employ it. Accordingly, it is also expected that people's beliefs in a supporting social environment would trigger a stronger behavioral intention. The same accounts for people's confidence in their ability to use mobile IM for CSI, wherefore it may be hypothesized that:

- H4(a): *Attitude* is positively related to *Behavioral Intention*.
- H4(b): *Subjective Norm* is positively related to *Behavioral Intention*.
- H4(c): *Perceived Behavioral Control* is positively related to *Behavioral Intention*.

4.1 Questionnaire Design

Our study design tackling the above hypotheses is strongly model-based, building on prior research conducted in technology adoption of e-services. The work by Chen & Chen (Chen and Chen, 2008) served as the main guideline, however, we focused specifically on the use of mobile IM for CSI and further replaced the original TRI model with its successor TRI 2.0.

Following the example of previous surveys (Chen and Chen, 2008; Dabholkar, 1996), we designed a

Table 1: Questionnaire survey completed by 154 respondents.

Name	Item
ATT1	Using WhatsApp for customer service interaction is a good idea.
ATT2	I like the idea of using WhatsApp for customer service interaction.
ATT3	Using WhatsApp for customer service interaction is a wise idea.
ATT4	Using WhatsApp for customer service interaction would be pleasant.
SN1	People who are important to me (e.g. friends, family) would think that I should use WhatsApp for customer service interaction.
SN2	People who are important to me (e.g. friends, family) would think that using WhatsApp for customer service interaction is a good idea.
SN3	People who influence me (e.g. bloggers, role models) would think that I should use WhatsApp for customer service interaction.
SN4	People who influence me (e.g. bloggers, role models) would think that using WhatsApp for customer service interaction is a good idea.
PBC1	I would be able to use WhatsApp for customer service interaction.
PBC2	I have the resources (e.g. Smartphone with WhatsApp installed, mobile data plan) to use WhatsApp.
PBC3	I have the knowledge to operate WhatsApp for customer service interaction.
PBC4	I have the ability how to operate WhatsApp.
BI1	I would plan to use WhatsApp for customer service interaction.
BI2	I would intend to use WhatsApp for customer service interaction within the next three months.
BI3	I would recommend WhatsApp for customer service interaction to others.
OPT1	New technologies contribute to a better quality of life.
OPT2	Technology gives me more freedom of mobility.
OPT3	Technology gives people more control over their daily lives.
OPT4	Technology makes me more productive in my personal life.
INN1	Other people come to me for advice on new technologies.
INN2	In general, I am among the first in my circle of friends to acquire new technology when it appears.
INN3	I can usually figure out new high-tech products and services without help from others.
INN4	I keep up with the latest technological developments in my areas of interest.
DIS1	When I get technical support from a provider of a high-tech product or service, I sometimes feel as if I am being taken advantage of by someone who knows more than I do.
DIS2	Technical support lines are not helpful because they don't explain things in terms I understand.
DIS3	Sometimes, I think that technology systems are not designed for use by ordinary people.
DIS4	There is no such thing as a manual for a high-tech product or service that's written in plain language.
INS1	People are too dependent on technology to do things for them.
INS2	Too much technology distracts people to a point that is harmful.
INS3	Technology lowers the quality of relationships by reducing personal interaction.
INS4	I do not feel confident doing business with a place that can only be reached online.
GENDER	What's your gender?
AGE	How old are you (in years)?
COUNTRY	My home country is:
WAEXP	I have used WhatsApp for:
SEXP	I have owned a smartphone (or several smartphones) for:
WADAILY	The time I spend every day in WhatsApp is:

questionnaire study which included a short introduction to the purpose of the research, a potential usage scenario which let respondents imagine a concrete application of mobile IM for CSI, and the actual question constructs, covering TPB, TRI 2.0, and demographic items.

With respect to the TPB, items developed by Taylor & Todd (Taylor and Todd, 1995) and validated by several follow-up studies (Ghyas et al., 2012; Lu et al., 2009; Püschel et al., 2010; Shih and Fang, 2004; Teo and Pok, 2003) were adjusted to the context of mobile IM for CSI. The term mobile IM was thereby substituted by the (today) more familiar term *WhatsApp*. Consequently, the first part of the actual questionnaire focusing on TPB included four *Attitude* items developed according to Taylor & Todd (Taylor and Todd, 1995). Additional four *Subjective Norm* items were taken from work by Shih & Fang (Shih and Fang, 2004) who also provide the four items for *Perceived Behavioral Control* as well as two items for *Behavioral Intention*. The third (and final) *Behavioral Intention* item, which particularly incorporated the recommendations of *WhatsApp* for CSI to others, was inspired by Lu and colleagues (Lu et al., 2009).

The second part of the questionnaire incorporated the 16 TRI 2.0 measurement items (Parasuraman and Colby, 2014). To this end no adaptation was required as TRI measures are technology and context independent. All variables used a five-point Likert scale differential ranging from "strongly disagree" to "strongly agree", complying with recommendations for both TPB as well as TRI 2.0 (Carifio and Perla, 2007; Parasuraman and Colby, 2014). The final part of the questionnaire comprised six demographic variables including *gender*, *age*, *WhatsApp experience*, *smartphone experience* and *daily WhatsApp usage*, as well as one question concerning the participant's *country of residence*. The complete survey (cf. Table 1) was distributed online using a convenience sample of *WhatsApp* users in Central Europe, particularly focusing on Germany, Austria and Switzerland, and led to 154 completed responses within 29 days.

4.2 Questionnaire Reliability and Validity

The returned data shows an equal gender distribution (i.e. 72 male and 78 female participants) with the respondents' age ranging from 18 to 62 years (note: 66.7 percent were between 21 and 26 years old). The majority (87.3%) has owned a smartphone for at least three years. As for the *WhatsApp* usage, 37.3% reported to use the app between 31 and 60 minutes per day, while 38.7% would use it shorter and 24.0% longer. Calculating Cronbach's a the questionnaire items investigating *Attitude* (ATT), *Subjective Norm* (SN), *Perceived Behavioral Control* (PBC), *Behavioral Intention* (BI) as well as *Innovativeness* (INN) had coefficients greater than 0.7, showing high reliability. The reliability of the items investigating *Optimism* (OPT), *Discomfort* (DIS) and *Insecurity* (INS) had coefficients ranging from 0.6 to 0.7, deeming them slightly less reliable.

Next, similar to previous studies (Gombachika and Khangamwa, 2013; Shih and Fan, 2013) we used an Exploratory Factor Analysis (EFA) to ensure that all the TRI 2.0 and TPB items would load to their associated construct. This process started with a variable selection and then continued with the consequent factor extraction. Here, the Kaiser-Meyer-Olkin (KMO) criterion measures whether a set of variables qualifies for an EFA (Kaiser and Rice, 1974). It is based on the anti-image covariance matrix and lies between 0 and 1, where a value lower than 0.5 indicates that a given variable set is not suitable. Applying the KMO criterion to the model-based variable constructs used in the above survey (i.e. the TRI 2.0 and the TPB questionnaire items) produced a value of 0.848, classifying our variable set as "meritoriously" suitable for an EFA (Kaiser and Rice, 1974). The Measure of Sampling Adequacy (MSA) follows an approach similar to the one pursued by the KMO criterion but serves as an instrument for eliminating those variables which do not qualify for the EFA. Based on this analysis we found that he majority, i.e. 22 of our 31 model-based questionnaire items, qualify as "meritoriously" suitable (MSA$>$0.8). The remaining 9 values, i.e. SN1, SN2, PBC2, PBC3, PBC4, DIS1, DIS2, DIS3 and DIS4, qualify as "mediocre" (MSA$>$0.6), but still did not have to be excluded for the EFA.

The consequent principle component analysis pointed to an eight-factor model with each factor having an Eigenvalue $>$1. As this model is able to explain 66.402% of the total variance implied by the relevant data, the validity of our underlying research constructs composed of four TPB components and four TRI 2.0 components, could be confirmed.

5 MULTIVARIATE STATISTICS

Previous work proposes to define the mean value of 3 as a cut-off point for measurements based on the Likert response format (Gombachika and Khangamwa, 2013). The argument derives from 3 being interpreted as "undecided" or "neutral". Participants' responses to TPB questionnaire items all exceeded this

middle point, indicating an overall positive attitude (ATT mean=3.46) and favorable influences from their social environment (SN mean=3.12) towards using mobile IM (i.e *WhatsApp*) for CSI. A strong agreement with the Perceived Behavioral Control (PBC mean=4.43) further shows that people belief that the use of *WhatsApp* for CSI would be easy and that they feel confident applying it. Consequently, it is not surprising that the *Behavioral Intention* to use *WhatsApp* for CSI also surpassed an average rating (BI mean=3.20). Finally, concerning technology-related personality traits, the data shows that respondents were rather *Optimistic* (OPT mean=3.74) as well as *Innovative* (INN mean=3.43) but felt *Discomfortable* (DIS mean=2.91) and *Insecure* (INS mean=3.35).

In order to further investigate the connection between TRI 2.0 and TPB elements, and consequently tackle the hypotheses put forward earlier, a Multiple Linear Regression (MRA) analysis was performed. A step-wise method was applied, as it supports the exclusion of those independent variables, which do not meet a predefined level of significance (in our case $p<0.05$). Consequently, only variables which make a significant contribution are included into the final model. According to our hypotheses, we tested the influence of technology-related personality traits on ATT, SN and PBC. Finally, one additional analysis was necessary so as to evaluate (and potentially confirm) the relations within the original TPB construct.

The results of the MRA show no significant influence of INN, DIS and INS on ATT ($p>0.050$), leading to the rejection of hypotheses H1(b), H1(c) as well as H1(d). OPT, however, had an influence on ATT (p=0.000), although it was only able to explain 7.9% of its variance (R^2=0.079). A positive connection was confirmed by the respective regression coefficient (B=0.369; β=0.281). Consequently, H1(a) was not rejected.

As for the relation between the TRI 2.0 components and SN the data showed, similar to the previous analysis concerning ATT, no significance with respect to INN, DIS and INS ($p>0.050$). The connection between OPT and SN was, however, again significant (p=0.002; R^2=0.066) producing a regression coefficient that confirms the positive influence of OPT on SN and thus supports H2(a) (B=0.240; β=0.256).

Evaluating the construct with PBC as the dependent variable - i.e. focusing on hypotheses H3(a), H3(b), H3(c), and H3(d) - identified INN as the only influencing construct (p=0.000). OPT, INS and DIS did not show any effects for which H3(a), H3(c) as well as H3(d) had to be rejected. With INN we saw that it was able to explain 8.2% of the variance exhibited by PBC (R^2=0.082). The resulting regression coefficient led to the assumption that INN positively influences PBC and thus supports H3(b) (B=0.201; β=0.286).

The final analysis evaluated the relations within the original TPB construct. Both ATT and SN were found to have an impact on BI, whereas PBC was excluded from the construct. With two independent variables being significant ($p<0.05$) we were able to formulate two different models. Model 1, integrating only ATT as an independent variable, was able to explain 76.7% of its variance (R^2=0.767; p=0.000). Adding SN as a second independent variable we were able to push the rate to 78.1% (R^2=0.781). This second model also showed positive regression coefficients for ATT (B=0.868; β=0.793; p=0.000) as well as SN (B=0.220; β=0.144; p=0.003) consequently supporting H4(a) and H4(b). A much higher regression coefficient of ATT, however, shows that its influence is much stronger than the influence of SN. Figure 1 depicts the resulting research model with its standardized path coefficients and variances of dependent variables.

In summary we may argue that our data did not support the existence of a significant relations between INN and ATT, DIS and ATT or INS and ATT. Neither did we find a connection between INN and SN, DIS and SN, and INS and SN, or an effect of OPT, INS or DIS on PBC. Effects between OPT and ATT, ATT and BI, SN and BI, as well as between OPT and SN and between INN and PBC were, however, significant.

6 INTERPRETATION OF RESULTS

Looking at the above results from the perspective of *Attitude* being the dependent variable, only an optimistic view of technology leads to a positive attitude towards using mobile IM (i.e. *WhatsApp*) for CSI. This complies with the findings of Chen & Chen (Chen and Chen, 2008) and Shih & Fan (Shih and Fan, 2013), who also found support for a positive influence of *Optimism* on *Attitude*. Yet, while Chen & Chen in addition found support for an INN-ATT relation, our study was unable to show that people's *Innovativeness* would lead to them having a more positive *Attitude* towards using mobile IM for CSI. Similarly, feelings of *Discomfort* and *Insecurity* did not show any influence on our participants *Attitude*.

Concerning the influencers of *Subjective Norm* we found a significant connection with *Optimism*, whereas a connection to *Innovativeness* highlighted by Chen and colleagues (Chen and Chen, 2008) was

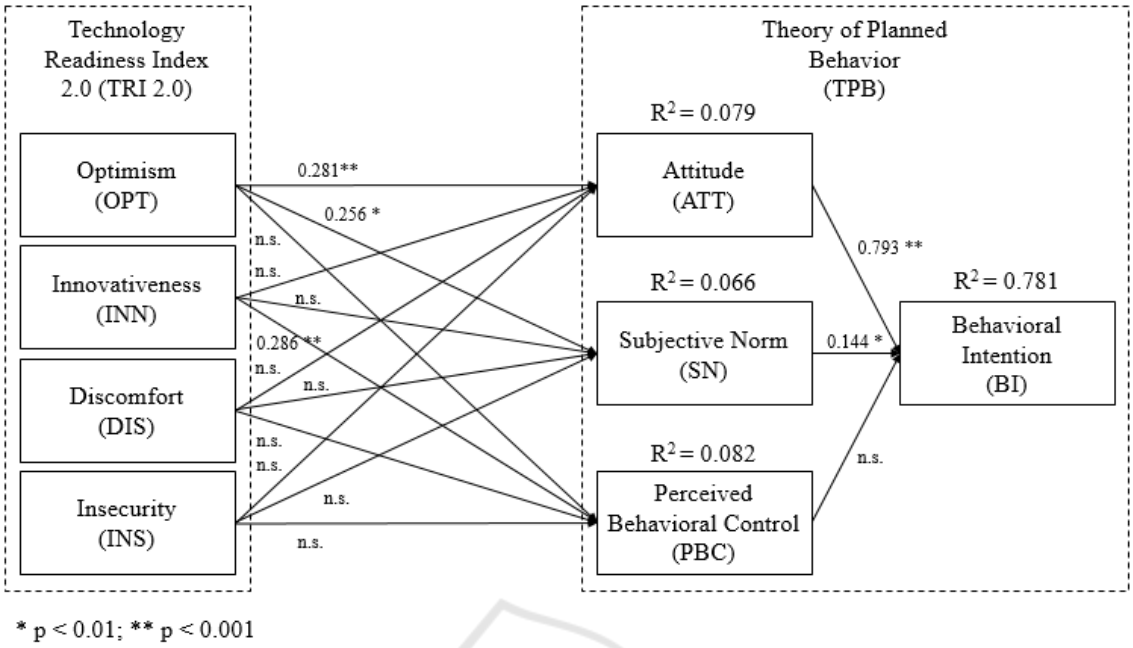

Figure 1: Results of the computed research model.

not inherent. However, we found that being open to new technologies makes people feel that their social environment would support the use of mobile IM for CSI. Again feelings of *Insecurity* and *Discomfort* had no significant impact on people's *Subjective Norm*. *Innovativeness* was the only significant influence on *Perceived Behavioral Control*. One may thus argue that, people considering themselves as technology pioneers makes them feel comfortable and easily able to perform mobile IM for CSI. Surprisingly, however, an optimistic view of technology was not found to significantly contribute to this *Perceived Behavioral Control*, which contradicts Chen & Chen's results, who also identify INN to be the most important influencer of PBC but further highlighted a significant relationship between OPT and PBC (Chen and Chen, 2008).

With respect to the actual TPB model, our study found that a positive attitude towards the technology is the strongest driver for people's *Behavioral Intention* to use IM for CSI. Furthermore, we found that perceived social pressure significantly influences people's BI, although with a much lower impact than their positive attitude. In contrast, people's confidence in their ability to perform does not impact on their BI. These results confirm findings from previous studies which show that "intentions are often formed without subjective norms playing a major role" (Dabholkar, 1994). The lacking influence of PBC on BI is also supported by the findings of Teo & Pok (Teo and Pok, 2003) who furthermore found significant effects for the relations ATT-BI as well as SN-BI.

In summary we may thus argue that our survey results are generally in line with previous work, although from a mobile IM perspective we expected certain deviations. Social pressure, for example, was expected to have less impact, as the actual communication would occur only between a customer and the company, and does not include any peers. In contrast, the perceived ability to use mobile IM was expected to be the main requirement for BI, yet did not show any significant effect. Consequently we may also state that our study, which essentially explored people's IM use for CSI and a respective connection between the TRI 2.0 and the TPB, confirms previous results reported by Chen & Chen (Chen and Chen, 2008). In doing so, it is particularly the TPB part which shows high power in explaining people's *Behavioral Intention* to use IM for CSI, accounting for 78.1% of the respondent's variance. To this end, previous studies focusing on other technologies were often significantly lower, e.g. Teo & Pok (Teo and Pok, 2003) were able to explain 17.2%, Lu and colleagues (Lu et al., 2009) reported 61% and Püschel et al. (Püschel et al., 2010) 68.8%.

7 CONCLUSION AND FUTURE WORK

The presented work explores the acceptance of mobile IM (i.e. *WhatsApp*) for CSI settings, using a

model-based questionnaire survey that integrates previous work on human behavior and technology readiness. Its results may be summarized by three core findings: (1) although we were not able to deduce a reliable statement as to whether people would actually like to use mobile IM for CSI, our data shows a slight tendency towards a positive adoption; (2) the drivers that may potentially lead to the adoption of mobile IM for CSI are mostly found in people's attitude towards the technology (Note: while attitude has the strongest influence, also people's subjective norms play a significant role. One may therefore argue that friends or family members as well as other influencers such as role models or tech bloggers have a positive impact on people's intention to adopt mobile IM for CSI); (3) technology-related personality traits did not influence technology adoption, i.e. the personality traits measured by the TRI 2.0 added little to explain the adoption of IM for CSI.

Future studies will aim at deepening our understanding in this application area. In particular we want to focus on other models integrating technology readiness and technology-related personality traits. Using the model by Chen & Li (Chen and Li, 2010) may, for example, show that not the underlying technology-related personality traits but technology readiness as a whole influences the adoption of mobile IM. Furthermore, the direct comparison of an integrated TRI-TPB model with an integrated TRI-TAM model might deliver valuable insights. Our study was not able to show that technology-related personality traits have a meaningful influence on people's behavioral intention to adopt mobile IM for CSI. Such may imply that for this specific application area technology-related personality traits are of little importance. On the other hand, this could also mean that the research model needs to be re-calibrated.

Also, an exploratory approach based on qualitative research methods may be an interesting path for further investigation, as it may add to a better discovery of underlying reasons (Hyde, 2000). In particular privacy aspects could be of high relevance here. Finally, the emerging market of mobile IM for businesses shows that artificial intelligence enabled messaging bots receive a lot of attention in the tech-community. Next to convenience tasks, also customer service belongs to the targeted application areas, wherefore a more general exploration of messaging adoption and its influencers may also be an interesting future research direction.

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