Increasing Usage Intention of Mobile Information Services via Mobile Tagging

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***Abstract*—Mobile information services are increasingly growing in popularity: end-users are getting used to "being always on", and they are changing their everyday communication behavior. Organizations focus on new ways of creating value-adding services for their customers, and researchers explore aspects of success and implementation of mobile services. In this connection, organizations have a keen interest in information about prospective acceptance and use of their offerings. However, research on the scope of mobile service acceptance often lacks practical relevance, as recommendations for enhancing prospective acceptance are seldom provided. To contribute to this part, the present study investigates user acceptance of mobile services, also showing up a concrete possibility of increasing behavioral intention to use such services by assisting their accessibility via Mobile Tagging. For this, characteristics and functionality of Mobile Tagging for access facilitation are presented first. After that, an integrated acceptance model is compiled and empirically tested. The results found, show that including Mobile Tagging into an integrated cross-media communication strategy significantly enhances the intention to use mobile services. Additionally, the findings indicate that mobile information service acceptance is strongly influenced by individual personality factors, and offerings should therefore be systematically addressed at selective target groups.**

Keywords-Mobile Information Services; Mobile Tagging; Technology Acceptance

I. INTRODUCTION

The evolvement of mobile technologies has a sustainably effect on today's business. Whereas the mobile market was incipiently dominated by phone and network suppliers, the extensive diffusion of mobile phones has also opened up the market to business offerings of further mobile value-adding services by now. Besides the aspect of mobile commerce, which describes "any transaction with a monetary value – either direct or indirect – that is conducted over a wireless telecommunication network" [4], the growing popularity and use of the mobile web also allows for new marketing and communication opportunities. As mobile devices are highly personalized and commonplace in our everyday life, organizational communication via the mobile channel offers an attractive way for customer relationship management providing an utmost interaction intensity as well as time and place independency [24]. These mobile inherent features of personalization and time and place independency are seen as the mobile value added per se, offering differentiated value compared to stationary web use.

Though, besides additional values gained through mobiles like mobility, ubiquity and place- and time-independency [3], mobile devices do also have resource-based limitations. For example, computing power and memory size are much lower than on stationary PCs or laptops. Additionally, screens of mobile devices as well as keypad or touch-input options are smaller and harder to handle and performance is limited to battery power and network connection. These restrictions do partly minder the overall use and adoption of mobile services. So, whilst it is assumed that more than 80 percent of all handsets meanwhile include some form of Internet browser [16], actual usage of mobile 3G-services in Europe just adds up to one third [13].

But, what actually influences consumer acceptance of and intention to use mobile devices and services? And, what can organizations particularly do to enhance user's acceptance and use of the mobile offers? Answering the first question a considerable amount of research investigated behavioral issues of end-user acceptance of mobile devices, applications and services, becoming a major topic in nowadays mobile research activities [30]. Here, exploratory foci ranged from investigations of perceived usefulness, ease of use, enjoyment in use [6, 27, 39], trust [23] or individual influences [2, 26, 29]. However, success in offering mobile services and implementing mobile communication activities into the marketing mix depends on the amount of end-users acceptance and use. Thus, besides the overall understanding of acceptance determinants the second question of how to increase consumer acceptance and usage will be of major interest.

Keeping this question in mind, the application of Mobile Tagging was suggested as a solution to overcome device limitations as cumbersome keypad input by facilitating mobile web access and thus, increasing user-sided mobile communication interaction [10]. Though, quite a few studies dealing with the application spectrum or cross medial embedding of Mobile Tagging are available meanwhile (e.g., [10], [15]), there is no research on the specific potential of Mobile Tagging for enhancing usage intention at the bottom of mobile services by now.

Following that, the aim of this study is twofold: first, to provide an understanding of the acceptance and usage intention on the core of mobile services as information retrieval on the web through mobile devices, as well as secondly, providing some first scientific insights on the

 ISBN: 978-1-61208-171-7

potentials of Mobile Tagging as a tool for intervention. In this connection both aspects will be investigated, the acceptance of Mobile Tagging as a mobile application itself as well as its potential for enhancing the acceptance of mobile information services providing a convenience value and boosting their ease of usage. On this, an introduction into Mobile Tagging as well as its application and value potentials will be presented in the next Section II before reviewing succinctly the relevant literature of mobile technology acceptance. In the thereafter following Section III, we will compile a context-adjusted acceptance model giving special attention to mobile-specific usage determinants. Sections V and IV will constitute the research design and results of the empirical analysis, which will be finally discussed in the last Section VI.

II. CONCEPTUAL BACKGROUND

For the current study, an understanding of both Mobile Tagging and end-users acceptance behavior is necessary and thus, will be provided in the following Sections.

A. Mobile Tagging

Mobile Tagging refers to the process of barcode decoding with camera-equipped mobile devices. At this, one scans a two-dimensional (2D) barcode –the so called Mobile Tag– with a camera phone, to decode and process information embedded in the Tag. These 2D barcodes do have enhanced capabilities compared to traditional one-dimensional (1D) barcodes known from common consumption goods, providing a much higher data capacity. Thus, they can store more as well as also alphanumeric information with an improved robustness. Meanwhile, more than thirty different 2D barcode types have been developed since the late 1980s [21], and some of them are suitable for being captured and processed by mobile devices or even were developed specifically for this purpose. Examples of such Mobile Tags are DataMatrix, Aztec Code, ShotCode, BeeTagg and the well-known Quick Response (QR) Code, which is also employed in this study. Although all of those Mobile Tags differ slightly in standards in terms of their technical characteristics and common application areas, they are characterized by a similar functional principle and typical processing flow as shown in Fig. 1: (1) activation of barcode reader software on the mobile device, (2) capturing barcode by embedded camera, (3) automatically detecting code area and decoding data by reader software, (4) displaying decoded information and providing further options for utilization [32].

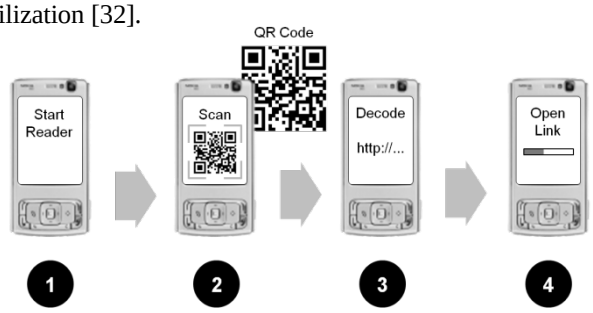

Figure 1. Mobile Tagging processing flow

Thereby, decoded information can not only be short texts but also telephone numbers, preformatted short messages (SMS), email addresses, electronic business card (.vcf) or a web address, which is most popular in use. When decoding an URL, the reader software directly gives the opportunity to open the particular link using the Internet browser of the mobile device making mobile web access more convenient. That way, referencing to a URL via a Mobile Tag provides an opportunity to link the user directly to a targeted topic via a "deep link" –a specific page or point on a website, which are often characterized by an enlarged number of characters compared to website's homepage and thus, making their input over a key- or touchpad even worse.

Application possibilities of Mobile Tagging are manifold. Typically, Mobile Tags are printed on ads, packaging or other prints such as newspapers and magazines. Thus, they can be used in a variety of applications in mobile commerce such as advertizing, marketing, trading, product information tracking and checking, security, customer or product verification and payment [15].

A prerequisite for the use of Mobile Tagging is a barcode reader software on the user's mobile device. Although a move toward preinstalled reader software can be observed on some mobile devices, the usually required download and installation of the reader software is a considerable barrier of Mobile Tagging usage [12]. However, it is likely that the willingness to install the software increases to the extent to which attractive applications for Mobile Tagging are available to the user. Thus, due to network externalities the dissemination and adoption of a specific barcode standard may depend on factors other than technical advantages as e.g., time-to-market and reaching a user base sufficient to ensure a self-sustaining growth [34]. However, QR codes are a widely used pattern for Mobile Tagging and are widespread in Asia, and particularly Japan where the QR code standard was developed by Denso Wave in 1994 and the first mobile with a reader software was already introduced in 2002 [10]. Even if not routinely visible yet, QR codes are also quite common in Europe and are spreading to the US as well by now [12]. Mobile Tags are a simple and inexpensive method to present as well as to retrieve information, linking the physical to the virtual world. By providing access to additional information via mobile devices they constitute an attractive enhancement of established organizational consumer communication, engaging users in interaction with marketers. For users, Mobile Tagging can facilitate mobile web access, substituting inconvenient typing on small mobile keypads by simply scanning the Tag and getting connected to a website. Thus, Mobile Tagging not only delivers value via embedded information but also by means of a convenience value, which has been shown to trigger consumer interaction [10]. However, no specific studies on the enhancement of user acceptance of mobile services through Mobile Tagging are available yet. Thus, the research question for this study is whether and to what extend Mobile Tagging influenced users intention to use information services via the mobile web.

For this purpose, we will develop and analyze a context-adjusted acceptance model, after shortly introducing

 ISBN: 978-1-61208-171-7

consumer acceptance of technology in principle in the next Section B.

B. Acceptance of Mobile Technologies

The question of potential information systems (IS) usage comes along with the well-established domain of IS diffusion, adoption and acceptance research [35]. Hence, the current study on mobile service acceptance adds up to this research area. However, we will contribute to the already existing scope of literature by investigating the hitherto unexplored acceptance potentials of Mobile Tagging and thus, not only investigating determinants of mobile service acceptance but also deriving implications for interventions and acceptance enhancement.

Assessing user acceptance in terms of behavioral (usage) intention researchers can choose from quite a wide set of theoretical approaches like the Theory of Reasoned Action [14] or Planned Behavior [1], the Technology Acceptance Model [8], the Unified Theory of Acceptance and Use [36], or the Task Technology Fit Model [18] (for an overview see e.g. [40]). However, opting for one theory should not be arbitrary but, considering research area and objective. In this connection an appropriate theoretical approach should meet three main requirements: first of all, it has to be eligible for the domain under consideration. Secondly, it should be well-established in order to gain valid propositions. Finally, especially regarding basic research in so far unexplored areas like in the present study, applied theory should be parsimoniously giving central insights rather than yielding a voluminous set of detailed propositions [35]. Still, the exposed requirements do apply to several theories. For the study at hand, especially the Task Technology Fit (TTF) Model [18] as well as the Technology Acceptance Model (TAM) [8] seem to be appropriate for analysis. At first view, TTF Model is based on the assumption that an IS is the more likely to be used the more the system under consideration matches the task a user must perform [18]. Thus, TTF theory would be an appropriate approach for investigating usage acceptance of Mobile Tagging as such in terms of decoding information and finally accessing a website. However, the current study wants to investigate the acceptance of mobile service usage acceptance and to what extend Mobile Tagging can enhance this acceptance. Implying this further goal by facilitating mobile information service access and increasing overall acceptance and use of such services TTF theory hardly would be suitable. In this context of investigation, TAM is likely to be a more appropriate approach, giving the opportunity to evaluate IS usage intention on two basic constructs, perceived usefulness and perceived ease of use [8], and thus, providing an appropriate theoretical framework for the current investigation of enhanced acceptance through access facilitation.

TAM is a widely applied model for analyzing the acceptance and use of innovative technologies, which has its roots in social psychology. It postulates that the intention to use a novel technology is determined by individual attitudes about a system, which are gained through specific beliefs about the systems performance (here: using the system). As mentioned above, TAM is based on two main constructs: perceived usefulness (PU) and perceived ease of use (PEOU). Whilst PEOU refers to the belief about the necessary effort for using the system, PU describes the extent to which an individual perceives that using the system will enhance his or her job performance. Thereby, PU is expected to be determined by perceived ease of system use, which means –other influences being equal– the easier it is to use a system, the more useful it would be. The reference to job related performance and usefulness relates to the development of TAM in an organizational context. In that, TAM was compiled to explore employees' acceptance of new software implementation but meanwhile the model was adapted to many different contexts. All in all, it can be stated that TAM has shown to be a robust and parsimonious model for analyzing technology acceptance, explaining about 40 percent of variance in system usage intention and behavior [38], showing to be well-established as claimed above.

In opposition to its robustness, former studies partly criticized TAM for not paying full attention to the wide range of relevant influencing factors, missing out important acceptance determinants. Thus, by fulfilling the demand of being parsimonious on the one hand, it has been shown that the two basic constructs in TAM do not fully mirror the specification of technological as well as usage context determinants that may influence user acceptance on the other hand [8]. To cope with these shortcomings lots of researchers identified key predictors of PU as well as of PEOU [37]. That way, a number of researchers applied TAM to different scenarios, adding a range of further determinants, and original TAM itself was refined to TAM2 [38] and, recently, to TAM3 [37]. While TAM2 considers processes of social influences as well as cognitive determinants TAM3 presents an extensive model of influencing factors on PU and PEOU on individual technology adoption, also introducing intrinsic factors like computer playfulness and enjoyment as determinants of PEOU. Further research extensions of TAM also included factors like enjoyment [9, 19], individual personality factors as innovativeness, compatibility and affinity [2] or trust [17, 23]. For a comprehensive overview on the most prevalent determinants Lee et al. provide a summing up as well as a critical review on the application of TAM [25].

Whilst the extensions of TAM offer a sound contribution, the study at hand focuses on a basic understanding of the enhancement of mobile information service acceptance through Mobile Tagging. Thus, we will focus on a more technology- respectively application-orientated acceptance approach not taking into account social norms or influences as proposed in TAM2 and TAM3. Anyhow, analyzing innovative technology –such as mobile information services– requires a model adapted to the respective technology system as well as its handling [31]. On this we will draw on existing literature applying TAM to mobile technology acceptance. Here, former studies worked out relevant mobile specific factors like technology readiness [29] as well as mobile desire as the craving for "being always on" [23, 28] for influencing behavioral intention to use the respective services. However, beside TAM's sound contribution for the prediction of usage intention and actual behavior based on

PU and PEOU, the question of "what actually makes a system useful" [5] mostly remains unanswered. Thus, next to the essential results on technology acceptance and insights into the influences of (mobile) technology acceptance gained through TAM-based research studies, a frequently mentioned critique on TAM claims its lack in providing practical guidance [25]. In this connection, TAM is said to treat technology as a "black box", missing out on focusing system design characteristics, which just determines the system's usefulness.

The aim of this paper lies in analyzing user-sided acceptance of available mobile information services and less in guiding design and development of technological construction and realization. Therefore, this study will not focus on specific system design characteristics. Nonetheless, we will refer to practical guidance by showing how the acceptance of an innovative technology itself as well as its PEOU can be enhanced by implementing selective practical support. Therefore, we will propose a mobile-adapted TAM, as mobile-specific antecedents were highlighted above. Further we will incorporate the acceptance of the Mobile Tagging application to the acceptance model of mobile information services. After proposing the combined model and causalities in the following Section III, we will afterwards test its significance empirically.

III. RESEARCH MODEL AND HYPOTHESES

Prior studies on mobile service acceptance applying TAM reinforced the relevance or PU and PEOU for predicting consumer acceptance and intention to use mobile services. For example, Wang et al. [39] found both constructs to be significant influences on the intention to use mobile services. Likewise, Lu et al. [26] found strong support for PU and PEOU in predicting usage intention of wireless internet services.

Whereas PU originally applied to the user's job performance [8], PU in mobile settings rather refers to the system's contributions to (private) personal targets. Based on this, the target of both Mobile Tagging (MT) and mobile information services (m-Info) does relate to the personal demand of information retrieval, although on a different level. Therefore, PU is assumed to be a relevant influencing factor on individual behavioral usage intention (BI) in both aspects. But, due to the fact that Mobile Tags are usually found on advertising posters or flyers as well as on products suggesting the availability of further concrete information it can be assumed that the goal orientation is more precise when using Mobile Tagging compared to the general information search on the mobile web. Therefore, we expect the relationship of PU on usage intention being stronger in the context of Mobile Tagging.

The results on the significance of PEOU as an influencing factor on the other hand are not consistent in prior studies [6], and, for instance, the study by Lu et al. [27] on the intention to use short message services for personal communication among young Chinese consumers just revealed a significant relationship for PU but not for PEOU. According to Venkatesh et al. [36], the significance of the direct influence of PEOU on usage intentions just seems to be prevalent in early stages of use and diminishes over long term as users become experienced [38]. At this, one could argue that due to the novelty of mobile services and the relative complexity of PEOU of mobile services, like the need of special system settings for web access or cumbersome navigation aspects, PEOU should appear as a weighty factor. Contrary, it can be assumed that due to the everyday use and thus, the high familiarity with mobile devices, PEOU of mobile handhelds as such will be on a very high initial level [31]. Therefore, concerns about high efforts should not be prevalent because users generally expect to be proficient in handling so that no direct influence of PEOU on intention but an indirect effect via PU for the application of Mobile Tagging (PEOU_MT) as well as for mobile information services (PEOU m-Info) is hypothesized. Nonetheless, users meanwhile are accustomed to the limited navigation and input opportunities of mobile devices the above referenced convenience still remains a valuable benefit, which is said to enhance the usage acceptance of mobile services [3]. Hence, we additionally hypothesize that the intention to use Mobile Tagging in turn positively effects PEOU of mobile information services as it facilitates the input on mobile devices. Further, we suggest PEOU effects individually perceived enjoyment of using a system as we assume that perceptions on handling a system also influence the anticipated enjoyment. It also can be assumed that if users do not get along with a mobile device, service or application, they tend not to be amused [31].

As mentioned above, the importance of enjoyment has been found to be a critical influencing factor in mobile usage scenarios. Davis et al. [9] noted that, in the context of computer interaction in the workplace intrinsic motivations are important determinants of usage intention going beyond the relevance of usefulness. Some studies award enjoyment to influence usage intention just in case of purely hedonic system usage as the end in itself [19], like mobile gaming. Whereas this may partly hold true for the current observation of Mobile Tagging as an enjoyable hedonic interaction technique the underlying intention to gain information exceeds the purely hedonic usage for both scenarios. Hence, we postulate a direct effect of perceived enjoyment on the intention to use both, Mobile Tagging (Enjoy_MT) as well as on mobile information services (Enjoy m-Info).

 ISBN: 978-1-61208-171-7

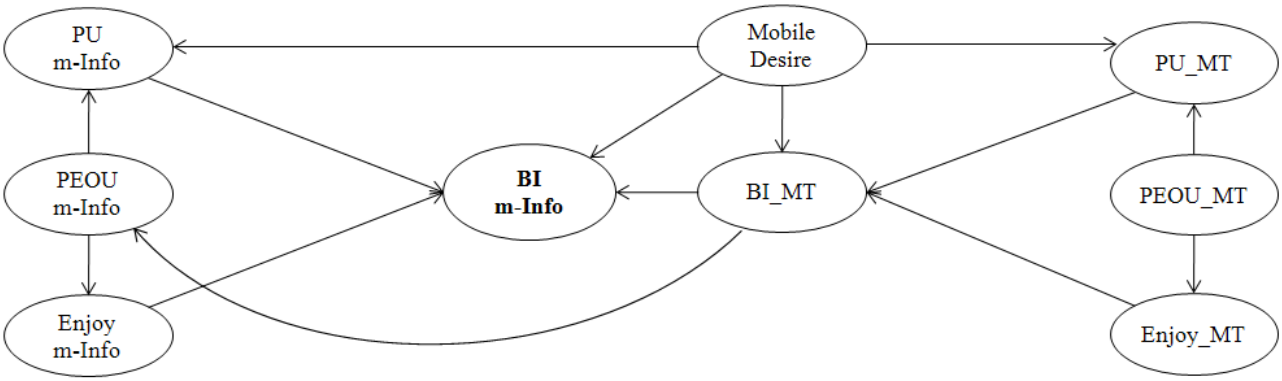

Figure 2. Proposed acceptance research model

As the last influencing determinant we introduce an individual personality construct, mobile desire, which will be imposed integratively for both cases and assumed to influence comparably PU as well as respective usage intention. Mobile desire thereby refers to the personal need for "being always on" in terms of being always connected and available for being reached out by family and friends [11]. This strongly refers to the above described time and location independent information access, also including a connection value and overall representing the core feature of mobile services: mobility [28]. To complete the assumptions on Mobile Tagging and mobile information services we finally postulate that the intention to use Mobile Tagging has an integral influence on the intention to use mobile information services. The proposed acceptance model is indicated in Fig. 2 and will be empirically tested in the next Section 4.

IV. Research Design and Method

To test the compiled model a paper-based survey was conducted among German students who were asked to participate voluntarily. Overall, 155 responses were obtained, which were all duly completed and thus, all accounted for the evaluation. The subjects were at the age between 19 and 29 with an average age of 22.50 years (standard deviation 2.28). Hereof, 61 percent were male and 39 percent were female.

Since Mobile Tagging is not very common in Germany, all participants gained a short explanatory description of the application indicated by a functional illustration as the one depicted above. The final survey to be answered covered the nine constructs, each measured by multiple items, which were adapted from existing literature [9, 8, 28] but, were modified in wording to adapt the measures to the specific context. All items were measured on a 5-point Likert scale with 1 for total agreement and 5 meaning total disagreement.

V. Data Analysis and Results

To analyze the overall acceptance model we used SmartPLS [33], a Partial Least Squares approach for testing structural equation modeling. As all constructs were measured by reflective indicators, the reliability of the items can be assessed on basis of their loadings [7]. At this, loadings should be above 0.6, what means that the variance shared with the construct is higher than error variance. According to this threshold one item of PEOU of mobile information system was removed due to its loading of just 0.528. All remaining items showed a loading in the range between 0.776 and 0.962, also being highly significant with t-values all above 10.34 and thus, being higher than the respective critical benchmark of 1.96 [20]. Thereby, t-values were obtained via PLS-Bootstrapping technique with individual sign changes and 1200 resamples.

Reliability of constructs was assessed by Cronbach's α and composite reliability (CR) as measures for convergent validity as well as by average extracted variance (AVE) for discriminant validity. At this, values for Cronbach's α were all above 0.868 and above 0.723 for CR and thus exceeding the claimed benchmark of 0.7 [20]. The values of AVE fulfilled the required objective of 0.5 with values all above 0.688 as well, indicating that the latent variable explains more than 68 percent of the variance of its indicators on average. Altogether, the measurement models appear to be adequately reliable (α), internally consistent (CR) and discriminant valid (AVE) as summarized in Tab 1.

Table 1. Reliability values

Construct	Cronbach's α	CR	AVE
BI MT	0.868	0.773	0.688
BI m-InfoServ	0.929	0.848	0.868
Enjoyment MT	0.937	0.910	0.788
Enjoyment m-InfoServ	0.968	0.950	0.909
PEOU MT	0.879	0.793	0.709
PEOU m-InfoServ	0.878	0.723	0.783
PU MT	0.873	0.781	0.697
PU m-InfoServ	0.918	0.867	0.790
Mobile Desire	0.903	0.840	0.757

The structural model, in turn, was evaluated by estimates of path coefficients, coefficient of determinants (R^2), and prediction relevance (Q^2) as proposed by Henseler et al. [20]. The partial model of Mobile Tagging shows a substantial explanatory power for the behavioral intention to use with an R^2 of 0.671, and the coefficient of determination for the behavioral intention to use mobile information services shows a good moderate effect with an estimate of 0.540 as well. Construct crossvalidated redundancy (Q^2) were derived from blindfolding technique, and were positive for all cases as required for being considered a predictive relevant [20]. All path coefficients showed to exceed the benchmark of 0.2

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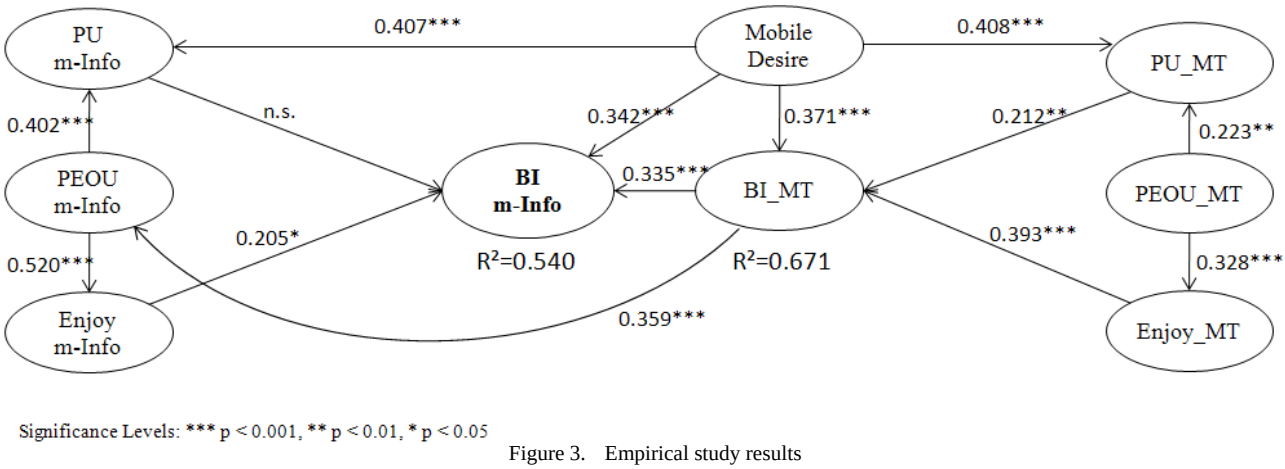

Figure 3. Empirical study results

[7] except the relation of PU of mobile information services on respective behavioral intention. At this, significance of testing the path coefficients assessed via t-values obtained by PLS-Bootsrapping with individual sign changes and 1200 resampels expectedly reveals the dependency of PU of mobile information services on its intention to use being non-significant. However, all remaining paths showed high significance with t-values all above 2.512, and PU was significant for the Mobile Tagging scenario with a path coefficient of 0.212. Overall, results show that individual mobile desire has the strongest magnitude on the PU construct of Mobile Tagging and mobile information services with 0.408 and 0.407 as well as on respective intention to use with 0.371 and 0.342. In total, effects in the partial models differ in strength. Whereas PEOU influences perceived enjoyment with 0.328 and PU with just 0.223 regarding Mobile Tagging, the PEOU for mobile information services influence its PU with 0.402 and even 0.520 on expected enjoyment. As hypothesized PU was of higher relevance for Mobile Tagging, and the intention to use Mobile Tagging positively affects PEOU of mobile information services (0.359) as well as its totaling intention to use (0.335). The overall coefficients are depicted in Fig. 3.

VI. DISCUSSION

The study was conducted to get a deeper understanding of the acceptance and usage intention of mobile services with a specific regard to the application of Mobile Tagging, showing up an opportunity to enhance the intention to use mobile information services. Conducting the acceptance model, mobile specific influences like enjoyment and mobile desire were worked out to be important antecedents. The results show that individual predispositions like mobile desire play a decisive role in the acceptance process having a substantial and significant influence on both, PU and overall intention to use Mobile Tagging as well as mobile information services. Thus, findings indicate that drivers for mobile services are strongly influenced by personality factors as e.g. suggested by Aldás-Manzano et al. [2]. Organizational activities in mobile commerce as well as mobile communication therefore should be well considered and precisely targeted to an accessible target group. For example, mobile activities have high potentials for tech-savvy consumer interaction as it is prevalently used by e.g., airline companies and the automobile industry [22].

Further, analysis revealed that PU indeed effected the intention to use Mobile Tagging but, did not play a role in the scenario of mobile information services. This effect can possibly be attributed to the low availability of mobile information services in the respondents' environment by now and thus, their comparatively vague imagination about mobile information systems as bringing concrete value-adding services into mind. The influence of perceived enjoyment was higher for Mobile Tagging than for mobile information services. It can be assumed that the direct apparent interaction of scanning a Mobile Tag from a poster or product implies also intrinsic motivation for just having fun [9], in trying out a new and innovative mobile feature.

On the contrary, the influence of PEOU on both, PU and enjoyment was higher at the use of mobile information services but was positively influenced by the intention to use Mobile Tagging as suspected. This can be traced back to the fact that the application of Mobile Tagging compensates the necessity of keying in essential information like a website address via the small input options of mobile devices as this is many times seen as uncomfortable [11]. According to that, our results support our hypothesis drawn up at the beginning: Mobile Tagging enhances PEOU of mobile services.

Observing the overall behavioral intention to use mobile information services one can state that our main hypothesis can be supported –the intention to use Mobile Tagging positively influenced the intention to use mobile information services. This may also indicate the major outcome for constructive managerial intervention inasmuch supplying additional support can actively enhance user acceptance and use of mobile information services. Thereby, the implementation of Mobile Tags to print and cross-media campaigns can not only provide additional value in form of offering extra information via the mobile web but also by facilitating mobile web access, constituting an additional convenience-value. To concretize best implementation opportunities of Mobile Tagging for increasing consumers' value in terms of realization, design and implementation further empirical research would be necessary. In so doing, system and information related aspects should be considered and, to what extent each of them influences different aspects of overall acceptance like usefulness, ease of use or enjoyment. Additionally, further research should investigate

 ISBN: 978-1-61208-171-7

whether and how the influence of Mobile Tagging may change according to the application context as well as over time since we just took a onetime snapshot on mobile information services.

Finally, some limitations have to be noted as data collection just took place among students and thus, results may lack external validity. Further research may tie up on this, also taking into account sociodemographic influences. Nonetheless, this study made some fundamental contribution to the application and integration of Mobile Tagging, providing a basis for further suspenseful investigations.

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 ISBN: 978-1-61208-171-7