Norsk konferanse for organisasjoners bruk
av informasjonsteknologi

NOKOBIT 2012

Universitetet i Nordland 19.–21. november 2012

NOKOBIT styre og redaksjonskomité

Terje Fallmyr	Universitetet i Nordland (redaktør, styreleder)
Bendik Bygstad	Norges Informasjonsteknologiske Høgskole
Jørgen Fog	Departementenes servicesenter
Laurence Habib	Høgskolen i Oslo og Akershus
Jon Iden	Norges Handelshøyskole
John Krogstie	Norges teknisk-naturvitenskapelige universitet
Bjørn Erik Munkvold	Universitetet i Agder

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FORORD

Velkommen til NOKOBIT 2012!

NOKOBIT 2012 arrangeres av Universitetet i Nordland.

Dette er det 19. NOKOBIT siden starten i 1993, og det er 13. gang at NOKOBIT arrangeres sammen med NIK – og fra 2008 også sammen med NISK. Det var også her i Bodø i år 2000 at NIK og NOKOBIT ble arrangert sammen for første gang. Det ble dermed starten på en tradisjon som har utviklet seg til en viktig arena for det samlede fagmiljøet for informatikk og informasjonssystemer ved universiteter og høgskoler i Norge.

I år har vi mottatt 26 bidrag, og det er 21 bidrag som skal presenteres. Alle bidrag har vært gjennom en grundig fagfellevurdering (blind review) av tre uavhengige reviewere. Denne proceedings publiseres både på papir og elektronisk som serie på Tapir Akademisk Forlag (www.tapironline.no) Hvert bidrag gir dermed forfatterne ett publiksjonspoeng.

I god NOKOBIT-tradisjon vil hver presentasjon ha en diskutant som er grundig forberedt, og bidragsytere må også fortelle hvordan de har forholdt seg til kommentarene fra reviewerne.

Jeg vil gjerne takke alle reviewerne for konstruktive tilbakemeldinger. Uten deres innsats hadde det ikke blitt noen konferanse. Jeg vil også takke styret i NOKOBIT for et utmerket samarbeid.

Til slutt vil jeg takke lederne for NIK og NISK for samarbeidet. Det har gått veldig fint å samarbeide over distanse.

Vi gleder oss til en god konferanse!

Terje Fallmyr

Handelshøgskolen i Bodø, Universitetet i Nordland
Redaktør og styreleder for NOKOBIT 2012, samt leder av den lokale arrangmentskomiteen

Innholdsfortegnelse

INFORMATION SYSTEMS SUCCESS AND TOURISM EMPLOYEES' USE OF A PAYMENT SYSTEM: THE INFLUENCE OF USER MOTIVATION, MANAGEMENT ATTITUDE AND EASE OF USE

Sørebø, Øystein, Buskerud University College, School of Business Administration and Social Sciences, Postboks 164 Sentrum, NO-3502 Hønefoss, oystein.sorebo@hibu.no

Fuglseth, Anna Mette, NHH Norwegian School of Economics, Helleveien 30, NO-5045 Bergen, Norway, anna.mette.fuglseth@nhh.no

Abstract

In this paper we investigate how user motivation, management attitude and ease of use may influence tourism employees' perception of how successful their use of a computerized payment system is. The information systems (IS) success approach, proposed by DeLone and McLean (1992, 2003), constitutes the theoretical framework for the conceptualization of IS success. This implies that user satisfaction and perceived usefulness are utilized as criterion variables. 161 tourism employees from ten car and passenger ferries in Scandinavia constituted the sample. The empirical results indicate that management attitude, user motivation and ease of use are critical for the users' level of perceived usefulness and their level of user satisfaction. The findings have implications for managers that want to increase the quality of ICT-based business processes within the tourism industry.

Keywords – user motivation, management attitude, IS success, computerized payment system, tourism industry, user satisfaction.

1   INTRODUCTION

The entire service industry of today relies on ICT as a tool to improve employees' productivity and as an essential means to increase customers' satisfaction with the services provided. Tourism, as one of the most important global service sectors, is no exception, since the market for tourism is founded on up-to-date information about products, services and prices. In consequence, ICT is a fundamental tool for improved quality of service-oriented business processes within the tourism sector.

However, neither employee productivity nor service process efficiency, as necessary prerequisites for improved service quality, emerges from investments in new ICT solutions only. Research on IS success demonstrates that even if productivity effects due to ICT usage are present, successful utilization of ICT may not be realized to its full potential without investments in complementary human resources.

IS research has identified user motivation (e.g. Yi and Hwang, 2003), management attitude (e.g. Drury and Farhoomand, 1996) and ease of use (e.g. Davis and Wiedenbeck, 2001) as fundamental means of successful usage among ICT users. Therefore, this paper investigates how core qualities of three different key factors, i.e. the user, the management and the technology, may influence IS success. The traditional IS success models are composed of ICT centric constructs exclusively (Alter, 2003), e.g. ease of use and perceived usefulness. Hence, our study extends the traditional IS success model with users' intrinsic motivation and their perception of management attitude towards ICT.

In the IS literature, evaluation of employees' successful use of ICT has typically been synonymous with evaluation of user satisfaction and/or net benefits (Seddon, 1997). DeLone and McLean (2003), the inventors of the IS success model, consider both user satisfaction and net benefits as the key to productive and effective IS use in the long run. Consequently, DeLone and McLean's (1992, 2003) concept of IS success is utilized as a framework for the conceptualization of our dependent variables.

As stressed above, the purpose of the present study is to utilize core variables from the IS success model by DeLone and McLean (1992, 2003) to test how critical user motivation, management attitude and ease

of use may be for tourism employees' successful use of a new payment system. In addition, the present study would enhance the understanding of how tourism employees' behavior can be influenced when the purpose is successful use of ICT-based payment solutions. Prior research has typically investigated successful use of ICT from a customer perspective within the tourism context, see, for example, San Martín and Herrero (2012). Our perspective is, however, on tourism employees and potential key factors that can, among others, be used in connection with managerial measures to improve successful use of ICT-based payment solutions.

The organization of this paper is as follows: In the next section, we present and adapt the original IS success theory (DeLone and McLean, 2003) in accordance with the purpose of the present study. Then we describe survey procedures, data analyses and provide the results. In the final section, we discuss the implications of our research findings and suggest some directions for further research.

2   THEORETICAL FRAMEWORK

2.1   Conceptual model

User satisfaction and net benefits constitute the key factors for evaluation of IS success in DeLone and McLean's (2003) IS success model. User satisfaction is here defined as the approval or likeability of an IS and its output (Petter and McLean, 2009). In contrast to user satisfaction, net benefits deal with the effects of an IS on an individual, group, organization, industry or a society. Net benefits are usually operationalized in terms of either organizational performance, perceived usefulness, or effect on work practices (Petter and McLean, 2009). Our choice of operationalization of net benefits in this study is perceived usefulness. The reason is that this variable captures users' perception of job performance effects of using a technology (Van der Heijden, 2004), i.e. the variable captures the users' perceptions of how the computerized payment system may influence customer satisfaction.
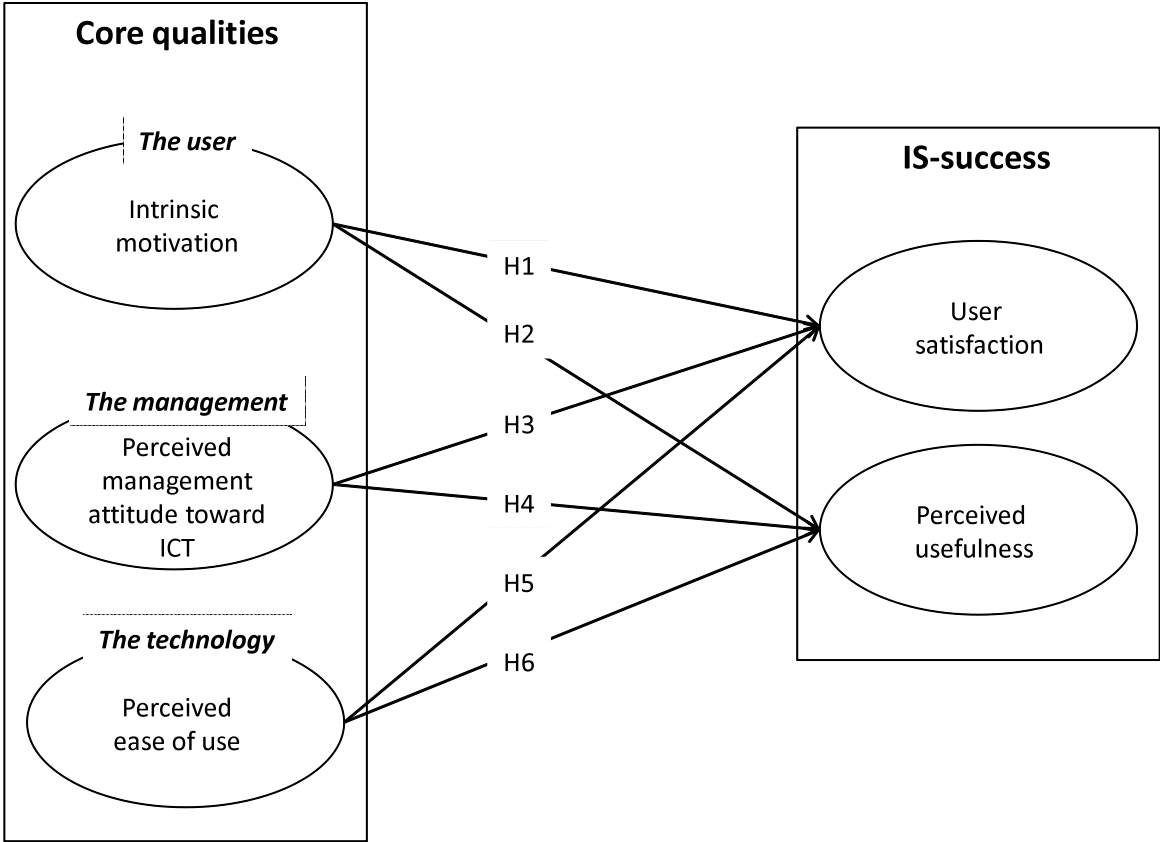

Figure 1 – Research model

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User motivation is shown by previous research to be a significant antecedent of IS success (Venkatesh et al., 2003). We define user motivation in agreement with the concept of intrinsic motivation, i.e. as the performance of an activity for no apparent reinforcement other than the process of performing the activity per se (Davis, Bagozzi and Warshaw, 1992). Previous research has also demonstrated that management attitude is an important factor for successful adoption of IS (Aggelopoulou and Pramatari, 2009). We define management attitude as managers' affective feelings concerning the procurement, implementation and usage of ICT in the organization. This definition is in agreement with e.g. Barki and Hartwick (1994), who describe attitude as an affective evaluation of an object or a behavior (e.g. good versus bad). Finally, among the three proposed precursors of IS success, ease of use is the key factor for explaining successful use of ICT (Benbasat and Barki, 2007). Perceived ease of use is defined as the degree to which a person believes that using a particular system would be free from effort (Davis, 1989).

The two IS success variables, i.e. user satisfaction and perceived usefulness, together with the three core qualities of users, management and technology constitute our research model. Figure 1 shows that these three key core qualities are hypothesized to explain successful use of a payment system.

2.2 Hypotheses

Intrinsic motivation refers to the performance of an activity for no apparent reason other than the genuine interest in or the enjoyment of the process of performing it (Gagné and Deci, 2005). Based on this definition we expect tourism employees with a genuine interest in their work, who enjoy the process of utilizing a payment system, to perceive a higher level of usefulness of a payment system in their work. We further propose that tourism employees enjoying their use of a payment system will be satisfied with the actual tool they use. Previous research supports the latter relationship between intrinsic motivation and satisfaction (Meng-Hsiang and Chao-Min, 2004; Wirtz and Bateson, 1999). Accordingly, the following two hypotheses are proposed:

Hypothesis 1: Tourism employees' level of intrinsic motivation toward the use of the payment system is positively associated with their level of satisfaction with use of the payment system.

Hypothesis 2: Tourism employees' level of intrinsic motivation toward the use of a payment system is positively associated with their level of perceived usefulness of the payment system.

Management attitude refers to managers' positive or negative feelings toward an IS. Both Zmud (1982) and Kwon (1990) have demonstrated that management attitude leads to successful adoption of an IS. We propose that tourism employees that perceive their managers to be positive to their use of the payment system will perceive a higher level of usefulness of the payment system in their work. Moreover, we also expect that tourism employees perceiving their managers to be positive to their use of the payment system are more likely to be satisfied with the actual tool they use. Accordingly, the following two hypotheses are proposed:

Hypothesis 3: Tourism employees' perception of managers' attitude toward the use of the payment system is positively associated with their level of satisfaction with use of the payment system.

Hypothesis 4: Tourism employees' perception of managers' attitude toward the use of the payment system is positively associated with their perceived level of usefulness of the payment system.

The technology acceptance (TAM) model specifies ease of use as a precursor of perceived usefulness (Davis et al., 1989). The substance behind this assumed association is that improvements in ease of use may contribute to less effort, and hence, enabling users to perform more in less time. Several previous studies have supported this assumption, for example Chau (1996), Hu et al. (1999) and Igbaria, Guimaraes and Gordon (1995). Ease of use is also conceptualized in TAM as a primary motivator of IS acceptance. It is therefore plausible to expect ease of use to influence tourism employees' level of satisfaction and perceived usefulness. To understand this assumption, it is important to recollect that the ex post beliefs of ease of use assess *the degree to which an IS gives effort free use*, while post-acceptance satisfaction assesses *the users' positive, indifferent, or negative experiences from using the IS*. Increased/reduced effort as a result of IS use is here believed to create a "negative/positive experience"

and hence, dissatisfaction/satisfaction among the tourism employees. This leads to the fifth and sixth hypothesis:

Hypothesis 5: Tourism employees' perceived ease of use with the payment system is positively associated with their satisfaction with use of the payment system.

Hypothesis 6: Tourism employees' perceived ease of use with the payment system is positively associated with the level of perceived usefulness of the payment system.

3   THE STUDY

3.1   Sample

Five hundred employees from ten car and passenger ferries in Scandinavia constituted the sample. All employees worked in one of the leading European ferry companies with approximately 3000 employees located in Scandinavian countries. The sample consists of waiters and shop assistants that utilized a rather new payment system. The purpose of implementing the system was to improve the service to customers and to increase the efficiency of payment procedures in shops and restaurants on board the ferries. The payment system is an example of an enterprise system, i.e. an IS system that spans the whole organization. In order to reap the benefits of such systems all employees involved in the business processes comprised by the system must use the system in order to perform their job. Hence, the use of the system is mandatory.

The main functionality of the system was to *capture* (e.g. bar code and number of products), *transmit* (e.g. bar code and number of products), *store* (e.g. sales related information as sale for a particular product), *manipulate* (e.g. calculate sale for a customer) and *display* information (e.g. sum and amount of products). Based on the presence of these five basic system characteristics, we characterize this payment system as a computerized information system.

3.2   Data collection

With the purpose of collecting valid data, the questionnaire was based on established and widely used measurement instruments. Before the questionnaire was distributed, we tested and refined the instruments through a pre-test among ten users of the payment system in the company. The pre-test resulted in important insights into user preferences when utilizing the payment system. This test led to some minor adjustments of the questionnaire items, mainly through more precise wording relative to the context chosen.

We believe that our use of well-established measurement instruments, together with the item improvement process, i.e. the pre-test, resulted in satisfactory content validity for all the measurement instruments. Distribution of the 500 questionnaire was by ordinary mail to the shop leaders and head waiters, who forwarded them to their assistants (the users of the payment systems). A total of 161 analyzable questionnaires were returned, i.e. the response rate was 32 %. This response rate was not unexpected, since the distribution of the questionnaires was dependent on busy middle managers, namely the shop leaders and head waiters. Moreover, conversations in connection with the pre-test revealed a very customer oriented job situation. Serving customers would always have priority over answering a research questionnaire.

42% of the employees in the final sample were women. The average tourism employee was 40 years old, held a college degree, and had ten years of experience using computers.

3.3   Measurement instruments

Items used to operationalize the variables in Figure 1 were adapted from research articles, with small changes in the wording reflecting characteristics of the payment system and the specific user context. The management attitude instrument was adapted from Bailey and Pearson (1983). Instruments on perceived usefulness and satisfaction were adapted from Bhattacherjee (2001). The ease of use instrument was adapted from Davis et al. (1992).

All items, except the perception of management attitude toward ICT items, were measured using a seven point Likert-type scale, with "strongly agree" and "strongly disagree" at each end of the scale. Perception of management attitude toward ICT was measured using a seven point semantic differential scale (e.g. with "important" at one end and "unimportant" at the other end).

4   RESULTS

We utilized the covariance based structural equation modeling tool Mplus (version 6.12) to validate the measurement model and analyze the proposed structural model.

4.1   Measurement model results

The adequacy of the six reflective variables in the proposed research model can be determined by looking at: (1) reliability, (2) convergent validity of measures associated with individual variables, and (3) discriminant validity between variables and items (Hulland, 1999).

Table 1 shows factor loadings for the six constructs in our research model. For each construct the assessment of convergent validity or internal consistency is also included through the Cronbach's alpha coefficient (Fornell and Larcker, 1981). As we can see from table 1, all the constructs have internal consistency values that exceed the threshold value of 0.70 recommended by Nunnally (1978).

	Loading
Intrinsic motivation (reliability = 0.88)	
Working with the cash transaction system is fun	0.83
I enjoy to work with the cash transaction system	0.94
Management attitude (reliability = 0.95)	
How will you describe managers' engagement toward ICT?	
Strong – Weak	0.74
Consequent – Inconsequent	0.82
Good – Bad	0.94
Important – Unimportant	0.96
Ease of use (reliability = 0.82)	
It was very easy for me to learn to use Oscar	0.74
It is very easy to make Oscar do what I want the application to do	0.78
My communication with Oscar is plain and accessible	0.86
Oscar is flexible in use	0.82
User satisfaction (reliability = 0.70)	
Based on my experience with the cash transaction system, I am:	
Very satisfied with using the system	0.88
Very dissatisfied with using the system	0.52
Absolutely delighted with the system	0.71
Perceived usefulness (reliability = 0.94)	
Using Oscar makes it possible to do my work faster	0.87
Using Oscar helps me in being more productive in my work	0.95
Using Oscar makes it easy to perform my work	0.80

Table 1 – Internal consistencies

Only one out of sixteen item loadings were below 0.7. In practice, it is common to find measurement items in an estimated model having loadings below the 0.7 threshold (Hulland, 1999). Thus, we decided to apply a cut-off value of 0.50 on the factor loadings to retain all items in the satisfaction scale. The

result was that no items had to be dropped. In addition to adequate factor loadings, all of the measures had significant loadings.

The inspection of discriminant validity among variables is based on the correlation between variables and the square root of their respective average variance extracted (cf. Fornell and Larcker, 1981). As table 2 shows, the average variance extracted value for the variables is consistently greater than the off-diagonal squared correlations, suggesting satisfactorily discriminant validity among variables.

Variables	1	2	3	4	5
1. Intrinsic motivation	**0.84**				
2. Management attitude	0.40	**0.83**			
3. Ease of use	0.26	0.22	**0.77**		
4. User satisfaction	0.59	0.45	0.40	**0.70**	
5. Perceived usefulness	0.50	0.23	0.61	0.57	**0.83**

Table 2 – Correlations among variables & square root of average variance extracted

4.2 Structural model results

Figure 2 summarizes the results from the test of the structural model. The effects of the three independent variables on the two IS success variables are represented by the standardized path coefficients. Four out of six path coefficients have significant p-values, and their range is from medium (0.26) to strong magnitude (0.50). The paths from management attitude to perceived usefulness and from perceived ease of use to user satisfaction are not significant.

Fitting the research model to the sample data resulted in a Chi-Square value of 96.37 (df = 67, p < 0.01), a Chi-Square/df ratio of 1.44, a CFI (comparative-fit index) value of .98, and a RMSEA (root-mean-square error of approximation) of .05. The model explains 40 % of the variance in user satisfaction and 47 % of the variance in perceived usefulness.
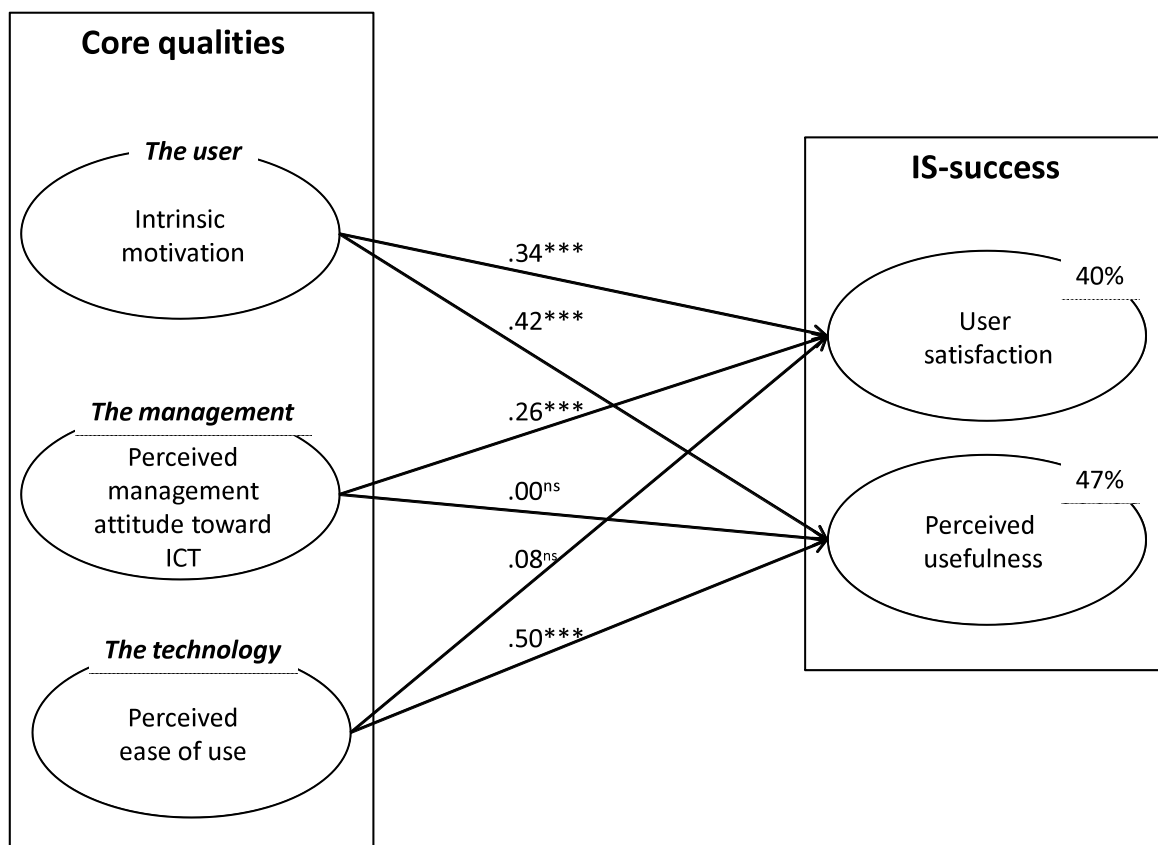

Figure 2 – Results from Mplus analysis

5   DISCUSSION AND CONCLUSIONS

ICT is today a critical source of increased effectiveness in service-oriented business processes within the tourism industry. In view of the potential advantages ICT provides to business within tourism, widespread use of ICT would still be an important trend the next decades. However, despite the ongoing trend in tourism toward intensive utilization of ICT in core business processes, both business and IS managers lack knowledge of key factors for achievement of successful use of ICT within service processes (Buhalis and Law, 2008).

Based on the findings in Figure 2, a number of interesting implications for business and IS managers emerge from the present study. The results indicate that it is important for business and IS managers to be sensitive to their service employees' intrinsic motivation toward use of ICT, their perceptions of managers' attitude toward ICT and finally their ease of use perceptions.

Service employees' intrinsic motivation toward use of the payment system is the most significant precursor of user satisfaction and perceived usefulness. Intrinsic motivation in this connection deals with the use of the payment system just for the sake of using it, rather than just the specific positive outcomes associated with use. That intrinsic motivation turned up to be the most important factor for explaining IS success, given that the use of the payment system is mandatory, was somewhat surprising. This finding indicates that even a very job-related ICT solution needs to be perceived as playful and enjoying. The question of importance is, however, how we can facilitate tourism employees' level of intrinsic motivation toward a payment system. Based on self-determination theory, the answer may be to facilitate tourism employees' needs for (Roca and Gagné, 2008):
  • competence and sense of achievement when using the payment system
  • belonging to a community of users' applying payment systems (cf. relatedness)
  • as much self-determination in user behavior as possible (cf. autonomy).

This post hoc explanation could be a basis for future research on the importance of intrinsic motivation when users have to apply a job-related ICT solution like a payment system.

Perceived management attitude toward ICT influenced employees' satisfaction with the payment system. This finding indicates that tourism employees seem to be more satisfied with the IS solutions they have to use in their job when they perceive that their managers are positive toward the use of the system. Based on this finding, the message to business managers is that they should show clearly, both in words-of-mouth and through their actions, that they have a positive attitude toward use of ICT.

The lack of a significant relationship between management attitude toward the payment system and perceived usefulness was unexpected. This finding indicates that the employees' perceived usefulness of the actual system develops independently of management attitude toward ICT solutions. Interestingly enough, perceived usefulness seems to be influenced by both intrinsic motivation and ease of use. The conceptual distinction between these two variables and management attitude may be a source to the observed difference in the empirical findings in this connection. Both intrinsic motivation and ease of use deal with the employees' use of the system, while management attitude deals with the employees' perceptions of others' engagement in the system. The results indicate that an employee's own perception of the qualities of the system (i.e. is it perceived as enjoyable and easy to use?) is critical for the perception of how much the system influences his/her job performance, while perceptions of others' engagement in the system seem to be relatively uninteresting. Further research is, however, needed to confirm this assumption.

Perceived ease of use influenced perceived usefulness, but surprisingly not the employees' level of satisfaction with the payment system. The former finding is in agreement with previous research on technology acceptance (Van der Heijden, 2004). The explanation behind the lack of support of the latter relationship may be that the effect of ease of use beliefs has a tendency to be weak after the initial usage phase (Bhattacherjee, 2001). In this study the payment system had been in use for around six months.

The present research has limitations. First, we measured users' perception of managers' attitude toward ICT, and hence, not managers' own perceptions of their actual attitude level. Further research is needed to clarify if managers' perception of their attitude toward ICT differs from users' perception of their managers' attitude. Second, the use of cross-sectional survey data has limitations. The most critical

limitation is that the design does not make it possible to infer the direction of causal influence. Further research, in particular longitudinal studies, is clearly needed to address this issue. Finally, given the relatively low response rate (i.e. 32%), the results may be influenced by a non-response bias.

The theoretical contribution of our research is the extension of IS success theory with the concepts of user motivation and management attitude. Our study provides support for the critical role of users' intrinsic motivation toward use of an IS, in addition to their perception of management attitude toward ICT, as significant determinants of established IS success variables.

The findings from the present study have implications for managerial practice. Both business and IS managers need to put ICT on the agenda, not only by signaling their own attitudes toward ICT, but also through complementary investments like user support, IS-training and the establishment of user communities. Applying such managerial measures is in agreement with the recommendation by Blake, Sinclair and Soria (2006) that favorable impacts of ICT in tourism are obtained when ICT solutions are combined with other strategic and managerial measures such as competence building and HRM (Human Resource Management).

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