Employees' Adoption of Workplace Innovations: An Investigation of Self-Efficacy, Motivation, Trust and Risk Propensity

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Abstract: In this study, we investigate the factors at employee level that influence the adoption of a customer-facing video conferencing software in an insurance company. Despite the associated benefit of significantly reduced driving times for the insurance agents, less than half of our sample finally adopted the software. We analyse the employees' self-efficacy, intrinsic and extrinsic motivation, risk propensity as well as trust in superiors as factors influencing their adoption behaviour. Our findings indicate that risk propensity and trust in superiors influence the behaviour only insignificantly, whereas self-efficacy as well as intrinsic and extrinsic motivation have an impact on the adoption behaviour. Surprisingly though, the extrinsic motivation points into the opposite direction as hypothesised. Employees who score high on extrinsic motivation are less likely to adopt this workplace innovation.

Keywords: workplace innovation, self-efficacy, intrinsic motivation, extrinsic motivation, trust, risk propensity, innovation adoption.

Introduction

The workplace of the future can take many forms. A particularly important one that emerges already since several years and still gains importance is the teleworking job. It depends on a digital environment where the employee is not bound to a certain physical space. This can be an important benefit, for example, for employees with children who can thus work from home. Likewise, jobs involving frequent travelling due to a reliance on face-to-face interactions with suppliers, co-workers, partners, or clients can benefit hugely through increased efficiency. However, the underlying technology shapes the digital environment that permits this increased efficiency.

Therefore, in this paper, we analyse some major determinants of the acceptance of a particularly fundamental workplace innovation. We chose the case of insurance agents, who frequently undertake business trips in order to consult or to acquire customers.

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While some people enjoy traveling, the majority experiences the travel time as stressful and unproductive. Moreover, valuable human resources specialized in sales are bound to travel. However, simple phone calls could not substitute for face-to-face interactions, because the lower information richness of this means of communication does not establish sufficient levels of inter-personal trust to successfully acquire and manage customers. To address this issue, a European insurance company introduced a video conferencing software, with which the agents can meet their clients virtually.

In order to increase efficiency, the adoption of such workplace innovations is vital for any firm. Information systems and in particular digital process innovations allow for an increasing share of efficiency gains in almost any industry [Ji16]. While there is consensus on the importance of adopting digital innovations [Oe16], most companies face significant difficulties, especially because employees experience the adoption process as complex and slow. Over the past decade, researchers within the innovation adoption community have embarked on conceptualizing, empirically validating and recently extending various models of individual level innovation technology adoption and usage. There are a variety of models that attempt to identify the key antecedent constructs affecting the adoption of technological innovations in general [Ma15]. This study investigates the factors at employee level affecting the adoption of a digital innovation in a service firm.

Theoretical Background

Self-Efficacy

Self-efficacy refers to the "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" [Ba97]. This is particularly important for the adoption of technology innovations, as a strong perceived self-efficacy increases the strength of coping mechanisms in case of obstacles. Consequently, a participant with a high self-efficacy will persist when facing obstacles or aversive experiences [Ba97]. Thus, it is no surprise that a strong self-efficacy increases the persistence with which a goal is pursued, as it directly influences the efficacy expectation. Someone who expects to succeed will always try harder than someone who expects to fail.

Kulviwat et al. analyse self-efficacy as an antecedent to cognition and its effect on technology adoption as well as its direct effect on the attitude towards technology adoption. While the direct effect proves to be insignificant, there is a considerable influence via cognition and affect [Ku14]. Waheed et al. analyse the effect of self-efficacy on the attitude towards e-book readers and consider it to be significant [Wa15]. The different findings of these studies might be due to the slightly different research settings. Therefore, this study aims to investigate the direct influence of self-efficacy on innovation adoption.

Motivation

Motivation forms the mechanism of human behaviour [De87], but it is also a key determinant of information technology acceptance behaviour [Mo01, Te99]. One of the key theories on human motivation is the self-determination theory [De87] according to which behaviour can be both extrinsically and intrinsically motivated. Extrinsic motivation is activated by external incentives, such as a "promised reward, praise, critical feedback" [Am94] and can be either material (e.g. financial rewards) or immaterial (e.g. career opportunities and awards) [Fr02]. In contrast, intrinsic motivation stems from "the organism itself, arising and persisting in the absence of external events that could be easily identified as the putative rewards or punishments motivating these actions" [Le97]. In this case, motivation comes from the pleasure one can receive from the task itself, from completing the task or just from working on a task[De87].

Furthermore, intrinsic and extrinsic motivation have a significant impact on the decision to adopt technology innovations, and many researchers ascertain their roles in technology innovation adoption [Hs04, Le05, Wa15]. More specifically, in order to provide a broader view and a better explanation of innovation adoption, researchers tested the influence of motivational factors and found that peoples' usage and acceptance of technology innovations is highly related to the level of extrinsic and intrinsic motivation [Te99]. Moreover, Davis recognized the importance of motivation and extended his initial TAM model by including motivational factors [Da92]. According to his extended TAM model, perceived usefulness is a form of extrinsic motivation and perceived enjoyment a form of intrinsic motivation.

Risk and Trust

Trust and innovation are inevitably interlinked. Irrespective of the benefit that an innovation bears, potential adopters have to develop a certain level of trust, which then compensates for the level of risk that is naturally inherent in the adoption. Taking a decision that involves a meaningful degree of risk of opportunistic behaviour is based on two conditions: (1) the decision maker exhibits a sufficient degree of risk propensity [Pa96], or (2) the decision maker can trust the other actors. Risk propensity is defined "as the cumulative general tendency of the individual to either take or avoid risks and influences how a decision maker evaluates risk and decides what risks are acceptable" [Si92]. Trust can be defined as the subjective probability by which employees believe that the technology innovation is capable of facilitating their tasks according to their expectations [Ba02]. Mayer et al. [Ma95] established several separate dimensions of trust. Hence, trust does not only refer to the capability of an innovation to perform a task (trust in competence), but also to the user's willingness to perform this task to the benefit of and/or as expected by the trustor (trust in benevolence) as well as to the trustees' behaviour matching the declared values (trust in integrity).

However, the trust placed in an artefact is violated, if the artefact does not work properly

or turns out to be less effective than others are. In case of a malfunction or lack of effectiveness, the employees are dependent on the way in which their superiors solve the problem. Either the superiors blame the employees for their adoption decision, or they provide advice on how to cope with the consequences. This demonstrates the connection between the risk involved with an adoption and the trust in superiors.

The importance of trust in the manager or leader in general is widely recognized [Di02, Ma05]. Stewart argues that trustors might transfer trust from a trusted entity to an unknown target if they perceive the latter as related to the trusted source. Therefore, trust transfer from one entity to another hinges on the unknown target being perceived as related to the source of the transferred trust [St03]. The effects of transferring trust are emphasized within the online world [Lu11, Wa13]. Studies reveal that transfer of trust occurs cognitively as consumers associate an unknown web site with a known, trusted one. Online consumers perceive the web sites as familiar and decide to use it. In this way, the unknown web site gains legitimacy through the trusted site.

Hypotheses and Conceptual Model

As there are already sufficient studies validating that the perceived qualities of a technology influence the user's attitude towards usage, we deliberately focus on the user himself. We investigate the already explained self-efficacy, the user's motivation as well as his/her outlook on the environment.

Fig. 1 shows the research model used in this study.

Self-efficacy is a judgment about the abilities of an individual as opposed to the perceived ease of use of the TAM, which is a judgment about the qualities of a technology. In terms of innovation adoption, the judgments individuals make about their capability for completing technology tasks are linked to future technology use [Ve00]. Therefore, we hypothesise that:

H1: *There is a positive relationship between an employee's perceived self-efficacy and his/her innovation adoption behaviour.*

Hansen and Levin found a highly significant connection between an employee's extrinsic motivation and his/her intention to use social media technology for work purposes [Ha16]. Respectively, we expect the same results and hypothesise that:

H2: *There is a positive relationship between an employee's extrinsic motivation and his/her innovation adoption behaviour.*

In the proposed model, we follow [Ve02], who redefined the TAM. This resulted in a model that includes intrinsic motivations as a predictor of behavioural intention to use. We hypothesize that intrinsic motivation influences innovation adoption. More specifically, we assume that:

H3: *There is a positive relationship between an employee's intrinsic motivation and his/her innovation adoption behaviour.*

We draw on [St03] work on trust transference and argue that trust in the superior is an adoption factor. In other words, employees who trust their superior are more likely to adopt and use the innovation that the manager proposed because of its perceived association with the trusted manager. Following the transference logic, we hypothesize that:

H4: *There is a positive relationship between an employee's trust in his manager and his/her innovation adoption behaviour.*

Risk propensity is defined as the general tendency of individuals to take chances with respect to risk of loss. [Si92]. As the adoption of a customer facing video chat software bears the risk of alienating the customer, we assume that:

H5: *There is a positive relationship between an employee's risk propensity and his/her innovation adoption behaviour.*

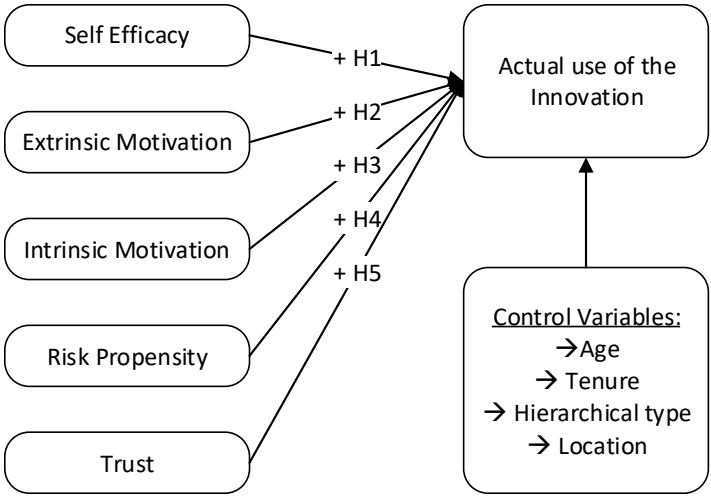

Fig. 1: Research Model

Methodology

Operationalization

Dependent Variable: In order to exclude those effects that are not resulting from the individual, we focus on one particular process innovation only. More specifically, the

regarded innovation is a software that permits to interact with clients virtually through a combination of video call and chat as well as tools to trace auxiliary activities on the site of the sales agent. Although this does not necessarily constitute the only way of client-agent interaction, it can be an important complement. We asked the sales agents how often they use the digital process innovation (0: never, 1: once or twice a month, 2: once or twice a week, 3: once or twice a day). Since we observed that only two respondents use the innovation daily and that there is a bias towards occasional use (once or twice a month), we decided to dichotomize the dependent variable. We hence coded 0 for no use at all and 1 for any kind of frequency indicated (*BINUSE*). This resulted in a sufficiently balanced sample.

Self-efficacy (SELF). Previous studies established different operationalisations for the concept of self-efficacy. The scales in these studies sometimes exhibit many items, like in the case of Sherer et al., who chose two factors, one of which already included 17 items [Sh82]. Since all of our participants are very busy, we opted for a more concise method. For the questionnaire we adopted the perceived competence dimension from The Intrinsic Motivation Inventory by McAuley et al. [Mc89]. The selectable options were: "I think I am really good at using the video conferencing software for sales purposes" (SELF1), "I am worried because of the usage of the video conferencing software" (SELF2), "Compared to other agents, I believe to be good at using the video conferencing software" (SELF3) and "The use of the video conferencing software in the sales process does not make me nervous" (SELF4). For analysis purposes the results of SELF2 were recoded to meaningfully fit the direction of the other variables.

Extrinsic Motivation (MOTEX). The scales for extrinsic and the scale for intrinsic motivation are based on items developed by Tremblay et al. [Tr09]. Following the introductory text: "For which reasons would you use the video conferencing software?", we asked the participants to indicate on a seven point Likert Scale "Because of the expected income" (MOTEX1) and "Because I want to be very successful in my Job, otherwise I'd be very disappointed with myself" (MOTEX2).

Intrinsic Motivation (MOTIN). Here again, we used items developed by Tremblay et al. by adapting the following two items: "Because I derive much pleasure from learning new things."(MOTIN1) and "For the satisfaction I experience from taking on interesting challenges." (MOTIN2).

Risk Propensity (RISK). In order to measure risk propensity, we recurred to the scale developed by Pennings and Smidts [Pe00]. We measured the following three items: "I am willing to take high financial risks in order to realize higher average yields." (RISK1), "I like taking big financial risks" (RISK2) and "I am ready to risk losing money, if there is also the chance to win money" (RISK3).

TRUST. Webber & Klimoski developed and validated comprehensive scales for cognitive and affective trust [We04]. As the distinction between the two kinds of trust is not important for answering our questions, we combined two items of each scale to one factor. Thus, from the cognitive scale we used: "I know that if I contacted my superior in

the organization, he/she would provide immediate and useful information." (TRUST1), "I can rely on my superior to not make my job more difficult." (TRUST2); and from the affective scale: "I can share strategic information about my organization with my superior without any concerns" (TRUST3) and "If I share problems with my superior, I believe that he/she will respond constructively and caringly" (TRUST4).

We also included several control variables. Since we investigate individual level factors, it is important to include basic demographics as controls. We included age as the variable (AGE), the employee's tenure in the current function as sales agent at this firm *(TENURE)*, his/her hierarchical type being either major agent or general agent *(TYPE)* and his/her type of territory or location being countryside, small to medium town or big city *(LOC).* Age and tenure were asked as intervals (18 – 25 years, 26 - 35 years…). In order to reduce the amount of parameters to be estimated in the regression, we recoded age and tenure into metric variables by coding the average of each interval into the variable. Additionally, the LOC variable was recoded into a dichotomous form, to only distinguish between city and countryside, as very few participants worked in big cities.

Sample and Data

We collected our data from a single company, namely a European insurance company, which implies that a sweeping generalization of our results is not possible. However, this approach allows us to control the effects of the firm as well as the software and thus to fully focus on the effects at employee level. The insurance company employs thousands of sales agents, the vast majority of which work on own account. Thereby the sales agents exclusively sell the company's products and do not offer directly competing services. Although they operate rather autonomously within their exclusive geographical territory, the sales agents are part of a hierarchical organizational structure and are thus subordinated accordingly. The management of the company allowed us to contact about 800 sales agents in Germany. The software at question is a video conferencing software which enables the agents to talk to specialists within the firm as well as to contact potential and existing customers. It is particularly the software usage towards the customers for sales and consulting purposes that is of interest for this study.

We contacted the respondents directly by means of an online survey that was hosted on the university server. In order to prevent any desirability bias in the responses, we took several precautions. In the invitation email, we explained that we collect the data without the involvement of the company's management. Moreover, we stressed that their responses will be kept anonymous and in a non-traceable way. In total, 197 of the addressed sales agents started or had a look at the questionnaire; 129 respondents completely finished the survey, which corresponds to a final response rate of over 16 %. After excluding those questionnaires that had been finished in less than 3 minutes (a time from our pre-tests) we ended up with n = 123.

Tab. 1 gives an overview over the sample data after cleaning and partial recoding. All factors have a Cronbach α above 0.7, the recommended threshold for psychometrics.

Neither the Collinearity diagnostics show anything worrisome, all being far below 10 [Ha10]. None of the binary variables shows a category with only few cases, so no inflated bias is to be expected.

Name		Min		Max		Mean		Std. Dev.		Cr.α	VIF
Factor	Item										
MOTIN	MOTIN1	1	1	7	7	4.47	4.80	1.63	1.74	0.82	1.72
	MOTIN2		1		7		4.14		1.79		
MOTEX	MOTEX1	1	1	7	7	4.43	3.98	1.56	1.75	0.74	1.68
	MOTEX2		1		7		4.88		1.75		
SELF	SELF1	1.75	1	7	7	4.62	4.34	1.32	1.60	0.70	1.41
	SELF2*		1		7		5.47		1.87		
	SELF3		1		7		3.66		1.81		
	SELF4		1		7		5.01		1.97		
RISK	RISK1	1	1	6	6	2.68	1.89	1.17	1.67	0.70	1.10
	RISK2		1		7		2.86		1.16		
	RISK3		1		7		3.29		1.56		
TRUST	TRUST1	1.25	1	7	7	5.21	4.96	1.53	1.82	0.92	1.18
	TRUST2		1		7		5.15		1.75		
	TRUST3		1		7		5.46		1.60		
	TRUST4		1		7		5.28		1.63		
AGE*		21.5		60.5		50.53		10.39			1.14
TENURE*		2.5		40.5		25.77		15.89			1.42
TYPE		#general		81		#major		42			1.31
LOC*		#City		69		#Countryside		54			1.07
BINUSE*		#No		65		#Yes		58			

*after recoding

Tab. 1: Descriptives, Reliability and Collinearity

Results and Discussion

Model quality

In order to test our hypotheses, we performed a hierarchical logistic regression. Hence, we first performed a logistic regression including only the control variables, followed by a second regression including the independent variables as well. The inclusion of the independent variables improved the model according to all pseudo-R^2s as well as according the Hosmer Lemeshow Goodness of Fit test [Ha10]. All statistics are shown in Tab. 2.

	Control Model				Full Model			
	β	S.E.	Wald χ^2	Odds Ratio	β	S.E.	Wald χ^2	Odds Ratio
intercept	-0.67	0.996		0.512	**-4.55****	1.575		0.011
AGE	0.02	0.019	0.861	1.018	0.03	0.022	1.486	1.027
TENURE	-0.02	0.014	2.118	0.979	-0.02	0.016	2.208	0.977
TYPEA2	0.30	0.454	0.426	1.344	-0.09	0.502	0.029	0.918
LOCCity	0.20	0.373	0.278	1.217	-0.15	0.431	0.120	0.861
SELF	(H_1)				**0.70****	0.217	10.328	2.007
MOTEX	(H_2)				**-0.31†**	0.178	3.023	0.734
MOTIN	(H_3)				**0.37***	0.185	4.004	1.448
RISK	(H_4)				0.13	0.201	0.428	1.140
TRUST	(H_5)				-0.02	0.150	0.013	0.983

Model Diagnostics:

		Control Model	Full Model
McFaden R^2		0.03	0.19 (Δ0.16)
Cox & Snell R^2		0.04	0.23 (Δ0.19)
Nagelkerke R^2		0.06	0.31 (Δ0.25)
Hosmer Lemeshow Goodness of Fit test	χ^2	15.75	10.70
	p	0.046	0.219

Signif. codes: **p<0.005; *p<0.05; †<0.1

Tab. 2: Hierarchical Logistic Regression

Results

The full model yields several interesting findings. The first curious result is that both RISK and TRUST do not seem to have any significant influence on the participants' usage behaviour. One potential explanation might be that the agents do not consider the use of the software to be risky by any means. Accordingly, they neither need to have trust in their superiors, nor do they require a strong risk propensity to use the software.

The second curious result is that the slightly significant influence of the extrinsic motivation takes the opposite direction as hypothesised. Although we reasonably argued that there is a positive relationship, we can only guess why the result is different than expected. One thesis might be that we observed an effect discussed in educational research. Kohn [Ko96] argues that extrinsic motivators have detrimental effects on performance: "…an extrinsic orientation toward learning has been shown to be associated with a range of negative affective and learning outcomes…". While our setting was only indirectly a learning situation, the parallel might still be drawn. It is, however, beyond the scope of this study to properly evaluate how this result came into

existence.

Finally, two of our hypotheses were verified by our data. Both, self-efficacy and intrinsic motivation are significant and positive predictors of usage behaviour. Beyond this, it is noteworthy that self-efficacy is outstandingly important to innovation adoption.

Implications and Conclusion

Our study has both practical and theoretical implications. The insignificance of trust in superiors and risk propensity should be analysed more closely. As already mentioned, one explanation for this insignificance might be that the participants consider the use of the software to be virtually risk-free. To shed light on this question, a similar study should be carried out focusing on another software or innovation that bears a higher perceived risk for the participants.

The significant and positive influence of self-efficacy and intrinsic motivation on the adoption probability is as hypothesised, based on pre-existing literature. These findings should motivate researchers to further investigate how to enhance self-efficacy and intrinsic motivation. In this line, the following questions could be addressed: How can effective educational interventions be designed to increase self-efficacy, or how should innovations be designed in order to trigger intrinsic motivation?

Also the direction of the influence of extrinsic motivation bears implications for the scientific community. Is it possible that the already mentioned detrimental effect found in education studies does also exist within the field of innovation adoption? We will address this question within the scope of future investigations.

Until this question is answered in a reasonable fashion, one of the practical implications of this paper is that firms should be careful when creating extrinsic motivators for innovation adoption: The consequences could be costly and counterproductive.

Moreover, with respect to the workplace of the future it is important for firms to also consult their employees, as changes that come from the employees themselves will naturally be adopted with a high level of intrinsic motivation and at least a sufficient level of self-efficacy.

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