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Mobile Business with Smartphones and Tablets: Effects of Mobile Devices in SMEs

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Abstract

Today, mobile devices like smartphones and tablets are omnipresent in many parts of the world. They are used for private and business activities. The effects of mobile business are discussed more and more in micro-enterprises as well as in small and medium-sized enterprises (SMEs). The question is: Do these devices have an impact on the productivity, flexibility and business processes of companies? The goal of this paper is to develop an explorative model that helps to identify and explain these effects. The investigation is based on a quantitative empirical study conducted among 900 Swiss SMEs. The model is estimated and evaluated using Partial Least Square (PLS) structural equation modelling. The results show that the number of mobile devices used and the portion of work carried out offsite have only a low impact on the perceived value of smartphones and tablets. On the other hand, the impact on value is high if mobile devices support business processes and if the variety of information used is high.

Keywords: Empirical Study, SME, E-Business, Mobile Business, Perceived Value of ICT

1 Introduction

Companies in Switzerland show an increasing interest in mobile business. Mobile data connections are increasingly affordable and data transmission is getting faster. Many consumers and employees use powerful smartphones and tablets.

The term "mobile business" is often defined as e-business via mobile networks using mobile devices (Lehner, 2003; Meier & Stormer, 2009). The main difference between mobile business and e-business is therefore the mobile information and communication technology (ICT), e.g. the type of devices and network connections. Mobile ICT offers additional functionality, e.g. continually identifying the location of a device or person (Schiller & Voisard, 2004). Other important characteristics of mobile ICT are portability and ubiquity (Junglas & Watson, 2003). Smartphones and tablets are always switched on and thanks to mobile network connections they can be used nearly everywhere. The mentioned features support mobile work, for example, by

providing access to information and information systems (Figure 1). In this paper, mobile work is defined as work processes that take place offsite, meaning outside the company's physical locations (see chapter 3.2).

The usage of mobile devices during mobile work depends further on the information needed, the business processes and the amount of mobile devices. Finally, companies use smartphones and tablets because they expect positive effects such as flexibility, productivity, and the ability to redesign business processes (Basole, 2004; Scherz, 2008). Based on these considerations, a basic chain of effects can be set up (Figure 1). Scherz (2008) empirically tested a similar model. Nevertheless, the dependencies between the variables have not been evaluated and explained so far. The goal of this paper is to find out if mobile business has a positive impact on company performance and to identify constructs and indicators that explain the impact.

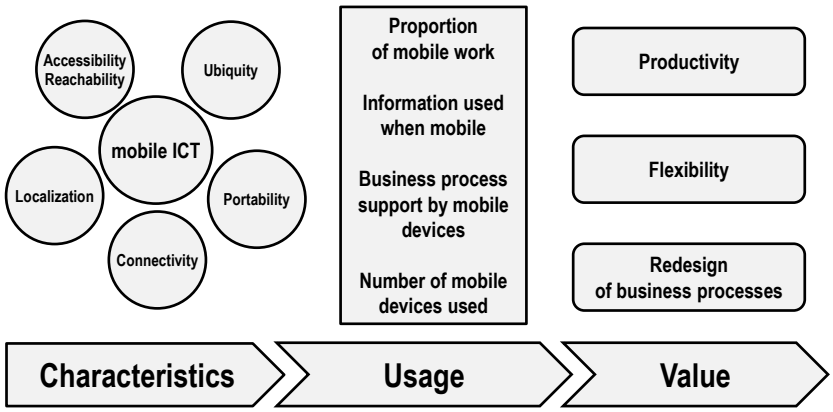

Figure 1: Chain of effects model of mobile ICT (adapted from Basole, 2004; Scherz, 2008)

Two main research questions guide the investigation described in this paper:

RQ1: What impact do the characteristics of mobile ICT have on the usage of smartphones and tablets in SMEs?

RQ2: What effect does the usage of smartphones and tablets have on the perceived value of mobile ICT in SMEs?

The paper is structured as follows: In chapter two, related work is discussed and the gap in the research is described. Chapter three describes the model built, its constructs and the hypothetical relationships. Chapter four shows how data is collected and explains the sample. Chapter five presents the estimation and evaluation of the model with PLS and the interpretation of the results. The paper ends with a discussion and conclusions.

2 Related Work

Several studies on mobile business and the usage and value of mobile ICT have already been conducted. Most of the studies are consumer oriented, focusing on mobile commerce. Some studies focus on the satisfaction and value the consumers will gain with mobile ICT (Anckar & D'Incau, 2003; Chong, Chan, & Ooi, 2012). Other studies examine which factors influence the behaviour and use of smartphones and tablets in mobile commerce (Venkatesh, Thong, & Xu, 2012; Yang, 2010).

The literature includes studies on companies' mobile business. They examine the use of mobile ICT by employees and the effects of the potential and value of mobile ICT such as higher flexibility, efficiency and effectiveness. They show the same user centric approach as the studies on mobile commerce mentioned above. Gebauer (2008) evaluated the potential and value on the basis of the technology acceptance model (TAM) (Venkatesh & Davis, 2000) and the technolo-

gy-to-performance chain (TTF) (Benbasat & Barki, 2007; Goodhue & Thompson, 1995). Gebauer (2008) also examines the effects of mobile work and the portability of ICT based on these user-centric approaches. Picoto, Bélanger, & Palma-dos-Reis (2014) take a broader view on business effects from an organizational perspective. They analyse the value of mobile ICT in the main three (e-)business areas: procurement, internal organization, and commerce and marketing. The research in this paper does not focus on the single employee (e.g. the user) but rather on the organization and structures of the companies themselves.

A theoretical basis of this paper can be seen mainly in the interdisciplinary approach of coordination theory (Malone & Crowston, 1994). Coordination theory is widely used in the area of information systems because the value of these systems can be explained with a reduction of communication and coordination costs. As mobile devices are also information systems, and, in particular, as they directly support communication processes, coordination theory suggests itself as an appropriate theoretical basis. Other theories are partly relevant, e.g. the innovation diffusion theory (Rogers, 1983), the resource-based view (Wernerfelt, 1984) and the market-based view of the company (Porter, 1985).

3 The Research Model

Along with the preliminary model in Figure 1 and the work of Basole (2004) and Scherz (2008), this section derives five sets of research hypotheses about the cause and effect chains of mobile ICT. The sub-sections focus on the respective exogenous variables and explain how and why they affect different endogenous variables. The individual hypotheses will be combined to create a comprehensive research model to show further interdependencies between the individual variables.

3.1 Characteristics of Mobile ICT

The particular characteristics of mobile ICT – depicted in the preliminary model (Figure 1) – distinguish it from other forms of information technology. The significance of these characteristics for the mobile work of SMEs can be used as an indicator to measure the importance of mobile ICT (Tarasewich, Nickerson, & Warkentin, 2002). The following characteristics are taken into account in this study: accessibility (having access to information resources anywhere and anytime), reachability (being reachable anywhere and anytime), portability (being able to take devices with you) and localization (pinpointing the localization of the user) (Basole, 2004; Junglas & Watson, 2003). Ubiquity is not taken into account separately because it is a combination of the other characteristics mentioned. Connectivity is also not taken into account because it is a prerequisite for accessibility, reachability and localization.

If these typical characteristics of mobile ICT are significant for a company, it can be assumed – following the TTF framework (H1a and H1b) and caused by a reduction of communication costs (H1c) – that they have a positive impact on the following three aspects: (a) the support of operational business processes with smartphones and tablets, (b) the number of smartphones and tablets used per FTE (full-time equivalent), and (c) the diversity of information used in mobile work scenarios. This leads to the following hypotheses:

H1a: A higher significance of the characteristics of mobile ICT has a positive impact on the support of operational processes with smartphones and tablets.

H1b: A higher significance of the characteristics of mobile ICT has a positive impact on the number of smartphones and tablets used per FTE.

H1c: A higher significance of the characteristics of mobile ICT has a positive influence on the extent of the types of information used in mobile work.

3.2 Proportion of Mobile Work

As already mentioned, this study is limited to mobile work processes taking place offsite. These mobile processes can be very diverse (Buser & Poschet, 2002; Gareis, 2003). Regardless of this diversity, it makes sense to use more mobile ICT to reduce communication and coordination costs the more working time employees have to spend offsite (outside the company). Therefore, it can be assumed that the ratio of mobile work time positively influences (a) the support of operational business processes with smartphones and tablets, (b) the number of smartphones and tablets user per FTE, and (c) the types of information used in mobile work scenarios:

H2a: The proportion of time spent on mobile work offsite, has a positive impact on the support of operational processes with smartphones and tablets.

H2b: The proportion of time spent on mobile work offsite has a positive impact on the number of smartphones and tablets used per FTE.

H2c: The proportion of time spent on mobile work offsite has a positive influence on the extent of the types of information used in mobile work.

3.3 Process Support by Smartphones and Tablets

Mobile business can be divided into three areas: mobile procurement (mobile support of procurement processes), mobile organization (mobile support of internal processes) and mobile commerce (mobile support of sales and distribution processes) (Möhlenbruch & Schmieder, 2001). These main areas can be further divided using the process areas of Porter's value chain (Porter, 1985). It is obvious that companies will not support all processes with mobile ICT at once. The diffusion takes place step-by-step, depending on the needs, the knowledge and the financial resources of the company as well as on the available applications. Due to the available resources, large companies more often develop individual software to support mobile work than SMEs (Walter & Sammer, 2012). The latter prefer to buy standard ERP software (Leimstoll & Quade, 2011). As only a few major business software providers in Switzerland offer mobile apps for their ERP systems to date, the use of mobile ICT in direct connection with business software depends on the availability of the necessary applications. Furthermore, it indicates a higher maturity level than just the support of e-mail and calendar functions (Basole, 2007). As a consequence, the mobile access to business software (known as process support) can cause a higher potential of mobile ICT. Therefore, one can assume that the availability of mobile access to business software has a positive impact on the number of smartphones and tablets used per FTE as well as on the perceived value of mobile ICT. Useful indicators for the perceived value can be seen in increased productivity and flexibility as well as in the option of reorganizing business processes (Scherz, 2008).

H3a: The support of mobile processes with smartphones or tablets has a positive impact on the number of smartphones and tablets used per FTE.

H3b: The support of mobile processes with smartphones or tablets has a positive impact on the perceived value of smartphones and tablets.

3.4 Information Used when Mobile

The information needs in mobile work processes depend on the business sector and on the tasks that have to be fulfilled (Varian, 2010). A construction worker needs different information than an architect or a real-estate agent. Thus, the amount and types of information are very individual and can be very varied. A wide range of information needs means that the employee has to physically transport many documents or other sources of information as long as no access is available to the electronic versions of these documents or data (Scherz, 2008). Thus, it can be

assumed that the amount and variation of information needed has an influence on the number of smartphones and tablets used per FTE as well as on the perceived value of mobile ICT:

H4a: The extent of the types of information used in mobile work has a positive impact on the number of smartphones and tablets used per FTE.

H4b: The extent of the types of information used in mobile work has a positive impact on the perceived value of smartphones and tablets.

3.5 Number of Smartphones and Tablets Used

Finally, the number of smart devices used in a company might have a direct positive influence on the perceived value of these devices. In some way, this seems to be tautological: The more employees use smartphones and tablets, the greater is the likelihood of realizing productivity or flexibility improvements. However, it has not yet been shown that the use of smart devices actually leads to an increase in productivity and flexibility and that processes can be redesigned. To shed some light on the effects that can be achieved through the use of smart devices the following hypothesis is made:

H5: The number of smartphones and tablets used per FTE has a positive impact on the perceived value of smartphones and tablets.

3.6 Structural Equation Modelling

Based on the variables and hypotheses described, a structural equation model can be developed (Figure 2). The model is explorative in the sense that indicators were evaluated whether they fit into the model or not (Hair et al., 2013). The model is evaluated in chapter five.

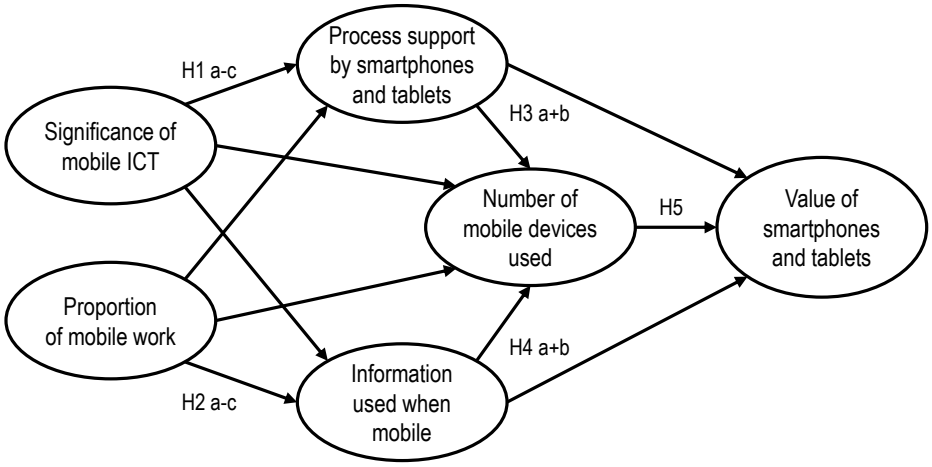

Figure 2: Structural equation model (own diagram)

4 Data Collection and Sample

The study focuses on micro-enterprises and small and medium-sized Swiss companies with 1 to 250 full time equivalents (FTEs) in selected areas of the economic sectors two (manufacturing industry) and three (service industries) (Bundesamt für Statistik, 2008). The population of the selected economic sectors covers 266'715 companies. A random sample of 6'000 companies was chosen from this universal set, based on sector and company size (see Figure 3).

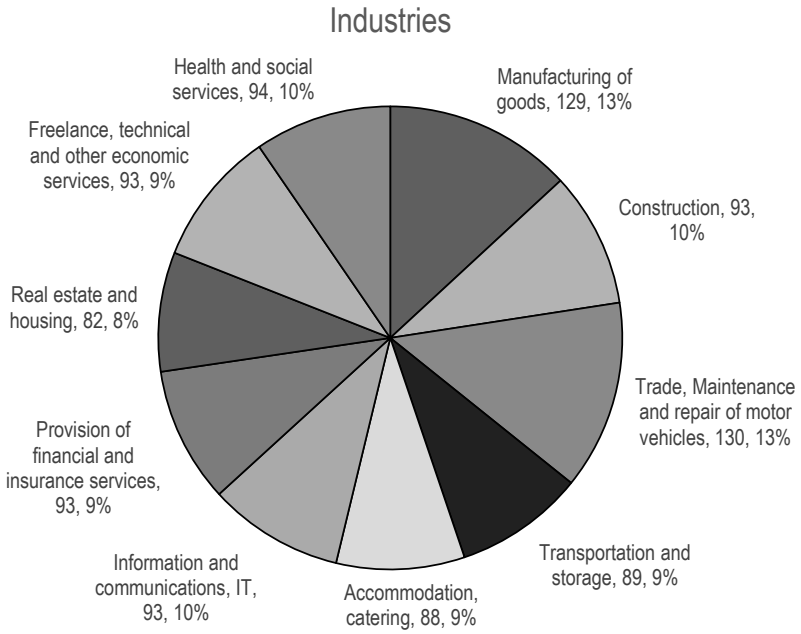

Figure 3: Distribution of the industries in the sample (own diagram)

Computer-aided telephone interviews (CATI) were used to collect the data. The survey was aimed at members of senior management. In total, 984 companies were interviewed from March to May 2013. In the industries "Manufacturing of goods" and "Trade, Maintenance and repair of motor vehicles", more companies were interviewed than in other industries. These two industries are the largest in the universal set. In addition, more small companies were interviewed than larger ones. Of the 984 companies 40.55% belong to the category 1-9 FTEs. The data collection was sponsored by four Swiss companies: ABACUS Research, BusPro, Sunrise and Swisscom.

5 Research Methodology and Evaluation

The Partial Least Squares (PLS) approach is chosen in order to evaluate and estimate the structural equation model (SEM) (see Chapter 3.6). PLS is a widely-used approach for research situations where the theory behind an SEM is still evolving (Wold, 1980). Considering the novelty of the present topic and the indicator scales used for the constructs, the choice of the PLS-SEM approach is justified. SmartPLS 2.0 M3 (Ringle, Wende, & Will, 2005) was used for the calculations.

The first step is to specify the indicators and scales for the measurement model based on the given conceptualization. The second and third steps are the evaluation of the model and the interpretation of the results.

5.1 Specification of the Measurement Model

To measure each construct in the model, appropriate indicators and scales have to be specified. To ensure the content validity of the measured constructs, widely accepted scales are used (Chin, 2010; Hair et al., 2013). The construct measurement mode is based on decision criteria found in the literature (Diamantopoulos & Siguaw, 2006). Therefore, two constructs are measured reflectively and four formatively. One construct is measured as a single-item (Diamantopoulos et al., 2012). Table 1 shows the indicators and the scales used to collect data and to evaluate the constructs in the model.

Construct	Measurement	Indicators used in the study	Source
Significance of characteristics of mobile ICT (SIG)	formative	How significant are the following aspects in your company? 1. Permanent online access to information and communication channels. 2. Permanent carrying of information or communication devices. 3. Constant reachability of persons (e.g. employees, customers or suppliers). 4. Localization of the current location of persons (e.g. employees, customers or suppliers) 5. Availability of continuously updated information (e.g. prices, rates, stocks) (1= insignificant, 2=rather insignificant, 3=rather significant, 4= significant)	(Adapted from Basole, 2005; Watson et al., 2002)
Portion of mobile work (WOR)	reflective (single-item)	Please estimate the portion of time worked by your employees not on company's site, which means mobile work (estimate as a percentage of time spent in mobile work).	(Adapted from Zhu et al., 2006)
Information used during mobile work (INF)	formative	Please tell us if the following information is used during mobile work. 1. Contact information (e.g. addresses, phone numbers, locations) 2. Data on plants, buildings, infrastructure or equipment (e.g. plans, schematics, maintenance history) 3. Information on the service billing (e.g. reports, time sheets) 4. Catalogs or manuals (e.g. for reference) 5. Checklists (e.g. for documentation of the work) 6. Information about employees (e.g. operational plans, personnel files) 7. Other information in the form of text files, spreadsheets or presentations 8. Information about customers or suppliers (e.g., contract, order data, files, reservations, invoices) (0=not used, 1=used)	(Adapted from Keller, Nüttgens, & Scheer, 1992)
Process support by smartphones and tablets (SUP)	formative	Is the following field of activity supported with smartphones or tablets in your company? 1. Financial accounting 2. Human resource / payroll 3. Controlling, reporting, business intelligence 4. Purchasing, supplier relationship management 5. Logistics, warehousing 6. Production of goods and services, production data acquisition 7. Order processing, project management 8. Marketing and sales 9. Customer Service, maintenance 10. Data management, file storage, archiving (0=not supported by smartphones and tablets, 1= supported by smartphones and tablets)	(Adapted from Zhu, Kraemer, & Xu, 2006)
Number of smartphones and tablets used (SAT)	formative	What types of smartphones and tablets are used in the company? Please give us the approximate number of devices. An estimate is sufficient. 1. iPhone with Apple iOS, smartphone with Google Android, smartphone with Microsoft Windows 2. iPad with Apple iOS, tablet with Google Android, tablet with Microsoft Windows (numbers are divided by the collected exact number of FTEs, percent of FTEs who use a smartphone or tablet)	(Adapted from Zhu & Kraemer, 2005; Wang, Wang, & Yang, 2010)
Value of smartphones and tablets (VAL)	reflective	Do you agree with the following statements? 1. (In our work), we cannot work well without smartphones or tablets. 2. Smartphones or tablets reduce the mobile data capture on paper. 3. Smartphones or tablets increase the productivity of our employees. 4. Smartphones or tablets increase the flexibility and responsiveness of our staff. 5. Smartphones or tablets allow us to design new business processes. (1=do not agree, 2=tend not to agree, 3=tend to agree, 4=fully agree)	(Adapted from Gattiker & Goodhue, 2005)

Table 1: Constructs and indicators

5.2 Evaluating the Model

After the specification of the model and the collection of data, the data is examined and the constructs and path of the model are evaluated. The SEM is evaluated by the recommended steps described by Hair et al. (2013).

The data examination revealed that 81 cases must be removed from the sample (8.2%) because of missing values. To ensure that cases of a particular category were not removed systematically, the cases were analysed: Those removed from the sample were in proportion and spread evenly across all industries and company sizes.

Next, the convergent and discriminant validity was assessed in order to ensure the validity of the reflective constructs. Convergent validity is ensured by the calculated results (for details see Table A1). To ensure that the measured constructs are sufficiently different from each other, appropriate levels of discriminant validity are needed. This requirement is fulfilled for the reflective constructs (for details see Table A2).

To evaluate a formative construct, each set of indicators assigned to a formative construct must be assessed for collinearity issues. Issues are present if any indicator has a variance inflation factor (VIF) of 5 or higher. All indicators are below 5. If there are no issues with the VIF values, each single indicator is assessed regarding its significance and the relevance it has to the assigned construct. The relevance is assessed with t values and outer weights (OW) values of each construct (for details see Table A3). According to the outer weights, few indicators are not significant or relevant to the assigned formative construct. Removing these indicators from the model has to be considered. However, if the theory-based conceptualization of the construct supports retaining the indicator, it should be kept in the model. Therefore, no indicator was removed.

As all measured constructs have satisfactory quality levels, the structural model can be evaluated. With the bootstrapping algorithm, the significance of the hypothetical relationships (path coefficients) is estimated. The path coefficients and significance levels are shown in Figure 4. All relationships are significant and the hypotheses are all supported.

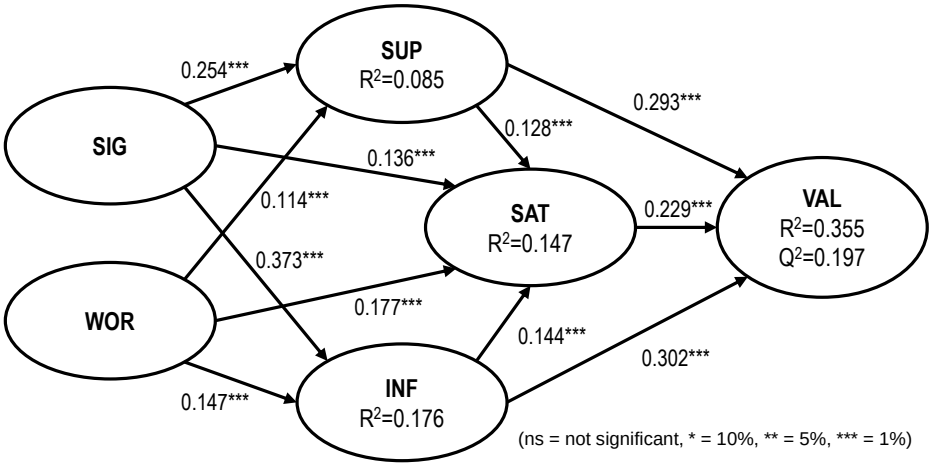

Figure 4: Significance and relevance of relationships

The model is also analysed on mediating effects of indirect paths between constructs. Within the six mediation paths in the model only one path has a partial mediating effect. The path SIG → INF → SAT has a variance accounted for of 22% (for details see Table A4). The effect can be considered as weak and can be explained as follows: The significance of the characteristics of mobile ICT is valued higher by the respondents if they have to use many types of information when working mobile. This leads to a higher amount of used mobile devices.

The last step is to assess the predictive power of the model with the coefficient of determination (R^2) and the predictive relevance with the Stone-Geisser's Q^2 value. The endogenous latent variable VAL (the only variable in the model which is only endogenous) has a R^2 of 35.5%, a moderate level. The other endogenous constructs have a rather weak or very weak level (Figure 4). The predictive relevance Q^2 is different from zero; therefore the model has a predictive relevance.

5.3 Interpretation and Refinement of the Evaluation

From the evaluation it can be interpreted, that SIG affects INF and SUP relatively more than the construct WOR. On the other hand, WOR affects SAT slightly more than the other constructs. INF and SUP affect VAL to a similar degree. SAT affects VAL less. Based on the evaluation all paths are significant, therefore all hypotheses can be confirmed.

The predictive power of the model is – according to the coefficients of determination – rather weak than medium. The reason for this weakness is the heterogeneity in the sample. In the de-

scriptive analysis of the sample it can be seen that there are significant differences between industries and company sizes and that different types of information are used in mobile work in individual industries.

Findings per company size: There are only slight shifts compared to the full sample. The most distinctive shift is shown in the path coefficients regarding VAL. In micro-enterprises (1-9 FTEs) the construct SAT affects VAL as much as the construct INF in SMEs (10-250 FTE). Each category shows a small increase in the R^2 and Q^2 values. This means that a small part of the heterogeneity is explained by the company size. But there are no major differences regarding the indicator outer weights on the formative constructs.

Findings per industry sector: The evaluation of individual industries shows greater differences in the model. Depending on the sector, the structural equation modelling leads to significantly higher or lower values compared to the full sample. Some industries show higher R^2 values in most endogenous constructs, particularly in the construct VAL. Some industries show lower values of R^2 in VAL but much higher values in the other endogenous constructs. Table 5 summarizes the findings.

	R^2				Q^2
Industry	**INF**	**SUP**	**SAT**	**VAL**	
Manufacturing of goods	0.255	0.146	0.150	0.457	0.259
Construction	0.325	0.098	0.209	0.512	0.262
Trade, maintenance and repair of motor vehicles	0.331	0.096	0.212	0.356	0.214
Transportation and storage	0.300	0.102	0.321	0.268	0.161
Accommodation, catering	0.253	0.175	0.188	0.515	0.307
Information and communications, IT	0.203	0.212	0.103	0.487	0.222
Provision of financial and insurance services	0.191	0.264	0.298	0.304	0.144
Real estate and housing	0.175	0.285	0.431	0.390	0.130
Freelance, technical and other economic services	0.122	0.178	0.221	0.323	0.175
Health and social services	0.270	0.250	0.306	0.232	0.138

Table 5: Coefficient of determination and predictive relevance for each industry

Additionally, the evaluation of the industries revealed that different indicators have more or fewer outer weights on the formative constructs. There are different characteristics of mobile ICT, types of information or process support in some industries with more weights than those in the full sample. Table 6 shows the indicators that have an outer weight >0.4 on a formative construct. If a cell is empty, there are no differences compared to the full sample.

Industry	Constructs and Indicator No.			
	SIG	INF	SUP	SAT
Full sample	2	1	7, 9	1, 2
Manufacturing of goods	1, 2	1, 3		1
Construction	5			2
Trade, maintenance and repair of motor vehicles			3, 9	
Transportation and storage	1, 2, 3	5	4, 10	
Accommodation and catering	1, 2	1, 6	6, 9	
Information and communications, information technology	5		10	2
Provision of financial and insurance services		1, 4, 7	8	1
Real estate and housing	5		7, 10	
Freelance, technical and other economic services				1
Health and social services			10	

Table 6: Indicators with outer weights >0.4 for each industry

6 Discussion

Other studies also show that smartphones and tablets are most commonly used for e-mail and calendar functions (Causse, 2012; Pelino, 2012). Therefore, it is not surprising that information such as "Contact information (e.g. addresses, phone numbers, locations)" explains a large part of the latent variable information used when mobile (INF). Regarding process support, the model makes sense in the respect that process areas such as "Order processing, project management" and "Customer service, maintenance" affect the process support (SUP).This result is in line with the descriptive results from Scherz (2008). Mobile work on-site at the customers' locations often is related to these two process areas (Buser & Poschet, 2002). Major software providers have not yet responded to this fact. The core modules of standard software packages often support fields of activity such as financial accounting, controlling and human resources. These are fields of activities which have less influence or negative influence on SUP in the model presented. Therefore, software providers will only have success with solutions for smartphones and tablets when these solutions satisfy the need for information or process support in areas such as project management or customer service.

Differences between the industries are shown through a separate analysis of the data. In some industries, the model calculates higher values. Within some other industries, the separate evaluation of the model produces lower values. It seems that there is still an unobserved heterogeneity in the sample and subsamples. Therefore, the sample heterogeneity should be checked using the FIMIX function of SmartPLS (Hahn, 2002). The calculation of the segmentation is based only on the given structural equation model. Some evaluations have already been carried out with this "a posteriori" approach (Sarstedt & Ringle, 2010).

7 Conclusions

Based on the evaluation with the full dataset, a clear difference is shown in the impact of "Significance of characteristics of mobile ICT" (SIG) and the "Proportion of mobile work" (WOR) on "Information used during mobile work" (INF), "Process support by smartphones and tablets" (SUP) and "Number of smartphones and tablets used" (SAT): SIG has a medium effect on INF and a weak effect on SUP. WOR has only a weak effect or even no effect on SUP, SAT and

INF. This means that the share of mobile work processes has a smaller impact than the characteristics of mobile ICT or qualitative aspects of the information used in mobile work processes. This result corresponds to the results of Gebauer (2008). The answer to the first research question (RQ1) is therefore: The significance of the characteristics of mobile ICT has an impact on the usage of smartphones and tablets in SMEs, particularly when mobile work involves the usage of information.

The model identifies three main effects on the perceived value of smartphones and tablets (VAL): the different types of information used when mobile (INF), the type and degree of process support by smartphones and tablets (SUP), and the number of smartphones and tablets used in the company (SAT). These constructs have more or less the same effects on the perceived value of smartphones and tablets (VAL) in SMEs. This means that there is no single construct that determines the value SMEs see in the use of smartphones and tablets. The answer to the second research question (RQ2) is therefore: The effect on the perceived value of mobile ICT is not only a result of the amount of mobile devices used by a SME. It depends more on the integration of mobile computing into business processes and on the variety of information used.

The descriptive analysis of the sample revealed that in most cases companies support only few of their business processes with smartphones and tablets. Nevertheless, most companies use unstructured information for their mobile work. Storing and accessing document-based information on a smartphone or tablet is easy and quickly done. In contrast, implementing process support on smartphones and tablets is much more challenging, because it needs specialist applications and an integration of the smart devices into the work processes. To fully explore the improvements in productivity and flexibility, processes often have to be redesigned according to the potential advantages provided by those devices.

Nevertheless, the model is limited and only accounts for a small part of the reality, and it is incomplete. There could also be other exogenous constructs that affect the value of smartphones and tablets, e.g. the information systems integration of mobile apps, or the characteristics of tasks that smartphones and tablets are used for, or the specific types of mobile work.

Future research could examine additional constructs or moderating factors that explain the differences between the industries.

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Appendix

	AVE	Composite Reliability	Cronbach's Alpha
WOR	1	1	1
VAL	0.562	0.864	0.802

Table A1: Convergent validity

Construct	SIG	WOR	INF	SUP	SAT	VAL
SIG	formative					
WOR	0.137	single-item				
INF	0.393	0.198	formative			
SUP	0.270	0.148	0.315	formative		
SAT	0.252	0.243	0.273	0.236	formative	
VAL	0.460	0.194	0.457	0.442	0.381	0.750

Table A2: Discriminant validity

Construct	Ind. No.	OW	t Value	Sig. Level	OL	t Value	Sig. Level
SIG	1	0.192	2.363	**	0.577	9.038	***
	2	0.752	10.696	***	0.906	26.424	***
	3	0.101	1.206	ns	0.471	6.348	***
	4	-0.243	2.856	***	0.018	0.199	ns
	5	0.285	3.442	***	0.580	8.667	***
INF	1	0.570	8.632	***	0.850	23.744	***
	2	0.168	2.483	**	0.614	12.717	***
	3	0.213	2.993	***	0.609	12.514	***
	4	0.184	2.675	***	0.608	11.823	***
	5	0.127	1.760	*	0.600	11.788	***
	6	-0.013	0.187	ns	0.422	7.279	***
	7	0.071	0.886	ns	0.621	11.950	***
	8	0.091	1.186	ns	0.633	12.883	***
SUP	1	-0.389	3.979	***	0.090	1.110	ns
	2	-0.308	2.977	***	0.123	1.536	ns
	3	0.098	1.219	ns	0.387	5.580	***
	4	0.182	2.332	**	0.490	7.757	***
	5	0.025	0.318	ns	0.419	6.582	***
	6	0.246	3.294	***	0.511	8.003	***
	7	0.469	5.405	***	0.757	16.225	***
	8	0.212	2.786	***	0.596	10.021	***
	9	0.334	4.347	***	0.650	11.584	***
	10	0.216	2.576	***	0.515	7.798	***
SAT	1	0.704	9.382	***	0.927	27.657	***
	2	0.437	4.965	***	0.796	16.032	***

(ns = not significant, * = 10%, ** = 5%, *** = 1%)

Table A3: Significance of outer weights / loadings

indirect path	direct path	indirect path 1	indirect path 2	VAF
SIG → SUP → SAT	0.159	0.254	0.128	17%
SIG → INF → SAT	0.195	0.373	0.144	22%
WOR → SUP → SAT	0.191	0.114	0.128	7%
WOR → INF → SAT	0.193	0.147	0.144	10%
SUP → SAT → VAL	0.329	0.128	0.229	8%
INF → SAT → VAL	0.352	0.144	0.229	9%

Table A4: Mediator analysis