27th Bled eConference

eEcosystems

June 1 - 5, 2014; Bled, Slovenia

Adoption of Mobile Business Solutions and its Impact on Organizational Stakeholders

Sabine Berghaus

Institute of Information Management, University of St.Gallen, Switzerland

sabine.berghaus@unisg.ch

Andrea Back

Institute of Information Management, University of St.Gallen, Switzerland

andrea.back@unisg.ch

Abstract

Companies which create mobile business solutions require users to adopt them in order to create value for the organization. However, when mobile devices enter the workplace, companies themselves face an adoption process, in having to integrate these devices into the existing IT infrastructure. In this research project, we conducted a focus group with subsequent expert interviews, following a grounded theory approach. We identified seven drivers of mobile business solution adoption in an organizational context: mobile user experience, social influence, time to market, security, workplace flexibility, information availability and process mobilization. While these factors facilitate adoption for some users, they create challenges for or require strategic decisions from other organizational stakeholders, such as internal users, operating departments and corporate IT. The adoption factors and implications for organizational stakeholders were compiled in a conceptual framework.

Keywords: Mobile Enterprise, Adoption, Mobile Business Solutions

1 Introduction

If employees do not actively use a provided mobile business solution, the company has invested in a channel which will run dry. Therefore, facilitating the adoption of mobile business solutions is an important challenge for organizations. Companies also experience employees demanding mobile devices as state of the art instruments in the workplace and use their personal devices and applications for business purposes. So who has to adopt enterprise mobility – the employees or the organizations themselves?

Going mobile has great potential for enterprises, but has also changed common practice in corporate information technology, in terms of security challenges or innovation

management (Sammer, Brechbühl, & Back, 2013). Therefore, CIOs need to manage the change process and in this context, the adoption task is crucial in order to generate business value from mobile IT (Stieglitz & Brockmann, 2012).

Technology innovation processes have always required users to adopt new solutions and practices (Zaltman, Duncan, & Holbek, 1973). However, with mobile devices, there is another important concept to consider, namely the consumerization of IT. In contrast to other IT innovations, mobile business solutions are not always forced upon employees, but particularly smartphone and tablet devices enter the workplace through users who already use such devices privately and then start using them for business purposes (Harris, Ives, & Junglas, 2012).

Accordingly, the adoption process of mobile business solutions in organizations is twofold. On the one hand, when required to use internal mobile business applications individual employees are influenced by various factors, such as ease of use, social influence by their friends or other variables like age or habit (Venkatesh, Morris, Davis, & Davis, 2003). On the other hand, the fact that employees bring their own mobile devices and consumer applications to work, requires organizations to adapt traditional IT practices and adopt the employee's mobile habits. We assume that the factors facilitating adoption within an organizational context might differ from those in a consumer environment. Also, we wish to explore how the adoption of mobile business solutions impact on organizations. Therefore, we propose the following research questions:

RQ (1): What are the main drivers of mobile business solution adoption in a corporate environment?

RQ (2): What implications do these drivers have for different organizational stakeholders?

2 Theoretical Background

The topic of adoption has been widely investigated in past research. There are many theoretical models, such as the Technology Acceptance Model (TAM) (Davis, 1989), Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003), Diffusion of Innovations (Rogers, 2003) or the Theory of Planned Behaviour (Ajzen, 1991).

However, these models investigate factors relating to individual adoption. When applied to adoption in organizational contexts, these models contain flaws, fail to cover all relevant issues, or to explain phenomena caused by organizational factors (Gallivan, 2001; Hameed, Counsell, & Swift, 2012). Individual adoption drivers and inhibitors are still applicable in organizational settings, but additionally, individual adoption influences other stakeholders, and challenges the status quo of common practice. IT-induced organizational changes are demanding, particularly when individual users do not behave as expected (Venkatesh & Bala, 2008). Some research has addressed this issue and attempted to develop theoretical and conceptual frameworks to explain organizational adoption factors.

Oliveira and Martins present an extensive literature review for IT adoption models at firm level and discussed diffusion of innovations and technology, organization and environment framework in detail (Oliveira & Martins, 2011).

Frambach and Schillewart have developed a framework which includes the individual adopter level, as well as the organizational level. According to these researchers, the adoption process is twofold and the implementation process within an organization is different from the organizational adoption decision (Frambach & Schillewaert, 2002).

Gallivan discusses how the adoption of information technology in an organizational context is imposed on people, since decisions are made by authorities and then implemented on the individual user (Gallivan, 2001). While this holds true for some situations, we argue that particularly for the adoption of mobile devices, the effect of consumer devices being brought to the workplace is equally important.

Hameed et al. argue that despite the fact that adoption has been widely investigated, knowledge on IT adoption for organizations is still limited, since existing work only discusses the adoption process until the innovation is acquired, but does not explore whether the innovation is permanently and effectively integrated into the organization. Therefore, the authors combine previous adoption models in a new conceptual framework which covers the full adoption process through the various implementation stages (Hameed et al., 2012).

Laumer and Eckhardt focus on why people in organizations reject technologies. The authors build a unified theoretical framework and their research indicates that technology resistance can be explained by their affective, behavioral and cognitive resistance to change, as well as personal trait resistance (Laumer & Eckhardt, 2010)

Since the existing research on organizational technology adoption presented in this chapter agrees on the fact that there is a lack of research with regard to adoption in a business context and in particular does not discuss the specific characteristics of mobile innovation, the aim of this research is to explore adoption factors and their implications for internal mobile business solutions within an organizational context.

3 Methodology

In order to understand the current organizational challenges with regard to adoption, we adopted a grounded theory approach. We first collected insights from a focus group and then strengthened them with expert interviews, after which we inductively analysed the collected data (Punch, 2013).

As a first step, we conducted a focus group with eleven managers (e.g. business unit leaders) from different industries (healthcare, banking, commerce, software, transportation, IT consulting and media) in order to identify the challenges that have arisen in their organizations from the implementation of mobile IT. The main identified challenge is the adoption of mobile business solutions as a critical prerequisite for the success of these solutions. The factors mentioned by the participants as facilitating adoption were gathered and discussed in a world café approach, with small group rounds for each hot topic. These results provided an initial idea on how to cluster the outcomes of the subsequent interview phase.

We then conducted additional expert interviews in seven organizations currently dealing with mobile business solutions. Interviews were conducted with mobile decision makers from IT, as well as operating departments from different industries (commerce, logistics & transportation, healthcare, insurance, software, IT consulting). The interview style was semi-structured. The interview guideline covered questions on (1) context

(individual's role and mobile solutions used in the organization), (2) individual adoption drivers, (3) individual adoption inhibitors, (4) organizational adoption drivers and (5) organizational adoption inhibitors. Questions were adapted according to the participant's background and the course of the interview. Interviews were then transcribed following a pragmatic approach suggested in Halcomb & Davidson (2006). During the interviews, notes were taken that covered all issues and aspects mentioned in the interview. After the interview, these notes were reviewed and amended using an audio recording of the interview.

In order to answer research question (1), the transcribed interviews were then coded. In total, 81 different aspects were discovered, which could be clustered into seven adoption factors. In order to answer research question (2), for each of these factors, the relationships and influences on the different organizational stakeholders were explored.

4 Results

Within an organizational context, the introduction of mobile business solutions affects various stakeholders. As the most relevant stakeholders, the participants mentioned internal users, operating departments and corporate IT. The following sections explain the seven adoption factors identified in the interviews.

4.1 Mobile User Experience

The cluster "mobile user experience" contains three main aspects:

The first aspect is an **easy-to-use use interface design** of the mobile solution. This not only relates to visually attractive design elements, but also to usability, user experience and interaction patterns. The interview participants unanimously mentioned that an easy to use interface is fundamental to users acceptance of a solution.

"When I get a solution which is only based on the underlying IT system, and the object model defines how the interface looks, this leads to dissatisfaction." (Head of Mobile Unit, IT Consultancy)

The second aspect that was mentioned is the **touch interaction paradigm**. Business applications are usually optimized for keyboard and mouse interaction, but as touch devices such as smartphones and tablets become more popular, the touch interaction paradigm is increasingly relevant for workplace interaction as well. This refers to the interface design of business software, as well as usability of hardware devices.

"The user has to get out his laptop and boot it, but he really just wants to press the power button on his iPad and start typing" (Head of Mobile IT, Healthcare)

The third aspect revealed in the interviews is the beneficial use of **global and standardized interaction patterns**. This factor is particularly relevant to global organizations, in which mobile business solutions are rolled-out to a great number of users. Solutions relying on standardized interaction patterns that are used worldwide have an advantage over proprietary solutions. Global and standardized interaction patterns help users to quickly adopt and use solutions without dedicated training.

"This was released to 3500 people without training. We offered training, but nobody needed it." (Head of Mobile CM, Insurance Company)

All aspects related to the "Mobile User Experience" cluster do indeed greatly influence adoption for users, but have no direct impact on other organizational stakeholders. This factor can be regarded as a prerequisite to the adoption of innovative mobile solutions. Previous research has shown that users who encounter discomfort in the use of mobile devices, may abandon them or create workarounds in order to handle them (Zamani, Giaglis, & Pouloudi, 2013).

4.2 Social Influence

The cluster "social influence" contains factors that can facilitate adoption for internal users, and also for operating departments. The concept of social influence indicates that the behaviour of individuals is influenced by that of others. In the technology acceptance models, the concept of norm is important where the user believes that others expect him or her to use this technology (Venkatesh et al., 2003)

The interview participants mentioned that the **opinions and experiences** of other users are a valuable reference point. Features known from app stores, such as ratings and detailed reviews on applications are important for users in a business context as well. Also, personal feedback on applications, such as having a mobile solution presented by colleagues or the boss, has a positive effect on adoption.

"I noticed that when I show the app to somebody, people think it's awesome and they will tell someone else. This works better than the usual means of communication" (Lead Mobile Services, Logistics and Transportation Company)

One important factor mentioned in the interviews, was that mobile devices, especially tablet devices, are required by users to enhance their **image**, especially when interacting with clients. Social influence and image are factors that apply directly to the actual user of the system, but also to operating departments, as the initiating units for mobile innovation.

"Often it's just a prestige thing and the reason to buy an iPad, but when you look closer at the real uses you wonder what the advantage is." (Head of Mobile IT, Healthcare)

This result has also been evident in other technology adoption research. The factor image, defined as the "degree to which using a specific systems is perceived to enhance one's status in a social organization", is considered a separate factor, since it is one of the strongest influences (Moore & Benbasat, 1991).

4.3 Time to market

The interview participants mentioned different factors which can be subsumed to the cluster "time to market", that facilitate adoption for the operating departments, but at the same time cause challenges or problems for the corporate IT. A rapid implementation of mobile business solutions is considered extremely important and a key advantage for operating departments. Particularly mobile business apps can be comparably cheap and fast to implement for operating departments.

"These are very moderate investments, apps for less than CHF 200.000, implemented in less than 6 months […] this also convinces the management." (Head of Mobile CM, Insurance Company)

However, these mentioned investments do not include maintenance costs and infrastructure changes. IT departments are also considered too slow from the operating department's point of view. Therefore, operating departments often turn to external vendors in order to have mobile solutions realized faster. Cloud services are in fact easier and more readily available, but at the same time challenging to integrate into an existing IT infrastructure.

"For example, when you want a central communication platform, you don't want to wait six months until it's implemented" (Mobile Product Manager, Software Provider)

Within a larger organization, the speed of implementation of a mobile project can serve as a competitive advantage for the operating department. Interview participants reported cases where once a mobile solution had been developed, it served as a blueprint for other solutions in other countries or business units.

"It's not only a mobile project, with it we decide internally which IT system will be used. There were two competing systems with product data and the one that the mobile solution pulled its data from won." (Head of Mobile Unit, IT Consultancy)

4.4 Security

Security is a facilitating factor for operating departments, which requires strategic decisions from corporate IT, but at the same time, the results can put pressure on the users of the system. Without protecting internal or customer data, operating departments will not be able to use mobile solutions. IT departments therefore need to define measures to achieve this protection from a technological perspective. For instance, the interview participants mentioned that devices used for business purposes need to be encrypted and secured by an additional PIN. Especially when the user is using personal devices, this forms an extra barrier.

"People get pretty angry when IT says - you can use your own device, but we will restrict functionality, put a virus scanner on it and you need an 8-digit PIN [...] This is a real problem when you just want to write an SMS on your own device and have to type in an 8-digit PIN" (Head of Enterprise Mobility, IT Consultancy)

4.5 Workplace Flexibility

The cluster "workplace flexibility" is one of the strongest facilitating influences for users of mobile business solutions, but creates challenges for the Corporate IT department.

Mobile devices have become an important expression of a modern and individualist lifestyle. Employees who frequently use mobile devices also tend to bring them to work or expect their employer to provide a mobile workplace.

"This is an expression of individuality, people like to express themselves at work; they like to be comfortable [...] modern and mobile. It's almost a status symbol."(Head of Enterprise Mobility, IT Consultancy)

This is also connected to the fact that the workplace is nowadays less tied to a fixed office, and by using mobile devices, users can work from anywhere.

This does not only apply to hardware, but also to software applications. For example, participants mentioned the use of file sharing applications like Dropbox, in a business context, even if comparable proprietary solutions exist for businesses.

"You want to use the devices that you know from your spare time. That's why touch functionality is becoming more important in business applications […]. Also younger people prefer to use chat, like WhatsApp, rather than e-mail." (Mobile Product Manager, Software Provider)

The integration of personal devices into a corporate IT landscape generally proves to be challenging. Devices have to be manageable for corporate IT when used in a business context, meaning they need to be able to block devices or delete data, in case a device is stolen. On the other hand, personal devices in the workplace can reduce some IT service efforts, since with personal devices, users are familiar with the administration of hardware and software themselves and therefore require less IT-support.

4.6 Information availability

Having important information available in a mobile context is one of the main factors that aids in implementing mobile business solutions.

Mobile business solutions make important information accessible anywhere. This is particularly important for employees in the field who do not have a fixed desktop workstation, like sales personnel or customer service. In some cases, people working in a mobile context need to have their hands free or operate a mobile device at the same time as other devices, which has also been mentioned in research (Kristoffersen & Ljungberg, 1999).

"They have a driver app which makes their life easier. There are lots of documents they have to carry around, they have to be updated. This gets checked by the authorities and now we combine this on an iPad." (Lead Mobile Services, Logistics and Transportation Company)

Mobile and digital information enables personalizing information for the specific user's needs and requirements. This means that current user profiles need to be reworked, but the relevance of information and therefore the usability of the solutions will be higher.

The convenience of the digital format plays an important role. Information can easily be updated and synchronized on demand. Also, the use of digital information instead of paper provides a physical advantage:

"What we also see is that for a trip which takes up to two weeks, you have an iPad which weighs 400gm. In the past, our colleagues reported that they travelled with 13kg of paper." (Head of Mobile CM, Insurance Company)

This adoption factor is critical for operating departments, as well as for users. Therefore, operating departments need to define mobile use cases and make strategic decisions about what information is critical.

"Some demands just don't make sense for a mobile use case. [...] I don't want an SAP screen with lots of entry fields on a mobile device" (Head of Mobile IT, Healthcare)

In order to provide relevant information, mobile business solutions need to have access to internal systems such as the intranet, internal databases or collaboration spaces. However, from an IT perspective, this might not be easy to implement.

"With the iPad it is not possible to access our intranet, for example. Authentication is based on Microsoft certificates, so this does not work for Android and iOS." (Head of Mobile IT, Healthcare)

For corporate IT departments, this would mean that they need to ensure cross-platform interoperability of information. Ideally, content is stored in one system and can be syndicated through multiple channels. However, this can require a different infrastructure and a content management system that needs to be maintained and must be scalable, so as to incorporate more platforms in the future.

4.7 Process Mobilization

Not only does information have to be available on mobile devices, but operating departments need to consider the entire workflow in order to make processes easier for users and not create additional complexity. IT departments face the challenge of building the respective infrastructure.

For internal users, a mobile business solution can enhance productivity by enabling new features, when the hardware functionality of a mobile device, such as camera or GPS, that had not been available before, is taken into account. In this case, mobile solutions enable new process steps, which may simplify existing processes.

"If I wanted to add a new client into the system, it is very complicated [...] I can't do this myself as client manager. Today, I take the business card, I take a picture, there is an automatic partial matching, I just have to add three values and the client is then automatically saved in the backend and accessible for everybody." (Head of Mobile CM, Insurance Company)

However, in order to ensure enhanced productivity through mobile business solutions, these processes need to be integrated into existing workflows. Mobile business solutions can enhance process efficiency, but only if processes are entirely mobilized and not redundant to or placed top of existing workflows.

"*One client wanted a mobile solution for his sales staff, but when they got back to the office with their mobile devices, they had to continue in the paper process"* (Head of Mobile Unit, IT Consultancy)

5 Discussion and Implications

The results from these interviews show, that there are several factors that facilitate the adoption of mobile business solutions in organizations. The adoption factors that emerged have an influence on single or many of these stakeholders. Adoption factors can either *influence the adoption* of mobile business solutions for one specific stakeholder, they can *require a strategic decision* or they can *create a challenge*.

5.1 Conceptual Framework

The adoption factors and the organizational stakeholders were placed in a conceptual framework (Figure 1) in order to build a comprehensive model and understand the relationships between them (Miles, Huberman, & Saldaña, 2014).

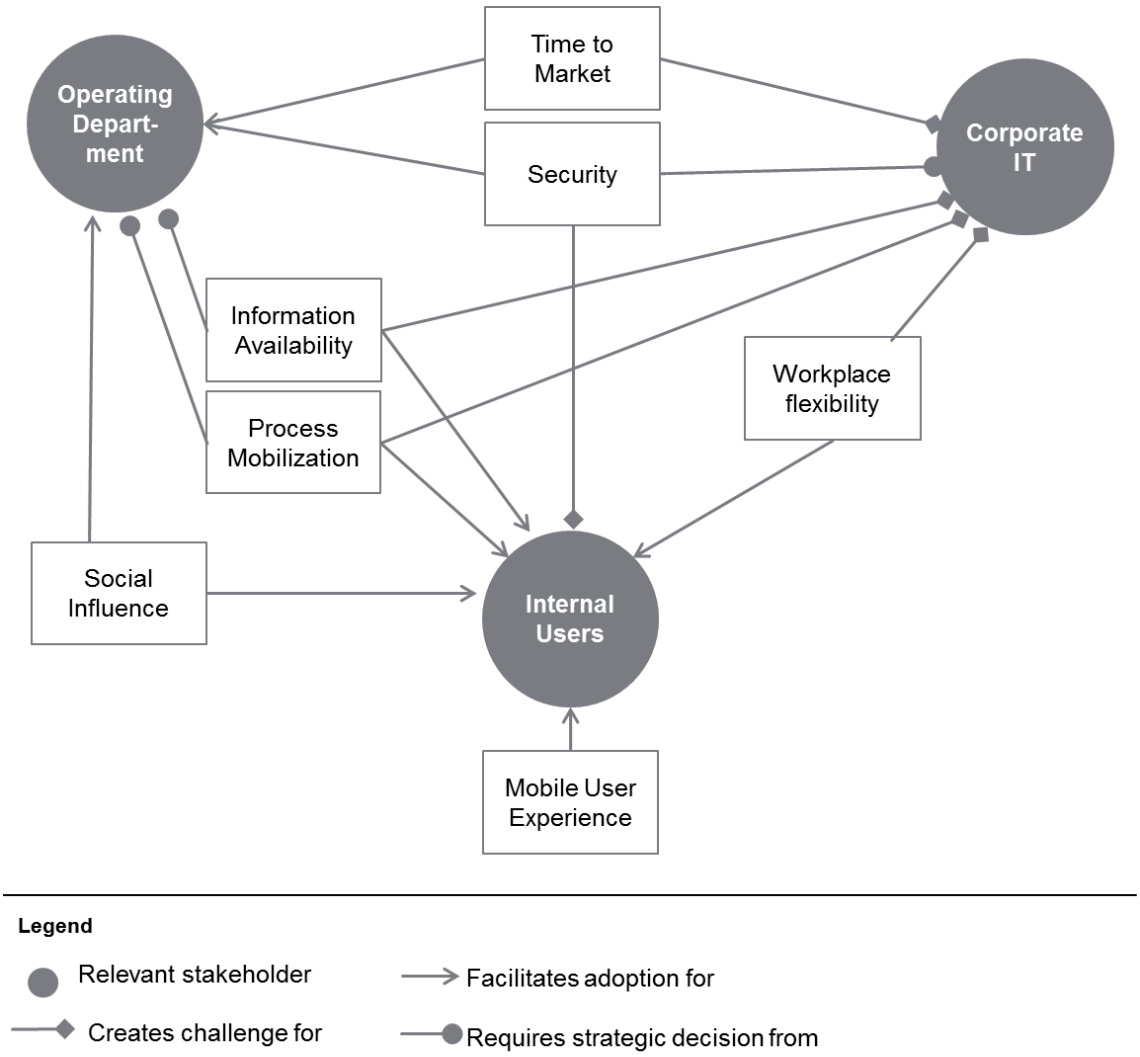


Figure 1: Conceptual Framework - Organizational Adoption of Mobile Business Solutions

The two factors that only influence single stakeholders, but have no simultaneous effect on others are *mobile user experience* and *social influence*. These factors influence adoption for operating departments and internal users, but this influence does not create any challenges for other stakeholders or require any strategic decision from them. Factors that impact mainly on the operating department and at the same time create challenges for the corporate IT are *time to market* and *security*. The factor *workplace flexibility* does connect internal users and IT, but does not affect the operating department. The factors *information availability* and *process mobilization* influence internal users and at the same time effect both the operating department and corporate IT.

5.2 Practical Implications

Based on this research, we can frame the following guidelines:

Guidelines for corporate IT

IT departments need to **rethink IT infrastructures** in order to provide the tools that are demanded by users and operating departments. This includes the challenge of managing complexity that is created by the mobile channel. Enterprise mobility often requires IT infrastructure in addition to traditional IT infrastructure. Developing strategies for handling this complexity is crucial for successful change management. Also, IT departments need to **prepare for an increasing consumerization of IT**, which concerns hardware as well as software. Focussing on application management in addition to mobile device management can be one strategy for tackling this challenge.

Guidelines for operating departments

Operating departments need to focus on **defining mobile processes** and devote particular attention to deciding what processes need to be mobilized, what features should be included, and what is not needed. **Using a phased approach**, where not everything is mobilized at once and features are increased incrementally, is a possible strategy for keeping mobile business solutions easy to use and for reducing complexity for IT departments. Operating departments need to prepare for the requirements of users in creating a more **flexible workplace**. Besides defining how users can bring their own devices and consumer applications to work, this also involves **integrating different working styles**. Within a heterogeneous workforce, the requirements may differ, but in order to ensure smooth collaboration, different working styles need to be integrated.

Finally, one important factor is **collaboration** between operating departments, users and IT in order to understand user requirements better and to build solutions that are tailored to mobilizing relevant processes and making information available in the field, while at the same time making use of mobile interaction patterns.

5.3 Conclusion

In this research, we explored the drivers for the adoption of mobile technology in an organizational setting and the impact they have on operating departments and corporate IT. We conducted a focus group in order to identify important topics and then deepened the results with expert interviews. We compiled our findings to a conceptual framework and framed guidelines for organizational stakeholders on how to deal with the impact of mobile technology in organizations.

This research demonstrates that the introduction of mobile business solutions can have serious implications for organizational processes, since the application of mobile IT challenges current practices. This shows the need to rethink IT infrastructure, to mobilize processes and allow for flexible working styles. Since the development of mobile business apps can be fast and flexible, they entail a risk of being implemented too quickly, without paying sufficient attention to the effects this may have on organizational structures.

While this research provides interesting insights, it inevitably has some limitations. With only seven interviews, the sample size is too small to provide a full picture of all requirements. Also, besides the stakeholder groups relevant for this research (internal users, operating departments and corporate IT), there are other important groups whose

influence could be taken into account, such as management, external users or external partners and vendors. For future research it could be interesting and useful to delve deeper into the specific preferences and demands of the different stakeholder groups, also into those not included in this research. Nevertheless, the adoption drivers and inhibitors, and their implications, provide valuable insights into the adoption of mobile business solutions in organizations. Especially the important role of consumerization of IT, and employees actively demanding a mobile and flexible workspace, and the associated need for organizations to integrate these different working styles into their workforce is a promising subject for further research.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, (50), 179–211.

Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340.

Frambach, R. T., & Schillewaert, N. (2002). Organizational innovation adoption: a multi-level framework of determinants and opportunities for future research. *Journal of Business Research*, *55*(2), 163–176. doi:10.1016/S0148-2963(00)00152-1

Gallivan, M. J. (2001). Organizational adoption and assimilation of complex technological innovations. *ACM SIGMIS Database*, *32*(3), 51. doi:10.1145/506724.506729

Halcomb, E. J., & Davidson, P. M. (2006). Is verbatim transcription of interview data always necessary? *Applied Nursing Research : ANR*, *19*(1), 38–42. doi:10.1016/j.apnr.2005.06.001

Hameed, M. A., Counsell, S., & Swift, S. (2012). A conceptual model for the process of IT innovation adoption in organizations. *Journal of Engineering and Technology Management*, *29*(3), 358–390. doi:10.1016/j.jengtecman.2012.03.007

Harris, J., Ives, B., & Junglas, I. (2012). IT consumerization: when gadgets turn into enterprise IT tools. *MIS Quarterly Executive*, *2012*(September), 99–112.

Kristoffersen, S., & Ljungberg, F. (1999). "Making place" to make IT work: Empirical explorations of HCI for Mobile CSCW. In *GROUP'99: Proceedings of the international ACM SIGGROUP conference on supporting group work* (pp. 276–285). ACM Press.

Laumer, S., & Eckhardt, A. (2010). Why do People Reject Technologies?–Towards a Unified Model of Resistance to IT-Induced Organizational Change. In *DIGIT 2010 Proceedings*. Retrieved from http://aisel.aisnet.org/digit2010/14/

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative Data Analysis. A Methods Sourcebook* (Third Edit., p. 408). SAGE Publications.

Moore, G. C., & Benbasat, I. (1991). Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. *Information Systems Research*, *2*(3), 192–222.

Oliveira, T., & Martins, M. (2011). Literature review of information technology adoption models at firm level. *The Electronic Journal Information Systems Evaluation*, *14*(1), 110–121.

Punch, K. F. (2013). *Introduction to Social Research: Quantitative and Qualitative Approaches* (Third Edit., p. 408). SAGE Publications.

Rogers, E. (2003). *Diffusion of innovations* (5th ed., p. 576). New York: Free Press.

Sammer, T., Brechbühl, H., & Back, A. (2013). The New Enterprise Mobility : Seizing the Opportunities and Challenges in Corporate Mobile IT. In *Proceedings of the 19th Americas Conference on Information Systems (AMCIS)* (Vol. 2013, pp. 1–8). AISeL.

Stieglitz, S., & Brockmann, T. (2012). Increasing Organizational Performance by Transforming into a Mobile Enterprise. *MIS Quarterly Executive (MISQE)*, *11*(4), 189–204.

Venkatesh, V., & Bala, H. (2008). Technology Acceptance Model 3 and a Research Agenda on Interventions. *Decision Sciences*, *39*(2), 273–315. doi:10.1111/j.1540-5915.2008.00192.x

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, *27*(3), 425–478.

Zaltman, G., Duncan, R., & Holbek, J. (1973). *Innovations and Organizations* (p. 212). New York: Wiley.

Zamani, E. D., Giaglis, G. M., & Pouloudi, A. (2013). A Sensemaking Approach to Tablet Users' Accommodating Practices. In *43th International Conference on Information Systems* (pp. 1–19). Milan.