Taxonomy of Enterprise-Related Mobile Applications

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Abstract. The increasing diffusion of mobile devices is changing the working environment and implicating new challenges for enterprises. Mobile applications specifically designed to the enterprises' needs, so-called Enterprise Apps, conquer the market. Enterprise Apps support e.g. enterprise processes to enhance the communication possessing interface to existing enterprise systems, like CRM or ERP. Mobile workers obtain thereby an ideal tool for the accomplishment of their operations in interaction with enterprise system. The applications areas in enterprises throughout Enterprise Apps are complex and widespread. This paper sheds light in the complexity of Enterprise Apps presenting a framework for specific Enterprise Apps. It contributes to research by providing a first approach of a classification scheme to the scenery of Enterprise App usage.

Keywords: Enterprise Apps, Taxonomy, Mobile, Classification.

1 Introduction

On average, each inhabitant of Germany already owns more than one mobile device 17. However, this development is not limited to Germany, smart phones and other mobile devices are widely spread around the world (c. f. table 1). The average penetration and usage rate of mobile devices in major emerging markets, such as Russia, Brazil, China and India and in the developed markets such as United States, Japan, and Germany are between 67 per cent and 130 per cent.

Within the next years the diffusion of mobile devices will further increase worldwide. The traditional feature phone, whose functionality is usually limited to phone calls and short message transmission, is increasingly being replaced by smartphones. Market researchers are forecasting the number of smartphones at one billion in 2016. 350 million smartphone owners will use their devices for business purposes 31. A survey by the University of St. Gallen substantiates this, as 40 percent of respondents state they have used a smartphone for business purposes, and their number is still rising 10.

Consequently, the ubiquitous availability of information due to mobile devices makes employees increasingly independent of their workplace. According to a survey

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Table 1. Average Mobile Device Penetration per Country 19

	Country	Number of Mobile Devices	Population	Percentage	Data exhibited
1	China	916,530,000	1,341,000,000	67.1	July 2011
2	India	858,368,708	1,210,193,422	71.59	July 2011
3	United States	327,577,529	310,866,000	103.9	June 2011
4	Brazil	224,352,712	192 376 496	114.88	Aug. 2011
5	Russia	224,260,000	142,905,200	154.5	July 2011
6	Indonesia	168,264,000	237,556,363	73.1	May 2009
7	Japan	107,490,000	127,370,000	84.1	Mar. 2009
8	Pakistan	108,894,518	171,901,000	65.4	Jun 2011
9	Germany	107,000,000	81,882,342	130.1	Aug. 2009

by BITKOM, 58% of employees prefer flexible working conditions concerning the place of value performance 16. The traditional workplace is becoming less important and an increasing part of the occupational activities occur outside of offices. Enterprises therefore feel the need to attune to these modified conditions and to allow their employees mobile access to enterprise systems 22. CIOs are recognizing this trend. The Gartner CIO Report 2012 states that enterprises now prioritize the adaption of mobile technology and that they are going to invest a large part of their budget in mobile solutions and concepts 23.

Especially the emergence of mobile applications (apps) has created novel applications which enterprises can capitalize on. The survey "Mobile-Web-Watch-2011", released by the consulting company Accenture, proves that 31% of downloaded apps are being used for business purposes. Furthermore, current mobile devices (e.g. smartphones and tablets) have already achieved a high level of maturity concerning their handling and functionalities 24.

Across different platforms, users download apps via so-called app stores and install them on their mobile devices. The amount of applications downloaded is constantly rising. Apple states that in February 2012, 25 billion mobile apps were downloaded via their app store. Nowadays, millions of applications are supporting a huge and complex spectrum of functionalities. The appearance of mobile applications can not only be observed in the private sector. Equally the usage of mobile apps for enterprises shows up an emerging trend. Mobile applications that fulfill the specific needs of an enterprise (e.g. giving access to enterprise information systems) and that are designed to support employees, especially mobile knowledge worker, are understood as "Enterprise Apps". Enterprise Apps exist for various platforms, for various services, and for various business-eco-systems. According to a survey by Research2Guidance, 200,000 enterprise apps were available in consumer app stores in early 2012 29. Their number has doubled since 2011 (Q1) and even there might be a quite large number of enterprise apps in non-public app stores, operated from the enterprise (e.g. SAP Afaria or Appcelerator). Enterprise Apps are promising regarding their ability to increase business values (e.g. increased productivity and higher

information flow) on the one hand and to raise the employee's satisfaction on the other hand.

Until now, there hardly exist any research on Enterprise Apps and they have not been classified so far. Therefore, the main research objective of this paper is to define a framework to easily classify the various enterprise applications and to identify use cases for certain contexts. By doing so, we contribute to both the academic discussion and the practical world by providing a framework for other researchers and managers.

In the next chapter the related work is discussed. Based on this, chapter 3 describes the theoretical foundations which are needed to develop a framework for Enterprise Apps. In chapter 4, the framework is presented and different applications scenarios (concepts) are discussed. The article ends with a summary and an outlook on further research.

2 Related Work

The accelerating diffusion of mobile devices, especially of smartphones, have massively influenced business as well as private life 23137 leading to several challenges and opportunities for organizations as well as for employees 1112. Organizations need to manage the transformation into a so-called mobile enterprise 933. The term 'Mobile Enterprise' describes a corporation or large organization that supports business processes by using mobile applications via wireless mobile devices such as smartphones. In this sense, 'Mobile Enterprises' focus on the external utilization with a focal point on marketing and distribution activities as well as on an internal perspective where organizational issues are the focal point of interest 4. Especially the internal perspective can perfectly supported with mobile applications.

Mobile applications (in short: mobile apps) are software applications designed to run on mobile devices such as smart phones and tablet computers. These technologies have come a long way since the opening of the Apple App Store in 2008, especially in its application for business, health, information, communication, and education.

Väätäjä 35 investigated the way mobile devices such as smartphones affect employee's efficiency. She compared the benefits of using mobile devices in everyday work with its costs and asserted that efficiency with regard to the organization (enterprises) is rising. Despite the increase in efficiency in the daily work, she also found that employees are not becoming more satisfied while using Enterprise Apps. Picoto et al. 28 investigated the additional value of mobile applications for enterprises. Supporting mobility is naturally one of the core points of mobile applications. They should help employees in finding assistance to accomplish core objectives and to manage unexpected issues in a flexible and efficient way, like delays or bugs 36.

Key functionalities of Enterprise Apps for mobile workers in terms of time and place are: mobile notifications, a location tracking and navigation system, and mobile, real time assignment of tasks. Furthermore, supporting location-dependent activities (location-based services) potentially generate business values 36. In knowledge-intensive industries, mobile information systems can increase project performance

and decrease problem response time 34. By providing information ubiquitously, problems could be identified ans even solved faster than with traditional means for exchanging information.

Bosch 5 suggests that software product integration across enterprise boundaries, e.g. along the supply chain, can improve efficiency. For example, using mobile GPS or RFID modules could establish new perspectives for the interaction of enterprises along their supply chains 15. Moreover, Hislop and Axtell 14 find that mobile devices can be used for managing the work/leisure boundary. They allow employees to organize labor hours individually. Mobile devices can facilitate work outside offices and independent of traditional labor hours to allow personal space at different times. According to boundary theory, they establish the boundary depending on individual interests. Using mobile devices does not only incorporate work topics into the employees' leisure time; rather, the reverse was also observed. In their survey of mobile service engineers, Hislop and Axtell 14 describe that the mobile phone was also used for non-work-related communication during labor time.

Nah et al. 25 characterize business value as profit and cost differences arisen out of the integration of mobile applications when compared to not using them at all. Stieglitz and Brockmann 33 suggested a model that explains how mobile services create business values in enterprises. Their approach describes how private and enterprise mobile IT expenditures could successfully be transformed into overall organizational performance by focusing on the internal perspective of mobile IT usage. A much larger amount of literature focuses on business values that might be created by m-commerce apps 16. M-commerce apps clearly differ from e-commerce apps in consideration of devices and user expectations. Existing e-commerce solutions often consider consumers only as passive receivers of information. To appeal to users with an m-commerce solution, existing e-commerce offers should not only be extended technically onto mobile devices. Moreover users of mobile devices also expect applications to provide individualized subjects and services with a high usability 8. The major advantages of m-commerce, compared to e-commerce, result from the main features of mobile devices, such as ubiquity, comfort, localization, technical advantages and personalization 8.

Kim and Hwang 18 conducted a survey and identified trust and security aspects as the most important factors of success of m-commerce applications. They further mention mobility, devices, quality of subjects, and comprehensibility as relevant parameters. Frequently, m-commerce applications are only noticed in the communication between enterprises and customers (B2C), but additional values are subsumed under the term m-commerce by the communication within enterprises (B2E) and between associate partners. Furthermore, Enterprise Apps can not only be used for exchanging information but to actively support collaboration. Open innovation approaches 7 can now be supported in a mobile and faster way. Customer integration and co-creation approaches 21 are not stationary anymore. E.g. prototypes can now be tested, evaluated and enhanced real-time in a real world setting. Experts are now reachable 24/7 and community members can operate from a mobile device.

Many enterprises begin to develop their own mobile applications which are adapted to their individual needs. By doing so, enterprises aim on facilitating

employees' everyday work and enhance their productivity 13. Furthermore enterprises begin to distribute their own apps, via enterprise app stores, which are often part of a mobile device management strategy.

3 Theoretical Background – Developing a Taxonomy

Nickerson et al. 26 suggested a process model for taxonomy development that is based on Bailey's 3 approach, which is called "A Three-Level Measurement Model". According to Nickerson et al. 26, this model is especially useful in the field of information systems for generating taxonomies. Nickerson et al. define a taxonomy T as a set of n dimensions Di (i=1,···, n), each of which consists of ki (ki≥2) characteristics Cij (j=1, ···, ki). Additionally, they found that one object has to have exactly one characteristic per dimension, which means that the characteristics have to fulfill the requirements of being mutually exclusive and collectively exhaustive.

A first step that has to be accomplished even before the actual beginning of the taxonomy development starts is the definition of the so-called meta-characteristic. It has to be chosen which function the taxonomy is supposed to cope with. The meta-characteristic therefore represents the basis for the further classification 26. After determining the meta-characteristic, the actual taxonomy is developed via a three-level, iterative process.

The first level of the process model consists of three consecutive sub-steps. Initially, the researcher determines the subset of objects to be analyzed. This subset is usually comparatively delimited and can be identified throughout a literature analysis. Afterwards, distinct features were identified with which the objects can be characterized and differentiated. In the last step of the first level, the identified features are analyzed and appropriate dimensions and characteristics are deduced so that a first concept of the taxonomy is already generated. The entire first level is described as "empirical-to-deductive" because empirical data constitutes the basis of the analysis and are subsequently transformed into dimensions and characteristics by the researcher 26.

The second level is based on the opposite approach and is therefore called "deductive-to-empirical". In the first step of this level, the researcher analyzes his first concept of the taxonomy and aims to deduce new dimensions and characteristics that could not be identified yet because of the comparatively small amount of analyzed objects, but could be relevant according to the determined meta-characteristic. Furthermore, it is possible that not only new dimensions and characteristics are added, but also existing ones modified or combined. Afterwards, the usefulness of these conceptual changes is inspected empirically via devices to be analyzed. On basis of the results of this inspection, a revised version of the taxonomy is established in the last step of the second level 26.

As the process model follows an iterative approach, it is possible (necessary) to return to the first step of the first or second level and hence to develop revised versions of the taxonomy until the result fulfills the criteria of the meta-characteristic and the requirements of a taxonomy. Nickerson et al. 26, however, list several

requirements that a useful taxonomy should fulfill. On the one hand, the number of dimensions and characteristics should not be too high as the taxonomy may become unnecessarily complicated and less comprehensible. On the other hand, it should not be too low, so that the taxonomy adequately expresses the differences between the analyzed objects.

Moreover, a useful taxonomy provides the opportunity to allow all objects of the research field to be classified. The taxonomy should be expandable in dimensions and characteristics, so that new items with new features can also be categorized if necessary 26.

The third level of this process model corresponds to the time after the taxonomy development phase and is described as "using taxonomy". After the classification of the investigated objects on basis of their features, it is useful to search for so-called "missing items", which means seeking combinations of characteristics within different dimensions to which no analyzed items can be assigned 26. This paper follows the process model for the development of a taxonomy suggested by Nickerson et al. 26 to classify Enterprise Apps.

4 Framework for Enterprise Apps for Enterprise-Internal Activities

Following the taxonomy development process by Nickerson et al. 26, the literature was first analyzed to find existing categories (meta-characteristic) for the classification of Enterprise Apps. For the review of articles, a period of ten years was defined, and only peer-reviewed IS journals with a strong emphasis on empirical research (for a further discussion on the categories of research in IS see 30) from 2002 to 2012 were considered. The index of information systems journals shows 731 active journals. As quality differs significantly between journals, the search was limited to ten well known IS- and IT-journals (MIS Quarterly, Information Systems Research, Communication of the ACM, Management Science, Journal of Management Information Systems, Artificial Intelligence, Decision Sciences, Harvard Business Review, IEEE Transactions and AI Magazine). Search criteria were, e.g., "apps", "mobile", "business" and "enterprise". Thus, 61 potentially interesting articles were identified.

To identify relevant literature we developed the following definition of Enterprise Apps. "Enterprise Apps support the daily work of mobile worker, whilst offering access to existing enterprise systems or supporting communication and collaboration among the employees".

Based on the literature review we identified a helpful approach categorizing mobile services according to their provided user experience [27]. According to Nysveen et al. mobile apps support user interacts among humans (via a communication medium) or among humans and machines (via interfaces) 27. Huang et al. extended Nysveen et al.'s framework, they identified four unique mobile application services.

- *Mobile Information Services:* Applications supporting users with information. The context of the communication is used to personalize information as much as possible. An example of a goal-oriented information service is a mobile application that connects users with the customer service of an enterprise to solve problems and answer upcoming questions.
- *Mobile Communication Services:* Communication applications of every description, from simple chat or videoconference applications up to ubiquitous communication. Most current experience-oriented communication services are applications of big social networks.
- *Mobile Transaction Services:* Applications for the goal-oriented accomplishment of transactions, especially of finances and other items, services and values.
- *Mobile Interaction Services:* Entertainment applications with video or audio contents as well as games in which users interact with the game themselves.

Nysveen et al.`s 27 and Huang et al.'s 15 works build the basis to define a taxonomy to classify Enterprise Apps (c.f. table 2).

Table 2. Framework for Classifying Enterprise Apps for Enterprise-Internal Activities

Application Area *(according to Nysveen, 2005)*	***Employee 2 Employee (E2E)***	***Employees 2 Machine (E2M)***
Information and Knowledge	**Cluster I – Information Sharing** e.g. Internal Knowledge Management, Context Support, Information Management	**Cluster II- Knowledge Management** e.g. Business Intelligence, Big Data
Transaction and Processes	**Cluster III – Process Support** e.g. Work Flow Management, Ad hoc Process Management, Social BPM	**Cluster IV – Process Management** e.g. Work Flow Management, BPM, Complex Event Processing
Communication	**Cluster V – Communication** e.g. Unified Communication	**Cluster VI – Epistemic Logic** e.g. (Multi-)Agent Systems
Interaction and Collaboration	**Cluster VII – Collaboration** e.g. CSCW, Co-Creation, Social Collaboration	**Cluster VIII - Smart Agents** e.g. Search, Prediction and Analysis (Social Media Analytics), Artificial Intelligence

This framework defines eight distinctive clusters of Enterprise Apps. Generally Enterprise Apps can be differentiated between apps which mediate among employees (E2E) or between employees and machines (E2M). In line with Nysveen et al.`s (2005) concept of mobile applications, - which serve for both before mentioned relationships - the following four purposes of Enterprise Apps could be identified: (1) information and knowledge, (2) transaction and processes, (3) communication, and (4) interaction and collaboration.

In cluster I Enterprise Apps are located which provide information and knowledge services for individuals or for the exchange of knowledge and information among employees. Cluster II consists of Enterprise Apps which enable employees to store,

manipulate or analyze data, hence for business intelligence and in the context of big data. Enterprise Apps in cluster III support transactions and processes between employees, e.g. workflow management, ad-hoc process management and business process managements. Mobile apps serve as a medium, not as for transactions, not a medium to transact with. Cluster IV comprises Enterprise Apps which support employees in the workflow management, business process management or complex event processing by providing access to databases and CPU capacities. Cluster V and VI support communication services between employees as well as between employees and computers. Unified communication services and agent systems are well-known concepts which fit into these two clusters. Cluster VII covers mobile enterprise tools for the interaction and collaboration among employees in a company. Known concepts are co-creation and computer supported collaboration cooperative work tools as well as social media applications [38, 39]. Applications in Cluster VIII provide employees with intelligent user interfaces for an effective human-computer interaction. Intelligent search and prediction algorithms are needed. Well-known concepts are Social Media Analytics or Artificial Intelligence [39].

However, it is immediately obvious that concepts involving third parties like supplier or customers for e.g. supply chain management and or more advanced concepts such as open innovation and customer integration cannot be positioned in this framework. This is due to the given, narrow definition of Enterprise Apps (Enterprise Apps support the daily work of mobile worker, whilst offering access to existing enterprise systems or supporting communication and collaboration among the employees). Expanding the definition to Business-to-Business (B2B) and Business-to-Customer (B2C) activities would enable to include the above-mentioned concepts. As this is a first step towards a framework the focus should lie on the support of enterprise-internal work support.

5 Conclusion

The presented framework supports the classification of Enterprise Apps. Build up on the framework of Nysveen et al. 27 the categories information and knowledge, transaction and processes, communication, and interaction and collaboration could be derived. We defined Enterprise Apps as apps who are only used internal in an enterprise and that the must have an interface to existing enterprise systems. Due to this the developed framework finally consists of two dimensions. First the interaction among employees (E2E) and the interaction of employees with machines (E2M).

Generally the framework of Enterprise Apps consists of apps providing mobile access to enterprise systems and able the interaction among colleagues and to access all needed information, as well as to share information. Mobile access and activities might include managing documents, connecting to the enterprise resource planning system (ERP), accessing enterprise communications systems and social business software. Furthermore enterprise apps support workflows e.g. approval processes or the interaction with intelligence enterprise systems.

An integration mobile application into an enterprise's processes and communication is not always expedient and can also imply disadvantages 32. This may cause by problems in case of application failure, network outage, or software bugs. Moreover, it may be more difficult to accomplish changes in enterprise processes with integrated mobile applications because in order to modify a process, the application needs to be changed as well. Additionally, the use of the Enterprise Apps has to be consistent with enterprise security policies and with data protection regulations. Otherwise, the generated business value will easily turn into business damage. Furthermore, Legner et al. 20 state that a major part of research is concerned with the concept and design of mobile business application, whereas the research of their effectiveness and efficiency for the user has not been examined enough so far.

This paper aims on closing a research gap which has arisen through the rise of mobile applications in the last two years. To the author's knowledge, no research had previously been done to categorize Enterprise Apps in the narrow definition of internal usage and an existing interface to enterprise systems. Furthermore a common understanding about the suitable domains for Enterprise Apps is missing. A common framework is needed to come up with a shared understanding and to enable an effective utilization of Enterprise Apps in practice and to build the basis for profound research. The suggested framework is a first step towards classifying mobile enterprise applications. Moreover professionals are provided with a framework to classify mobile applications.

However, the framework still needs to be validated. This could be operationalized by analyzing mobile applications listed in the iTunes or Google Play Store considering only those apps categorized as "business applications" or "productivity applications". Furthermore, it might be helpful to gather information about the distribution of apps among the identified clusters. One research question could be to figure out, if currently mostly "simple" mobile apps are offered more frequently as complex applications (e.g. those of clusters II, VII, and VIII). More research needs to be done in the field of B2B and B2C applications. Moreover it could be investigated whether the use of mobile applications in specific sectors can lead to other dimensions.

References

1. Abdelnasser, A., Hesham, A.: On Incorporating QoS Parameters in M-commerce Applications. In: Proceedings of the 12th Americas Conference on Information Systems, Acapulco (2006)
2. Ahuja, M., Chudoba, K., George, J., McKnight, H., Kacmar, C.: IT Road Warriors: Balancing work-family conflict, job autonomy, and work overload to mitigate turnover intentions. Management Information Systems Quarterly 31(1), 1–17 (2007)
3. Bailey, K.D.: Methods of social research. Free Press, New York (1994)
4. Basole, R.C.: The Emergence of the Mobile Enterprise: A Value-Driven Perspective. In: Proceedings of the Sixth International Conference on the Management of Mobile Business, Toronto (2007)
5. Bosch, J.: Service Orientation in the Enterprise. Computer 40(11), 51–56 (2007)

6. Chau, T., Leung, F., Tang, H., Liao, S.: A Context Information Center for M-commerce Applications. In: Proceedings of the 7th Pacific Asia Conference on Information Systems, Adelaide (2003)
7. Chesbrough, H.W.: The Era of Open Innovation. Sloan Management Review 44(3), 35–41 (2003)
8. Clarke, I.: Emerging Value Propositions for M-commerce. Journal of Business Strategies 18(2), 41–57 (2001)
9. Dery, K., MacCormick, J.: The CIO's management of mobile technology: the shift from mobility to connectivity for executives. MIS Quarterly Executive 11(4), 159–175 (2012)
10. DMI: Smartphones motivate employees. Mobile Business Life, 1–3 (2012)
11. Golden, A.G., Geisler, C.: Work-life boundary management and the personal digital assistant. Human Relations 60(3), 519–551 (2007)
12. Harris, J., Ives, B., Junglas, I.: IT-Consumerization: When Gadgets Turn Into Enterprise IT Tools. MIS Quarterly Executive 11(3) (2012)
13. Hess, B., Sutanto, J., Ameling, M., von Reischach, F.: A Business-to-Business Perspective on Mobile Application Stores. In: Proceedings of the 2012 International Conference on Mobile Business (2012)
14. Hislop, D., Axtell, C.: Mobile phones during work and non-work time: A case study of mobile, non-managerial workers. Information and Organization 21(1), 41–56 (2011)
15. Huang, H., Liu, L., Wang, J.: Diffusion of Mobile Commerce Application in the market. In: Proceedings of the Second International Conference on Innovative Computing, Information and Control (2007)
16. Huth, N.: Netsociety. BITKOM, Berlin (2011)
17. Kaplan, A.M.: If you love something, let it go mobile: Mobile marketing and mobile social media 4x4. Business Horizons 55(2), 129–139 (2012)
18. Kim, J., Hwang, C.: Applying the analytic hierarchy process to the evaluation of customer-oriented success factors in mobile commerce. In: Proceedings of ICSSSM 2005, 2005 International Conference on Services Systems and Services Management (2005)
19. Lattemann, C., Khaddage, F.: A Review of the Current Status of Mobile Apps in Education. In: Alon, I., Jones, V., McIntyre, J.R. (Hrsg.) Innovation in Business Education in Emerging Countries. McMillan-Palgrave (2013)
20. Legner, C., Nolte, C., Urbach, N.: Evaluating Mobile Business Applications in Service and maintenance Processes: Results of A Quantitative-empirical study. In: Proceedings of the 19th European Conference on Information Systems, Helsinki (2011)
21. Lerner, J., Tirole, J.: The Simple Economics of Open Source. The National Bureau of Economic Research, Cambridge (2000)
22. Lünendonk, T.: Themendossier: Mobile Enterprise Erfolgsfaktor Grenzenlosigkeit. Lünendonk GmbH, Kaufbeuren (2011)
23. McDonald, M.P., Aron, D.: Amplifying the Enterprise: 2012 CIO Agenda. Gartner (2012)
24. Mohr, N., Sauthof-Bloch, A.K., Alt, M., Derksen, J.: Mobile Web Watch 2011. Accenture (2011)
25. Nah, F.F., Siau, K., Sheng, H.: The value of mobile applications: a utility company study. Communications of the ACM 48(2), 85–90 (2005)
26. Nickerson, R.C., Varshney, U., Muntermann, J., Isaac, H.: Taxonomy development in Informations Systems: Developing a Taxonomy of Mobile Applications. In: Proceedings of the 17th European Conference on Information Systems (2009)
27. Nysveen, H., Pedersen, P.E., Thorbjørnsen, H.: Intentions to Use Mobile Services: Antecedents and Cross-Service Comparisons. Journal of the Academy of Marketing Science 33(3), 330–346 (2005)

28. Picoto, W., Palma-dos-Reis, A., Bélanger, F.: How Does Mobile Business Create Value for Firms? In: Ninth International Conference on Mobile Business/2010 Ninth Global Mobility Roundtable, Athen (2010)
29. Research2Guidance: The Enterprise Mobile App Market Status Report (2012)
30. Rowe, F.: Toward a richer diversity of genres in information systems research: new categorization and guidelines. European Journal on Information System 21(5), 469–478 (2012)
31. Schadler, T., McCarthy, J.C.: Mobile Is The New Face of Engagement – CIOs Must Plan Now for New Systems of Engagement. Forrester Research (2012)
32. Seo, D., La Paz, A.I.: Exploring the Dark Side of IS in Achieving Organizational Agility. Communications of the ACM 51(11), 136–139 (2008)
33. Stieglitz, S., Brockmann, T.: Increasing Organizational Performance by Transforming into a Mobile Enterprise. MIS Quarterly Executive 11(4), 189–204 (2012)
34. Šuman, N., Pšunder, M.: Mobile Computing Changing the Traditional Ways of Organizing the Construction Company. American Journal of Applied Sciences 5(1), 42–47 (2007)
35. Väätäjä, H.: Mobile Work Efficiency – Balancing between Benefits, Costs and Sacrifices. In: CHI 2011, Vancouver (2011)
36. Yuan, Y., Archer, N., Connelly, C.E., Zheng, W.: Identifying the ideal fit between mobile work and mobile work support. Information & Management 47(3), 125–137 (2010)
37. Willis, D.A.: Bring Your Own Device: New Opportunities, New Challenges, Gartner (2012)
38. Schneider, A.M., Stieglitz, S., Lattemann, C.: Social Software as an Instrument of CSR. In: Transparency, Information and Communication Technology, pp. 124–138. Philosophy Documentation Center, Virginia (2007)
39. Stieglitz, S., Dang-Xuan, L., Bruns, A., Neuberger, C.: Social Media Analytics: An Interdisciplinary Approach and Its Implications for Information Systems. Business and Information Systems Engineering (2014)