Abstract

The IT productivity paradox raised the issue of finding appropriate measures for capturing the business value of information technology. While the topic is much discussed on the general IT level, there is little research on the specific investments in innovative mobile and ubiquitous technologies. In this paper, we apply a case study research methodology in order to identify the specific characteristics of mobile and ubiquitous technology investments and the subsequent requirements on appropriate measures for the IT business value of mobile-integrated business processes. The results are discussed with respect to the existing propositions from general IT business value frameworks. The outcome is a set of requirements on IT business value measures tailored to the specific characteristics of mobile-integrated business processes. We see the result also as a first step in the development of a suitable measurement framework which could be applied by both researchers and practitioners, especially ex ante in mobile business process reengineering.

Keywords: Mobile-Integrated Business Processes, IT Business Value, Performance Measurement
INTRODUCTION

While in the past the adoption of mobile and ubiquitous technologies has mostly followed a technology-driven approach (Köhler and Gruhn, 2004), organizations increasingly expect measurable business returns from their mobile technology investments (Basole, 2004). In order to demonstrate the returns that the mobile technology delivers to business, companies are required to define appropriate measures to capture the realized business value outcomes. While the topic of IT impact on organizational performance has been extensively discussed in literature in connection with the IT productivity paradox (e.g. Brynjolfsson 1993; Brynjolfsson and Hitt, 1994; Dewan and Kraemer 1998), little research has been conducted on appropriate measures for capturing the specific returns of mobile and ubiquitous technology in business process reengineering (Van der Heiden and Valiente, 2002).

The research objective of this paper is to contribute to theory building in the area of mobile-integrated business processes (MIBP) by deriving a set of requirements on appropriate business value measures for MIBP. For this, we analyse the findings from four case studies. In order to relate the business value measures to the specifics of MIBP, we explore typical characteristics of MIBP investments and derive the requirements in relation to each characteristic. The outcome is a set of requirements that need to be considered when assessing the business value of MIBP.

In the context of this paper, the term mobile business processes (MBP) refers to any business process which is partly or completely mobile and thus cannot be fully supported by the use of stationary IT (Gumpp and Pousttchi, 2005). The term mobile-integrated business processes (MIBP) refers to any MBP that is fully supported by mobile or ubiquitous IT (Pousttchi and Thurnher, 2005). Typical examples of MIBP in this respect are mobile service, mobile sales and logistic processes where applications on mobile devices, RFID-based systems, dispatching software, backend systems or whatever is needed for full support are all seamlessly integrated and allowing in the best case a bidirectional real-time information exchange from any part of the process.

The paper is structured as follows: In section 2 we examine the existing literature on IT business value measures and MIBP. In section 3 we describe our research approach and the context of the applied case studies. In section 4 we then identify the specific MIBP characteristics based on the findings from the case studies, derive the requirements on the MIBP business value measures and compare them to propositions from general IT business value models. In section 5 we draw conclusions and discuss the limitations.

LITERATURE

2.1 Research on IT business value measures

The need for appropriate measures of IT business value has been a major topic in IS literature for almost twenty years. The topic received particular attention in conjunction with the debate on the IT productivity paradox which claimed that a direct relation of IT investments and productivity outcomes cannot be empirically shown (Brynjolfsson, 1993). While the original paradox actually addresses the macroeconomic level, it also initiated the IT business value research on the organizational level (e.g. Mahmoud, 1993; Barua et al., 1995). Most studies on the organizational level are able to prove a positive correlation of IT investments and organizational performance, but show at the same time a significant variance over the complete sample (Brynjolfsson and Hitt, 1994; Mukhopadhyay et al., 1995).

The process models of IT value explore this effect by looking at different levels of business value (Soh and Markus, 1995; Weill and Broadbent, 1998). They conclude that only through internal user
adoption, the application to business processes and a positive external environment, the IT expenditures will ultimately lead to positive organizational performance (Soh and Markus, 1995, Kohli and Hoadly, 2006). Based on these findings, they suggest assessing business value outcomes at each level separately with a particular focus on the intermediate level (Seddon et al., 2002). Measures at the intermediate, as opposed to firm-level measures, have the advantage to provide insight on how value is created (Davern and Kauffman, 2000) and they are less affected by external factors such as competitor actions or general market developments (Kohli and Hoadly, 2006).

In contrast to the models that focus on the organizational level of measurement, Mooney, Gurbaxani and Kraemer look at the degree of transformation that is created (Mooney et al., 1996). They distinguish three dimensions of IT business value based on the degree of process change: automation, information and transformation. Based on this distinction, they define different measures and demonstrate how business value increases as IT permeates the organization. Their approach basically follows and summarizes an earlier model from Venkatraman who distinguished seven different categories of potential benefits from IT-enabled business transformation (Venkatraman, 1994). Two other central aspects with respect to business value measures are explored by Barua, Lee and Whinston (Barua et al., 1996). First, the IT impact can typically not been measured in isolation and, second, there may be dependencies and conflicting business value impact. They maintain that without the understanding of the complementarity, of the (inter-)dependencies and the conflicts, wrong measures may be applied or business value outcomes may be wrongly measured.

IT business value measurement frameworks have also been developed in the corporate environment. One of the most recognized ones is published by Svard and refers to the value dials concept established through Intel's IT Business Value program (Svard, 2006). In this program, over 350 IT projects were reviewed over a three year period from 2002 to 2004. The result is a set of 18 general measures for IT business value in four categories: headcount management, expense avoidance, revenue increase and working capital. Especially notable is also Svard's definition of business value which is explicitly requesting to represent IT business value in monetary terms. He refers to business value as the benefit for business groups represented in dollar terms which are a result of IT solutions or services. Academic papers in turn define business value typically more general as the contribution of IT to firm performance (Tallon et al., 2000).

While these general requirements on IT business value measures certainly include important aspects that are also valid for MIBP, they, however, do not consider the specific characteristics of MIBP investments and its consequences on particular requirements for MIBP.

2.2 Research on IT business value of MIBP

Dedicated research on the specific characteristics of MIBP investments and IT business value measures is rare up to now. As with static IT, the business value of implementing mobile and ubiquitous technologies can typically not be assessed in isolation but only in conjunction with respective process improvements (Van der Heiden and Valiente, 2002). The MIBP literature mainly describes two broad beneficial effects of mobile technology: (1) improved process efficiency, and (2) improved process effectiveness (e.g. Gebauer and Shaw, 2004). Also convenience is suggested as a third potential benefit (Basole, 2004). Most existing papers derive exemplary MIBP benefits based on observations in certain industries, for certain process types or in relation to specific MIBP capabilities. Examples of benefits in specific industries can be found for the building and construction industry (Löfgren, 2006; Gump et al., 2005), healthcare (Scheepers and McKay, 2004), utilities (Nah et al., 2005), intervention forces (Bazijanec and Pousttchi, 2004) and the financial services sector (Hastreiter, 2006). Benefits of specific MIBP types have been explored, e.g., for dispatching processes (Botzenhardt and Pousttchi, 2008). Effects of specific MIBP capabilities like real-time order assignment have been analysed by Habermann (Habermann, 2005). However, it can be contended that none of the studies provides an overarching business value framework and dedicated requirements on business value measures for MIBP.
Another valuable source for examples of achieved business value may also be the various whitepapers from mobile software vendors (e.g. Aventeon, 2008, Cognito, 2008). These whitepapers certainly provide a deep insight in the process improvements and achieved business values, but naturally tend to overestimate business value potentials and underestimate the drawbacks (Van der Heiden and Valiente, 2002).

Specific research on MIBP assessment methodologies is rare up to now. Deibert and Rothlauf (Deibert and Rothlauf, 2006) suggest a set of quantitative indicators (e.g., error rate or stock size) and qualitative indicators (e.g., process and stakeholder goals) for measuring the process performance. However, these indicators remain at the level of process improvement and do not relate to any measurable business value impact. Earlier, Gumpp and Pousttchi (Gumpp and Pousttchi, 2005) provided a structural framework for the implementation of mobile and ubiquitous technologies in business processes and the assessment of its impacts (Mobility-M framework). However, the benefits assessment in this framework is relying on informational added values and thus also lacking concrete measures to capture the achieved business values.

3   METHOD

3.1   Case study research

For our analysis, we apply a case study approach (Eisenhardt, 1989; Yin, 1994). We consider case study research as especially appropriate in this situation as we are aiming to contribute to theory building in a new research area. The case study research allows us to build our requirements on existing practice and leverage the expert knowledge of experienced practitioners (Benpasat et al., 1987).

Following Eisenhardt's process steps for building theory from case study research (Eisenhardt, 1989), we defined the initial research question and selected a group of organisations that seemed suitable to contribute to the research question. In order to achieve a broad understanding of the topic, we selected four organisations for which their M(I)BP is at the heart of their business and which show a high level of maturity with respect to business value assessment. This certainly does not lead to a representative result, but provides insight in advanced practices with regard to the research question. To be most diverse, we selected the organisations from different industries, countries and company size. For data collection, we applied a combination of different methods (Yin, 1994). We reviewed internal documentation, company presentations and conducted semi-structured personal interviews, both face-to-face and telephone-based. In each organization, we spoke in person to at least one person from the IT and the business side who have been involved in the mobile technology implementation phase.

3.2   Applied Case Studies

Case Study 1: Utility Company, Ireland

For the first case study we investigated a major Irish Utility Company in the area of network management and metering. In three phases, over the last 4 years, more than 1,000 technicians have been equipped with a mobile solution. Typical tasks of the mobile technicians are the maintenance of network components and services around meter reading and exchange. Compared to the previous decentralized planning, the dispatching of work orders is now handled through a central dispatching system, which also results in significant organizational changes. The central dispatching system also proposes a preferred task order based on criteria such as priority, specialization of the technicians, and availability of required equipment.
Case Study 2: Logistics company, Netherlands

For the second case study we investigated a Dutch logistics company with an own fleet of 300 and an additional 450 associated trucks. All own trucks have been equipped with ruggedized PDAs. The associated trucks had to commit themselves to use the same mobile software, so that the dispatching can be uniquely controlled through a central tour planning solution. The software on the mobile device provides an order management application, barcode scanning and integrated navigation module. Initially, the mobile solution was implemented with the goal to reduce the vehicle cost through saved kilometres and toll costs, but the efficient real-time management of new orders, and especially the provision of information problem reports on an integrated webpage, have also proven to be a differentiator in the market and resulted in an extended customer base for the logistics company.

Case Study 3: Airport operating company, Europe

For the third case study we investigated the service unit of a company in the airport operating sector. The company provides both logistics and facility maintenance services. In total, about 30 processes have already been mobile-integrated or being currently rolled out. More than 1000 mobile workplaces are impacted. The MIBPs include the maintenance of equipment, technical asset control as well as a series of processes around loading and unloading of the aircrafts. Many technical assets have also been equipped with RFID tags to ensure efficient data exchange. While the first processes were mobilized mainly to comply with legal requirements, mobile integration has increasingly become a source of business value for the company. The mobile process engineering does not only allow for real-time coordination and seamless data transfer but also for the accurate recording of start and end-time of orders which is basic for an accurate service charging to the airlines.

Case Study 4: Sales company, Germany and Austria

For the fourth case study, we investigated a specialized sales company that is offering sales and merchandizing services for major product companies especially in the cosmetics industry. The company has about 200 mobile sales consultants equipped with a scan-enabled mobile device. Main intention of the mobile solution besides the improved coordination of customer visits is the creation of a central market intelligence system. The documented data from the field will be analysed to improve the sales process, but also the optimal product positioning and best display method. The generated knowledge will be provided as extra service. Also a new consulting arm for innovative display methods is planned, where the company can run specific campaigns and document the results directly on the mobile device including photos and recorded testimonials from the shop owners.

4 REQUIREMENTS ON MIBP BUSINESS VALUE MEASURES

In this section, we derive the requirements on business value measures of MIBP based on four specific MIBP characteristics that have been rated by both the interviewed experts from the business and IT side as major impact factors on the definition of their MIBP business value measures.

- Close relation of MIBP investments to the business side
- Dependency of MIBP impact on organizational changes
- Significance of mobile employee independence
- Consideration of the innovative nature of MIBP

In the following, we describe each characteristic and derive the associated requirements on the business value measures. To raise the theoretical level, we also compare each requirement with propositions from existing IT business value literature. The outcome is a set of six requirements that should be considered when defining a suitable measurement framework for business value of MIBP (Figure 1).
Specific characteristics of MIBP from case studies

Requirements on MIBP business value measures

Figure 1. Analysis model for deriving the requirements on MIBP business value measures

4.1 Close relation of MIBP investments to the business side

The first characteristic states the close relation of MIBP investments to the business side. In all regarded cases, the investments are to a large extent sponsored from budgets outside of the IT department. Business managers are also over proportionally involved in the MIBP planning, implementation and control processes. As a consequence of their sponsorship, the business side normally associates clear expectations on the concrete technology contribution to defined business objectives. Typical business objectives in that sense are, for example, cost savings for central coordination, reduction of rework efforts or an increase of mobile work productivity. In some cases the business objective is even more concrete in the sense that it determines a concrete value target like 10% cost savings or achieving 100 Euro of additional revenue per customer. To prove that the technology can really fulfil its expectations, the business value measures need to be set up in direct relation to the concrete objective for which the technology is deployed. Concerning the business objectives also the expected time of the business value realization is relevant. The business side typically expects almost immediate results from the MIBP implementations. This is clearly another major impact factor on the definition of appropriate business value measures and the time horizon for actual business value measurement.

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Sponsorship and project lead</th>
<th>Business objectives and expected realization time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility Company</td>
<td>All direct project costs sponsored from business side. Project lead by business side with IT support.</td>
<td>Improving dispatching capabilities with expected savings of at least 300k Euro per year. Reintegration of outsourced services saving a min. of 100k Euro. Realization of business value for back office expected for first year, total project payback within 24 to 30 months.</td>
</tr>
<tr>
<td>Logistics Company</td>
<td>Specific MIBP project outside normal IT budget. Project lead by IT side, high involvement of drivers during design phase.</td>
<td>Reducing kilometres by 5%, resulting in vehicle cost savings of 800 Euro per truck per year. Not planned, but achieved has been an extent ion of the customer base and orders by 18%.&quot;Immediate&quot; impact of mobile technology investment expected, payback within 18 month.</td>
</tr>
<tr>
<td>Airport Operating Company</td>
<td>Partly sponsored from business side. Infrastructure updates within IT budget. Project lead by IT with close relation to business side.</td>
<td>Fulfil legal requirements, reduce overall process expenses by defined percentage, improve service level to airlines to justify agreed price increase. Single projects embedded in MIBP, concrete payback horizon based on strategic plan.</td>
</tr>
<tr>
<td>Sales Company</td>
<td>Specific MIBP project outside normal IT budget. Dedicated project team from business and IT side.</td>
<td>Increasing sales by 20% through optimized product selection and improved product display Realization of business value within two years, also depending on implementation of business intelligence system</td>
</tr>
</tbody>
</table>

Table 1. Overview of case study findings in relation to the first MIBP characteristic

Based on the close relation of MIBP investments to the business side, we derive the first two requirements on MIBP business value measures.

Requirement 1: MIBP business value measures should be defined in relation to the business objectives for which the technology is deployed
Requirement 2: MIBP business value measures should be considering the time horizon of the expected realization

Within the IT business value literature, the relation of measures to concrete goals is a central demand for realizing business value outcomes. Kohli and Hoadly state that the technology investments are typically initiated in the context of certain strategic objectives. Measures should therefore be defined in close relation to the strategic goals in order to show if the original goal has been achieved to the extent expected (Tallon et al., 2000; Kohli and Hoadly, 2006). Hitt and Brynjolfsson contend that the focus of an IT initiative, i.e. productivity, customer value or profitability, determines which measures are attended to (Hitt and Brynjolfsson, 1996). Regarding the measurement of business value outcomes, the literature typically mentions that it has to happen over a longer period of time (Wagner, 2003), especially in dynamic environments (Chan, 2000). The specific requirement of a short time horizon is mentioned by Svard, particularly in situations where there is also high pressure on the business side to deliver fast results (Svard, 2006).

4.2 Dependency of MIBP impact on organizational changes

The second MIBP characteristic derives from the awareness that the business value of MIBP can only be realized when companies also possess the flexibility to incorporate the required organizational changes. Only in very few cases, for example the logistics company's vehicle cost reductions, the mobile technology implementation leads to immediate business value effects. In most case, especially when the MIBP is intended to transform the existing process, the organisational changes are condition to the realization of business value outcomes. The utility company for example realized business value only after completely restructuring the dispatching function from a decentralized to a centralized structure. The business value measures consequently need to consider this complementarities. They also need to comprise the complete effect that is generated through the technology and the organizational changes which in turn means that also all related costs, including expenses for process reengineering and organizational changes, need to be considered in ROI calculations. Clear aim of the companies is to ensure traceability and credibility of the business value assessment. Therefore they typically define their business value measures at the internal level. This avoids the dilution of the results through external effects, which often cannot be influenced.

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Required organizational changes for value realization</th>
<th>Organizational level of MIBP business value measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility Company</td>
<td>Major organizational changes: Centralization of dispatching function across all maintenance and repair processes, option for mobile employees to retrieve additional work orders from central work order pool</td>
<td>Process level, in relation to business case assumptions. Considering BPR and change management cost in ROI calculation.</td>
</tr>
<tr>
<td>Logistics Company</td>
<td>No major changes in process flow, business value mainly from real-time dispatching</td>
<td>Direct measurement based on kilometre account per truck</td>
</tr>
<tr>
<td>Airport Operating Company</td>
<td>Major organizational changes, including repositioning of work staff, relocation of responsibilities to mobile employee</td>
<td>Measures at process performance level (process time, error rate) and recalculation in monetary terms</td>
</tr>
<tr>
<td>Sales Company</td>
<td>Job enrichment for mobile employees through extension of work tasks in combined sales and merchandising function</td>
<td>Measuring the weekly product sales depending on new product assortments and re-positioning in the stores</td>
</tr>
</tbody>
</table>

Table 2. Overview of case study findings in relation to the second MIBP characteristic

Based on these cognitions, we derive the third requirement on MIBP business value measures.

Requirement 3: MIBP business value measures should be defined at the internal organizational level, assessing the complete business effect of the MIBP

In the IT business value literature, the complementary of IT investments with organizational changes is central aspect in all process and BPR-related models. Kohli and Hoadly for example state that the IT
effect in IT-enabled BPRs is typically not to measure in isolation (Kohli and Hoadly, 2006). The IT implementation often creates business value only in combination with coordinated structural changes (Brynjolfsson, 1993) and must be changed in a coordinated manner to improve business performance (Barua et al., 1996). For the business value measurement, the process models typically suggest to set up separate measures at each organization level (Soh and Markus, 1995; Weill and Broadbent, 1998), however it is widely suggested to use the intermediate level, i.e. the internal process or organizational level, for assessing business value outcomes (e.g. Kohli and Hoadly, 2006).

4.3 Importance of mobile employee independence

As the cases show, it is crucial to respect the fact that the mobile employees are often self-employed or at least a high share of their income depends on performance. So it should be in their natural interest to improve their performance through mobile technology support. However, in reality we can also see many cases where the productivity of the mobile employee is even decreasing. The reason is to be found in the on-site work process which is sometimes loaded with additional verification and documentation needs resulting in significant business value gains at the back office level. To reach acceptance in these cases, a potential negative business value for the mobile employees needs to be considered in their performance schemes. This necessarily requires the separate measurement of business value outcomes for the mobile work process and the back office. The separate measurement becomes even more crucial in cases where the mobile process is outsourced. If the additional effort is not reflected in the price per work task, the external service provider is not likely to adopt the new technology, thus the associated business value impact at the back office is inhibited. In an outsourcing scenario even a small productivity increase for the mobile work process may often not be enough as the expenses for mobile devices and process changes are often to be carried by the external service provider. A distinct assessment of the added value is also necessary for business partners or customers. It is for example contingent for setting accurate prices for new service offerings. Furthermore, from the experiences in the case studies, it can be concluded that the measures should be agreed upon by all stakeholders to ensure that objectives are well understood by all parties involved and the measurements receive broad long-term support.

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Degree of organizational independence of mobile work force</th>
<th>Agreement process on measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility Company</td>
<td>70% of work orders currently handled by internal employees (25% performance bonus), 30% outsourced</td>
<td>Measures defined within project team and in accordance with service level measures defined in coordination with airlines</td>
</tr>
<tr>
<td>Logistics Company</td>
<td>45% of all tours through own fleet, 55% outsourced. External drivers paid based on structure of tour.</td>
<td>Measures aligned within project team, service level measures defined in coordination with airlines.</td>
</tr>
<tr>
<td>Airport Operating Company</td>
<td>Central solution provided to different business departments. Outsourcing in certain areas, e.g. cleaning.</td>
<td>Measures aligned within project team, service level measures defined in coordination with airlines.</td>
</tr>
<tr>
<td>Sales Company</td>
<td>Mobile sales personnel typically self-employed, but strongly connected to company. Average performance bonus between 20% and 40 %.</td>
<td>Measures defined within project team and in accordance with mobile sales personnel. Extra payment scheme for additional work tasks that are supported by the new MIBP.</td>
</tr>
</tbody>
</table>

Table 3. Overview of case study findings in relation to the third MIBP characteristic

Based on these finding, we derive the next two requirements for MIBP business value measures.

Requirement 4: MIBP business value measures need to assess the outcomes separately for different stakeholders in the process

Requirement 5: MIBP business value measures need to be agreed with all stakeholders prior to the invest to ensure later acceptance
The separate business value measurement for different stakeholders is not a typical requirement in IT value frameworks. It is especially important in MIBP due to the high share of self-employment and outsourced work tasks. The stakeholder agreement in turn is a central topic in various concepts (e.g. Svard, 2006; Ward and Daniel, 2003). For implementation of the stakeholder agreement prior to the investment, Ward and Daniel for instance suggest to create a dedicated benefits realization plan that a priori determines the business value measures and also defines the measurement points (Ward and Daniel, 2003).

4.4 Consideration of the innovative nature of MIBP

Throughout the cases, it can also be observed that business value measures for MIBP have a specific importance in the phase of assessing the business value potential prior to the investment, i.e. when building the business case. This is due to the innovative nature of MIBP for most companies. While the companies are able to estimate the impact of automating existing processes quite accurately, they face problems when the MIBP really leads to a new process design or effectiveness increases. Depending on the intended degree of innovation, also the consideration of realization risks will become a central element for assessing the business value potential.

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Degree of intended process innovation</th>
<th>Business Value realization risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility Company</td>
<td>High. Strong transformational character of new process. New role for many back office employees, reduction of staff in call center.</td>
<td>High realization risk as centralization of dispatching is imposing a role change for many coordinators. Risk is incorporated in time horizon of business value measures.</td>
</tr>
<tr>
<td>Logistics Company</td>
<td>Low. Basically automation of previous paper-based process. New is option to control tour in real-time.</td>
<td>Low realization risk internally as stricter tour control is supported by most drivers. Higher risk of integrating external drivers.</td>
</tr>
<tr>
<td>Airport Operating Company</td>
<td>High. Often new roles with more responsibility for mobile workers.</td>
<td>Business Value realization risk is reduced by earlier involvement of staff in MIBP definition.</td>
</tr>
<tr>
<td>Sales Company</td>
<td>Medium degree of innovation. Base process of sales people is not changed, but extended with new work tasks.</td>
<td>Medium realization risk. To ensure acceptance, the mobile workers get paid extra for the new work tasks.</td>
</tr>
</tbody>
</table>

Table 4. Overview of case study findings in relation to the forth MIBP characteristic

To cope with the specifics that arise from the innovative nature of MIBP, we derive the sixth requirement on MIBP business value measures.

Requirement 6: MIBP business value measures should regard the degree of intended innovation and consider the corresponding realization risks especially when the MIBP has a transformational character.

In the IT business value literature, the importance of measures for the assessment phase prior to the investment is for example highlighted by Davern and Kaufman (Davern and Kaufman, 2000) who also conclude the measures need to be suitable for the estimation of business value and the subsequent tracking of achieved results. The business value dimension model by Mooney, Gurbaxani and Kraemer (Mooney et al., 1996) also helps in the assessment phase. Based on the degree of intended change, automational, information and transformational, the business value expectation can be set. The consideration of business value realization risk in the measurement process is considered for example by Peppard, Ward and Daniel in his distinction of problem-based and innovation-based interventions (Peppard et al., 2007).

4.5 Resulting set of requirements on MIBP business value measures

Based on the analysis of the specific MIBP characteristics, we derive a set of six distinct requirements that need to be considered when defining appropriate MIBP business value measures, which is shown in Figure 2.
5 CONCLUSION

The research objective of this paper was to develop a set of requirements on appropriate business value measures for MIBP. Based on the case studies of four different companies with distinct experiences in the implementation of mobile and ubiquitous technologies, we identified four central characteristics of MIBP and derived six subsequent requirements that need to be considered when defining business value measures of mobile-integrated business processes.

Comparing these requirements with existing IT business value frameworks, it can be concluded that especially the short time horizon and the separate assessment of the business value outcomes for different stakeholders stand out and can be seen as very particular for MIBP. Furthermore, it can be concluded that the complementarity of mobile technology and organizational changes is central for the definition of MIBP business value measures. The complementarity points to the fact that mobile and ubiquitous technology can only unfold its potential in connection with associated business process changes and organization flexibility. The innovative nature of MIBP also demands for the development of a business value concept that especially supports companies in the phase of evaluating the business value potential and designing MIBP that have a true transformational character. This will be an essential issue for realizing the true potential that MIBP offer.

This paper only represents a first step in the development of a business value framework for MIBP. In order to ensure the applicability for all types of MIBP, the research needs to include a wider range of cases, especially in areas such as warehouse optimization, facility management, construction or healthcare solutions. The eventual framework will also require an extension with regard to the public service sector where business value is rather created through improved offerings to the people rather than cost savings or revenue increases. The result is especially intended to be used ex ante and to provide an improved third quadrant to the Mobility-M, enabling better investment decisions within the process model for mobile business process reengineering.
References


