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Uncovering the Potential Benefits of Mobile Technology in a Business Relationship Context: A Case Study

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UNCOVERING THE POTENTIAL BENEFITS OF MOBILE TECHNOLOGY IN A BUSINESS RELATIONSHIP CONTEXT: A CASE STUDY

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Abstract

While the business world has felt the impact of wireless mobile technology in many areas, valuation of mobile systems investments have remained largely uncovered. The initial hype for mobile technology has by now simmered down and business investors too, are demanding more concrete evidence before they are willing to put their money into mobile applications or services. The ability to assign value of mobile technology to business outputs is far more difficult than a simple cost/benefit analysis. Unlike the system development costs, there are no standard anticipated benefits, as these greatly depend on the business context. In this paper, we present the findings of a case study of the development of mobile applications in a paper producing company for supporting the complaint-handling process. The paper industry is highly influenced by the development of ICT, globalisation and fierce competition, and the success of the companies operating within this industry is likely to depend on their ability to utilise ICT in taking the best possible care of their business customers. A method for identifying the potential benefits of a mobile system is proposed, explained and examined in the context of the case study. Finally, the case study illustrates and highlights the potential benefits of the mobile system, which provides operational efficiency, functional effectiveness and aims to strengthen business customer relationships.

Keywords: Potential benefits, Mobile system, Business process, Complaint handling.

1   INTRODUCTION

In the last few years, a lot of attention has been paid to the potential impact of mobile technology on people on the move where and when those services are needed. Consequently, research on mobile applications has started to focus more on the consumers' expectations and intentions than on technological potential for organisations. In spite of rapid technological development and sound predictions that the consumer market for the third generation mobile services and applications would kick off in 2002, the experience to date has not matched expectations. Presently most mobile applications and services are still in an infant state and actual usage of 3G consumer services is postponed. The huge investments in the third-generation networks and lack of any prospects for revenue growth in the short term create an uncertain environment in which to launch mobile services for public use. The worldwide economic downturn in recent years has imposed strict consumer savings and even if the economy shows strong signs of recovery, the tight monetary spending on new mobile applications and services will first of all be expected from the business segment. Wireless mobile technologies and applications are likely to follow the revolutionary history of electronic marketplaces, where the largest share of revenues was generated in the Business-to-Business segment (B2B). One of the B2B application areas of mobile technology is business customer relationship management and related services. Most of the research and discussion in the literature are future studies in the general context of mobile business opportunities (Kalakota et al 2001, Keen et al 2001, Newell et al 2001, Settles 2002). Although they address the quest for new value, consider the rise of mobile business strategies, and claim new applications having unique benefits for business relationships, they do not try to prove it empirically or with examples from real world cases. However, it does not suffice to invest in the state of the art technology that is perceived to add value and 'nice to have'. In general, it also have to be usable and a 'must have' for a particular organisation. Fortunately, there are a few research papers that focus on business value of mobile technology. The first one by Segev (2003) presents a theoretical framework for evaluating the business value of mobile technology, although still lacks validation within a real business context. Valiente and Heijden (2002) came up with a comprehensive method to identify opportunities for the mobile business and illustrated it with several case studies, yet any quantified or more precise business benefits remain uncovered.

Rather than a formal methodology, this paper should be viewed as guidance for decision-makers who face analytical decisions related to mobile technology investments in the business relationship context. We present a case study of the critical customer facing business process, and we show how to identify the related potential benefits of a mobile system that is to be implemented in the case organisation.

2   THE CBA APPROACH TO MOBILE INFORMATION SYSTEMS

IT consulting companies and vendors dominate the question of valuating mobile technology investments and in most cases tend to over-hype the true essence of it based on a few implementation cases (Gartner, Accenture, IBM, Celesta). Some of the business managers fell for those highly exaggerated stories without considering the critical points of mobile information systems initiatives in the company's operating context, and the majority of projects may fail to deliver the expected results, as has happened with previously over-hyped information systems. Although the field of mobile business value is developing on the basis of practical implications, it needs to be supported by scientific research and needs appropriate academic focus. It is extremely difficult to make hard investment decisions on pre-implementation data, and with mobile technology investments in particular, due to their short history, rapid development and the uniqueness of pioneer cases implemented so far. We start by stating that it is worthwhile to consider the Cost/Benefit Analysis (CBA) approach here. Economic theory has been founded on the notion of a rational individual, who makes decisions on the basis of comparison of benefits and costs (Brent 1997). From being previously considered strictly a social area, the CBA has been extended to the area of information systems

decision-making by replacing private benefits and costs with organisational benefits and costs associated with the implementation and usage of information systems. The definition of the CBA given by Prest and Turney (1968) is still valid for mobile information systems: 'Maximise the present value of all benefits less of all costs, subject to specific constraints'. The latter in our case refers to the particularities of a specific business context in which the company is operating, looking at the core processes facing its business customer. The value of Information Technology (IT) in very general terms can be expressed as: *value = benefits – costs*. There are different IT evaluation techniques known in business practice, but the most commonly used are potential and the realized value of IT (Davern and Kauffman 2000, Tallon et al 2000). A new system is considered economically feasible if the potential or anticipated value of the benefits is greater than the projected costs of development. A detailed cost and benefit analysis is then used for an overall valuation of the system – financial calculations like ROI, NPV, etc. and non-financial evaluations such as business impact. If the cost /benefit analysis does not have thorough and complete data it could be of limited value and even dangerous to make hard decisions based on some examples. It is especially true in our case - even roughly estimated data on mobile system expenditure is not available. Therefore we outline a theoretical pathway for cost/benefit analysis with the right equations and variables needed, and present potential benefits – as a result of the study.
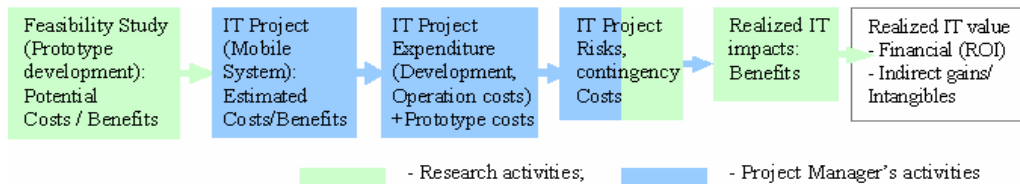

Figure 1.   *Layout for valuating mobile technology investments*

The value assessment of mobile system starts with the potential offered by the prototype developed (feasibility project usually carried out by a consulting or research organisation). It continues with the expenditure of a real, fully running system to be implemented within the PP business value chain (a project carried out perhaps by some outsourcing company, also responsible for maintenance of the system). During that stage, contingency expenses may occur, which will influence the total expenditure on the system, and consequently the potential value realised (ROI is most often used to justify the final value of IT). Therefore the whole picture should be considered when justifying the value of a new system. Usually a project manager and other members of the project team (outsourcing or in-house development) have the final responsibility and competence to estimate the cost of the new IT system development and operations. However, in practice they do not attempt to estimate or evaluate the benefits of the new system- and should never do that for objectivity purposes. Moreover, users are the ones who perceive the actual benefits of the system, but usually the case is that they do not have time for an extensive evaluation of it. This is why the consulting bodies (researchers etc.) are needed to observe the potential and to determine the actual value of the new IT system. Mobile applications are the most modern form of IT investment in business practice and also a new discipline in IS research, so the anticipated value they deliver and our understanding of the value source may not be correct at the first glance. We propose that a series of cost/benefit analyses should be carried out from the start of the IT project until the realised IT value can be captured (see Figure 1). Identifying both tangible and intangible benefits and costs should be required due to the fact that intangible benefits provide useful support for approving a mobile project, especially in a situation where the financial benefits (ROI) are marginal. The value can clearly be identified after the mobile system has been in use for some time – it allows us to verify that the expected benefits have been achieved and to identify new benefits that it was perhaps not possible to foresee when the system was first deployed. This might also suggest new process improvement opportunities.

Even a potential value assessment of a new system is usually tricky. The anticipated costs of a new mobile information system are usually the sum of development costs and operations costs.

Development costs are incurred during the development of a new system (project costs + equipment). Operational costs are generated when the system is put into use (Satzinger et al 2002). Contingency costs may vary due to the changes in time the project will be run and the applications involved (reduced or newly introduced). Unlike information technology costs, there are no standard anticipated benefits as they greatly depend on the business context.

3 BUSINESS PROCESS EXCELLENCE AND INVESTMENT OPPORTUNITIES

A paper industry also a very complex value network and fragmented business activities; thus general logic suggests that focusing on the entire value network at once would be a rather unwise decision, leading to poor or contradictory results. Therefore we will concentrate on one of its fragments- the high quality communication paper business and focus on serving business customers. Traditionally, B2B solutions aim to specifically address the process issue. Since Valiente and Heijden (2002) assure us that benefits and costs are hard to quantify in isolation, one unit of analysis to identify the benefits of mobile technology in our case is a complaint handling business process. Currently it is the most critical customer facing business process. The latter focus was initiated by the study results by applying the SERQUAL method (Parasuraman 1985) for the existing customer facing processes.

3.1 Value Source of a Mobile System and Investment Focus

Each mobile system, with its inputs and outputs, might have multiple and even contradictory goals (Venkatraman 1997, Alter 1999, Seddon et al 2002). Therefore, it is essential to agree upon a value source as to what the PP company is trying to achieve with a mobile system. At the first, the company is currently interested in providing IS-enabled capabilities for existing strategies while minimising risk, yet still increasing customer satisfaction and improving the quality of internal processes. In this case, one valuable source is the service centre. An additional IS investment focus in our project would be to increase efficiency, support the existing business strategy and to minimise a risk – the source of value is a cost centre. It may be that the future source of value will be the profit centre, which also involves the highest risk of technology investment. After the value source was identified, we list the following areas upon which the mobile technology investment will have an impact:

- Customer - to increase the customer service level, taking into account the customer's desired level of being informed about every new piece of information/current stage of the complaint and decisions made during the process.
- Process - to simplify and improve the quality of internal process, and consequently make it more visible and integrated for both the customer and employees (common digital template for complaint file, real-time information tracking and access via mobile devices / PCs, ability to make statistical analysis of complaint file summaries).
- Employee - to increase the number of working environments for those who are mobile. Decrease the percentage of work interruptions occurring due to the process complexity, the need for co-ordination and the variety of the conventional communication medium used. More efficient media can lead to faster, asynchronous and less expensive communication, as a single person can do the job with no need to request or provide information to co-workers and manually duplicate it for entering into the mill database.
- The company's financial improvement – to gradually reduce the costs of complaint handling. The cost savings are expected from all the above impacted processes: reduction in the process time (including working time, interruptions, and travel time), travel expenses. Indirect financial gains can be expected from a customer 'lock in' when they experience a positive service level, which is far beyond that of any other paper suppliers, using modern and integrated complaint system, which aims to establish an even higher degree of integration within the existing value chain.

3.2   Characteristics Of Business Process Excellence

In recent times, applying a business process oriented view to the company has become very popular. Kalakota (2001) claims that great service has two components: a consistent process and a new experience. Broadly speaking, one important parameter relating to process excellence is that of value added time. It concerns removing activities that do not add value and ensuring the efficiency and effectiveness of those activities, which do add value. Meyer (2001) goes even further into the process performance, suggesting that company should add value to the customer experience if it could not reduce the value added time any more. Every company strives to have the best business processes, be the 'best-in-class' and follow business best practises. This process orientation is all about identifying the excellent business process, which does not have a common definition and probably will not have due to the specific nature of the company operating context and business logic of the industry. Mårtensson and Steneskog (1996) argue that there are number of obvious factors that might lead the company towards excellent business processes. Based on variety of research statements (Davenport 1993, Zairi and Sinclair 1995, Mårtensson et al 1996, Morash and Clinton 1998, Bhatt 2000, Hammer 1990, Champy 2002, Aubert 2003) we conclude that the potential benefits expected from mobile technology investment in a business process would be closely related with the excellence characteristics of that process that the company is trying to achieve. Carrying out a value assessment of a new system is usually tricky, because a full justification of a new system requires considering both the quantified and qualitative benefits. A dominating logic is that tangible benefits might be obtained from decreased costs or increased revenues: new revenue may be generated through the creation of new business process which are enabled by mobile technologies; cost savings or decreases in expenses may come from an increased efficiency in company operations. In a Table 1 below we summarise the quantified benefits for the complaint handling process:

Potential Areas for Quantified Benefits	
Process Excellence	Description
Efficiency	Manifests itself in reduced process costs, faster executions, and higher output for existing processes. Efficiency gains can be classified into information sharing, increased reach (coordination) and dynamic pricing.
Lead-time	In our case consists of response time and complaint closing time. Going deeper into the problem, the customer response time can be even more structured. In our case it is comprised of the processing time, queue time, interruption time and recovery time.
Processing time	It is comprised of working time spent on all activities within an analysed process. Organisations aim to reduce it with IT investments to minimum level but keeping the same level of quality of a process output.
Queue time	Waiting time for the resource (employee or information) to be available, which may include travelling time.
Interruption time	Is caused by externally generated, randomly occurring discrete event, which requires decisions or certain actions. I would classify phone calls being the highest interruption mode which impose a high time pressure, followed by e-mails (as the interrupted person has an ability to delay the interruption interval)
Recovery time	It is the time that an interrupted person needs for recovery before continuing his/her previous activities.
Partial Productivity ratio	$R = \dfrac{\text{number of successfully handled (closed) standard complaints}}{\text{number of standard complaints} \times \text{working hours spent on a standard complaint}}$

Table 1.   The potential areas for quantified benefits.

The quantified benefits can be expressed in a productivity ratio. In general, productivity is expressed as output divided by input. When more output is produced with less input, we have an ideal productivity case. However, in practice the partial input factors are most commonly used. If a level of analysis is a process level, the productivity measurement may focus on operations within the process

that have been identified as the result of the analysis. *R* is a partial measure here because it includes only employee working time as an input factor. Moreover, the input represents a technology leverage point, and thus this measure would be quite useful to monitor.

Although it might be relatively easier to capture and present financial benefits than non-financial benefits, most of today's organisations do not rely entirely on them and try to include qualitative (un-quantified) benefits. Unlike financial calculations, there are no commonly recognised methods to assess or measure intangible benefits. Within the context of our study and investment focus, we consider the following anticipated benefits as qualitative:

Potential Areas for Qualitative Benefits	
Process Excellence	Description
Customer Satisfaction	It can be attained when delivering the right quality product for the right price, and serving the customer in the best possible way. The first two attributes are relatively easy to imitate by competitors (especially in the publishing paper business). But the last one- a service quality was always and still is a matter of research and development activities. Therefore this explains the reasons for our focus.
Effectiveness	It is an introduction of new functionality in a process. This relates to the achievements of higher-level objectives than efficiency. In relation to the company context, we propose that effectiveness can be achieved by increasing: visibility / transparency of process activities and/or flexibility:
Flexibility	Defined as the ability of a process to handle changes in its environment. It is related to how easily one can maintain the lead-time and process output quality without loosing productivity, when the environment is changing.
Visibility	Measure relate explicitly to the process level benefits and gains in the value chain. Making the process more visible invites customer's participation, empowers them and facilitates their self-fulfilment.
Transparency	Relates to the ability to understand what is being passed throughout the process. Transparency enables data integration and sharing through its standardisation.
Quality of service or product	Increasing the availability of any kind of service or product by making it available at more times & places, is perceived as improvement is quality (SERQUAL is applicable).

Table 2.   The potential areas for qualitative benefits.

Even though intangibles may not be easy or even possible to quantify using subjective methods, they are still benefits and retain a significant weight in business practice.

4   DATA COLLECTION AND CASE RESULTS

Since the study was conducted with the idea of establishing appropriate qualitative and quantitative measures for the constructs being studied, i.e. benefits of mobile applications in complaint handling process, a positivistic case study methodology was used (Dubé and Paré 2003). Multiple data sources (interviews, documents, questionnaires) provided more convincing and accurate evidence of the process complexity. In our data collection effort, we used F-to-F interviews and documentary materials as the primary source of data. We conducted private interviews with each of the 5 employees of the customer service at a paper mill, and other important actors: a sales director of the case company, 2 purchasers at the merchant site and 2 production managers at the customer plant. In order to draw out more objective conclusions, two of the study project authors attended all the F-2-F meetings that were held. The official documents we received (a standard flow diagram and complaint handling summaries of year 2003) described us the picture of how the complaints have been currently handled at the PP company. By using some standard modelling principles we were able to illustrate the process of complaints/claims in a more standardised way so that the working activities, actors, input and output objects (information) will be visible within a space of time and place. We used the secondary source of data, collected from PP company employees through an expert survey to represent

the real values of existing process *'as-is'*, i.e. how standard complaint cases were handled with a local business customer. Responses were obtained from 16 experts at two different paper mills, all of them were involved at some point in handling complaints (for a response rate of 100%). The questionnaire asked the amount of time spent on different process activities, such as working time per step, interruption time, frequency of travelling and other idle time; as well as indicate decision making points which require collaboration with other process actors. Fragmentation of working time, information flow and working space were used as measures to uncover shortcomings within the existing process, potential improvement areas and to suggest a new *'to-be'* process. The complaint handling process was reengineered from the customer's perspective and the proposed system is supported with an IS web-mail system and mobility features. Below is a summary of the anticipated business benefits, steaming from the difference between existing and new process characteristics.

Process Excellence Characteristics		'As-Is' Process	'To-Be' Process
Quantified	1. Efficiency - total labour cost per complaint (# of steps)	1694.8 EUR (15)	1194.92 EUR (7)
	2. Lead time (per standard complaint)	107.655 h	49.46 h
	3. Processing time	51.655 h	45.46 h
	4. Queue time (incl. information and employee queue time)	8.25 work days	0 work days
	5. Interruption time (including recovery time)	2.5 work days	0.5 work day
	6. Partial Productivity ratio	0.0112	0.0162 (44% ↑)
Qualitative	7. Customer Satisfaction (5-point scale)	4	5 (20% ↑)
	8. Effectiveness	Low	High (customer centric)
	9. Flexibility	None	High (anytime, anyplace)
	10. Visibility	None	High (real time)
	11. Transparency	Low	High (structured data)
	12. Quality of customer service (7-point Likert scale)	5 (perceived)	6,5 (expected)

Table 3.   Characteristics of the existing complaint handling process and suggested new one.

Fortunately we have realised that mobile technology even inherits new innovative features, so significant process improvement can not be achieved just by creating mobile applications after the BPR is done. In our case, the introduction of mobile technology and the development of new applications rest on business process integration within an enterprise resource planning system and standardisation according to the global PapiNet standard for transactional exchanges.

5   CONCLUSIONS

Mobile applications are the most modern form of IT investment in business practice and also a new discipline in IS research, so the anticipated value they deliver and our understanding of the value source may not be correct at first glance. We propose that a series of cost/benefit analyses should be carried out from the start of the IT project until the realised IT value can be captured. Identifying both tangible and intangible benefits and costs should be necessary due to the fact that intangible benefits provide useful support for approving a mobile project, especially in a situation where the financial benefits (ROI) are marginal. We acknowledge that the costs of IT investments are usually obvious, but the business value is often elusive. To demonstrate business value, you must show how mobile technology enables you to do business faster, more reliably, and at lower cost within the context of the company's operating environment. The core business processes will perhaps drive the evolution of enterprise mobile wireless technologies towards achieving excellence characteristics. We do not underestimate the value of mobile technology, but emphasise that true business benefits in our case will be achieved only if the state of the art technologies are applied within improved business process and rest on the basis of a sound technical infrastructure. Accordingly to the identified potential benefits, we strongly support the idea of modernising the process for the complaint handling. In the future we plan to conduct a field experiment and connect the potential benefits with the actual advantages of a modernised complaint handling.

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