Mobile Technologies and Their Use in a Company

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Abstract: - An exploration of the current state of development of mobile information and communication technologies, as well as the opportunities they offer for massive deployment in the field of information support of businesses and their internal processes.

Key-Words: mobility, strategy, mobile commerce (m-commerce), mobile business (m-business), mobile devices, mobile technology

1. Introduction
The current state of development of mobile information and communication technologies offer many opportunities for their massive deployment in the field of information support of business firms and their processes. According to [4] [5] there is a trend in transition from wired to wireless communication as well as from the fixed location of communication centres to localizations that are not specified by place, time or person. In the field of information systems, these distributed approaches and systems, which are mainly based on service-oriented architecture (SOA) [7], have been successfully pursued in recent years. In contrast, elements of mobility and mobile technology in the design and implementation of large-scale information systems have only been incorporated in a very limited fashion. Available mobile devices already offer a very basic environment for building mobile applications, but still many users and businesses are only using the basic set of telecommunication services provided - such as voice services, SMS sending, or mobile access to e-mail mailboxes or the Internet [2] [6].

On the Czech market, there are very few companies that using mobile devices to access their corporate information systems. Many of these companies are international in nature and their mobile software solutions have been imported and adapted for the Czech market. We can say that mobile technologies at present far outpace development in the implementation of new management methods and processes with elements of mobility. Deploying these technologies in the business requires necessary reconstruction of a number of business processes within the company.

The opposite approach, where the analysis of existing business processes with elements of mobility requires further research, development and implementation of new mobile technologies, is less common but equally necessary. In addition to these basic communication services, mobile technology is used primarily in “mobile commerce” (MC), which is currently limited to sales (offering services) through a mobile device (typically a mobile phone) to end users - predominantly the sale of entertainment content (logos, wallpapers, ringtones, music). Mobile technologies (wireless technologies, mobile devices such as PDA and mobile internet) can be used more meaningfully in the implementation or facilitation of transactions, searching for information, business to customer communication (B2C), support of mobile customer relationship management (CRM),
the communication between (B2B) and within business entities, as well as the support of coordination and management [7].

2. Goal of the Research Project
The research project focuses primarily on the issues of the efficient use of mobile technology in e-business and e-commerce. In developing a solution, you base the answer on the feasibility of the mutual influence and synergy between the management and the mobile information technology. Emphasis is placed on the research of the basic models of interaction between mobile devices and business information systems so that they can be used more efficiently to support the business processes of the company - particularly the processes involving the elements of real mobility. The following step is to identify and further examine the real business processes that, for the moment, have no support and parallels in mobile information systems (IS) and technology. The basic architecture and models of information systems, based on a detailed analysis of these processes, will be designed in correlation with the massive yet reasoned and meaningful use of mobile access.

2.1 Methodology Used
In the scope of the research project, “Models of Businesses with a Mobile-Oriented Architecture” (ID 402/08/1046) of the Grant Agency of the Czech Republic, a questionnaire survey was used to identify the use of mobile devices and the most frequently used sources of mobile information. The questionnaire included fewer than 40 questions and completion time did not exceed 10 minutes.

Questions were worded clearly and distinctly, and given in a multiple-choice format. In addition to identifying and segmenting the respondents, observations were noted on how they currently used selected groups of mobile equipment technologies and then the potential for their further use was mapped. A sample unit was defined - legal entities (companies) located in the Czech Republic. The size of organization was not defined. The probability of including the unit into the sample was the same for all units.

The first technique used to determine the extent of the basic sample was the expense or “cost view” and the expected returns and thus the "blind guess" method was implemented. In this method, there is a basic assumption of the subjective experience of intuition. Due to prior experience as investigators of this type of project, a sufficient, basic sampling number was determined and set at 90 to 100 respondents.

The second technique of determining the basic sample was the use of a formula for determining sample size for a specific character quality:

\[ n = \frac{t^2 \cdot P \cdot Q}{\Delta^2} \]  \hspace{1cm} (1)

where \( n \) is the sample size, \( t \) is the reliability coefficient, \( P \) is the proportion of units showing an alternative one, \( Q \) is the proportion of units showing an alternative two and \( \Delta \) the allowed percentage error.

In our case, the proportion of units were showing that alternative one is equal to the projected proportion of companies using mobile technologies and that alternative two were companies not using mobile technology.

Table 1 shows the calculated number of respondents for different views of the alternatives.

<table>
<thead>
<tr>
<th>( PQ )</th>
<th>( \Delta )</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.7 * 0.3</td>
<td>131.25</td>
<td>103.7</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>0.6 * 0.4</td>
<td>150</td>
<td>118.52</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>0.5 * 0.5</td>
<td>156.25</td>
<td>123.46</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Source: internal
Table 1 shows that the “blind guess” method corresponds to:

a) 9 -10% of allowed error – companies using mobile technology, 70% and 30%.

b) 9 -10% of allowed error – companies using mobile technology, 60% and 40%.

c) 10% of allowed error – companies using mobile technology, 50% and 50%.

By using an electronic format the study was able to acquire 97 correctly completed questionnaires.

3. Selected results of the survey

3.1. Mobile devices and their use in the company

Descriptions of some of the mobile devices that are not the base standard of a normal user:

a) PDA (Personal Digital Assistant) or palmtop is a small handheld computer. It is usually controlled by a touch screen and stylus.

b) Smartphone is a phone that provides advanced features. Characteristic features include the application interface to allow installation or modification of programs, but also advanced features such as video conference calls.

c) Netbook which is a smaller version of modern notebook computers, which favours low consumption, price and weight, and focuses primarily on providing functionality such as Internet access and can be used for simple office work.

3.1.1. Types of mobile equipment used in companies

This question gave respondents the choice a total of 5 mobile devices, which we expected that the companies might use. Given that the potential answer allowed for the combined use of these devices, Venn diagrams were used to represent the combined data and resultant intersections of data sets. Individual sets were colour coded with numbers in the box, representing elements of the given sets, increased by other mobile devices. The additional devices are listed below.

Fig. 1: Mobile devices use distribution

The diagram shows that the largest combination of mobile devices used was in the category of mobile phones. The largest group of respondents only used a single mobile phone. The second largest group used a combination of mobile phone and Netbook. The third largest group used mobile phones and PDA’s equipped with GSM capability. Only 3 respondents did not have mobile devices.

3.1.2. Other mobile devices used in companies

The following were among other mobile devices that respondents used, ordered from the most to least used:
1) Notebook with a 4G card
2) Pager
3) BlackBerry
4) iPhone
5) GPS monitoring units with GSM.

3.2. Mobile device operating systems

3.2.1. Which operating systems are used by companies on these devices?

The used of operating systems (OS) for mobile devices (MD) was based on 6 basic user-known operating systems:
1) Windows Mobile which is an operating system from Microsoft and is based on Windows CE. It is designed for mobile devices. The user interface is derived from the classic look of Microsoft Windows and a minor subset of the Win32 API, but contains an entirely different hybrid core.

2) The BlackBerry is a service developed by the company Research in Motion (RIM), which provides constant synchronization of data on the handheld and the corporate server.

3) PalmOS ™ operating system has a graphical user interface and intuitive controls designed for PDAs and communicators. This OS offers touch screen capability, multimedia and memory card support and IrDA, Bluetooth ™ and Wi-Fi connectivity.

4) Symbian OS is a proprietary operating system that was designed for use in mobile devices. It provides added libraries, graphical user interface capability and reference implementation tools developed by Symbian Ltd. Company. Symbian OS is the successor to the system used in the EPOC Psion handheld computers and runs exclusively on ARM processors.

5) Android is a Linux-based software platform designed primarily for mobile devices developed by Google. The entire platform and the source code were later given to an Open Handset Alliance conglomerate of which Google is also a member.

6) The iPhone OS is a designation for the operating system from Apple, which is used for the mobile phone iPhone and iPod Touch music player. While not yet published under an official name, the system was often referred to as OS X.

Respondents chose a combination of these operating systems. Therefore Venn diagrams were again used to represent the mutual combinations of these operating systems. The numbers in the boxes represent elements of the sets used by other operating systems.

The largest single group among the respondents were using Windows Mobile, which corresponds to the number of respondents who also own a mobile phone. The second largest group is the combination of Windows Mobile and Symbian users. The third largest group is using Symbian. A total of 24 respondents did not indicate which OS they use. One respondent does not use any OS, and one respondent uses an OS other than ones that were mentioned.

Fig. 2: Distribution of frequency of use of operating systems for mobile devices

Source: internal

3.2.2. Other operating systems

Respondents said that in addition to the operating systems mentioned, the also used:

1) Manufacturer operating systems, mainly Sony Ericsson and Nokia,
2) Windows XP,
3) Windows Vista,
4) Linux,
5) Windows 7

3.3. Forms of use of mobile devices

In the survey, several questions were directed at the way companies used mobile technologies. Results confirmed the
assumption that the companies are not yet using the full potential of these devices and their related technologies. Mobile devices are used primarily as a personal digital assistant (PDA) by their users, as evidenced by the following report.

3.3.1. Digital Assistant Services
This group of functions may include services such as time management (appointments, tasks), taking notes and access to electronic mail. The latter service is used on a regular basis by 54% and rarely by 26% of the respondents. The most used method of accessing their e-mail inbox was identified as via as the already surpassed POP3 protocol (more than 55%). IMAP protocols and access via a web interface took second place with a share of slightly above 10%.

The mobile device is very often used as a planning tool - 69% of respondents use it to regularly plan appointments and other events, 61% regularly use it to track tasks and 41% uses it to store and record notes. The fact that users are accustomed to synchronization of data while the prevailing method was ascribed to on-line synchronization is a satisfying result. This synchronization is done on a daily basis by 41% and at least once per week by 16% of the respondents.

3.3.2. Mobile Applications
Types of applications used on mobile devices were identified in one of the groups of questions. The most common use of mobile devices was the tracking of vehicles - navigating, monitoring, correlating information for log books. The positioning function of mobile devices in combination with another application is regularly used by 17% and rarely by 5% of the respondents.

One of the questions directed for the use of mobile devices was the communication with customers (B2C), with the exception of voice services and SMS messages. This function was only used 21% of respondents. Specifically, applications for ordering or selling products via the mobile device while on location were only used on a regular basis by 12% and rarely by 10% of respondents. As a method of collecting data in the field, 20% used it on a regular basis and 13% of respondents rarely used it at all. Another 19% are not using the mobile device functionality but expressed an interest in it. An interesting result yielded a question which asked whether the respondents were using mobile devices to access the internal information systems. 30% of the respondents reported regular access, 18% rarely and 15% showed an interest in this option.

4. Conclusion
It may be assumed from the above information that a growing importance can be placed on the role of mobile information systems. Each of these systems consists of a set of composite components that gather information and manage processes, store and distribute information with the use of mobile information and communication technologies.

The survey results suggest that consumers from the business sphere exhibited an appreciable interest in the possibilities of mobile devices which are connected to an information system, or the possibility of business cases to support these technologies. Increasingly, existing processes can be mobilized in the near future (ie, part or all of these processes, the processes are ready for mobile application). The transition of the processes into mobile includes: software processes, service processes, operational processes, and most business-oriented business processes [1].

Thinking about the mobility of the processes and the transfer of elements of the processes into mobile use has a significant impact on the structure of the processes, supporting technologies and changes in organization and management.
of the processes. The main difference is deciding what data should be accessible from which end device with consideration to the effectiveness of the mobile device as well as the management of the mobile processes. Transformation of processes into their mobile counterparts is usually focused on selected individual activities (parts of) the process.

Courageously conceived transformation may also result in more significant effects in the increase of efficiency of the overall business processes and it is this change that goes hand in hand with the transformation of the organization processes in service-oriented architecture [3][8][9]. Deploying these mobile solutions into existing processes is a very sensitive issue and should be based on well-described models and architectures, which constitutes one of the main objectives of the research project.

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6. References


