MUMMY in the Field

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The IST project MUMMY described previously in this issue has recently finished its field trials in order to compare the general expectations concerning the enhanced mobile information management with first experiences in real work situations. The field trials have been carried out with the »user« partners within the MUMMY project. Here, we summarize the main results from the trials performed in Darmstadt, Germany in September 2005.

The General Expectations

As opposed to office work, in the mobile environment it is much easier to capture an image, record a voice note, or draft a sketch than write down a descriptive text. Thus, nowadays mobile workers document their insights as paper-based notes and sketches, or in digital media on a set of devices, such as cameras or voice recorders. Back in the office this information has to be consistently re-integrated into one descriptive digital report. Mobile ad-hoc retrieval of digital task-related information is still often complex or simply not supported.

Obviously, it would be better to record new information digitally and coherently already during the mobile work. MUMMY suggested to utilize the new multimedia possibilities in PDAs and smartphones to record findings in terms of photos, hand-drawn sketches, speech notes, and simplified input forms with just one device. These captured information elements could then be correlated with descriptive information from users' context, such as time, locations, people, tasks, and projects in order to bring structure into the loose bunch of unstructured files coming up this way. Additionally, the new recordings could be used as annotations to existing multimedia documents, such as videos with predefined hotspots, SVG drawings, maps, and site plans. We expected that this approach should ensure that in return the registered information can easily be retrieved along the contextual information (who, when, where, which task / project, etc.).

Therefore, the expectations of the general benefit from supporting mobile knowledge capturing and retrieval in the current context of work could comprise, e.g., the following:

- An easier and faster mobile information retrieval
- An easier, faster, and less error-prone mobile information capturing
- Time savings due to the avoidance of later data entry
- Enhancement of timeliness and accuracy of data in repositories
- Improvement of mobile working conditions

The Trials

To assess the above general statements and the impact of using the MUMMY system in mobile work, a series of trials in site inspection business processes have been carried out. Experts performed Hazardous Build-

Figure 1: Site inspection without MUMMY

German Abstract

Das IST-Projekt MUMMY, vorgestellt im vorhergehenden Artikel, hat in 2005 eine Reihe von Feldtests durchlaufen, um die realen Auswirkungen des mobilen Informationsmanagement in den jeweiligen Geschäftsprozessen zu evaluieren. Die Ergebnisse dieser Feldtests im Bereich Facility Management werden in diesem Artikel zusammengefasst. Die Evaluation basiert auf Datenerhebungen während der Tests, sowie Interviews mit Benutzern und zuständigen Prozess-Managern.

factor \ phase	pre-processing	mobile work	post-processing	total
time	o	o	+	+
quality	n/a	+	+	++
costs	o	-	+	o
employee satisfaction	o	+	+	++
knowledge work improvement	n/a	+	+	++

+ improvement
o no change
- deterioration
n/a not applicable
confirmed by user statements

Figure 2: Summary of user's evaluation from the MUMMY-enhanced inspection

ing Material Inspections and were observed and interviewed during and after the inspections respectively.

The Hazardous Building Material Inspection (HBMI), as most site inspection processes, is composed of three distinct phases: 1) the preparation work, 2) the work on site, and 3) analysis & reporting. A typical activity during the preparation phase is the study of the construction plans and their preparation on suitable media with suitable sizes. The site inspection is carried out by engineers who are specialists for the process. While performing the HBMI process, the engineers examine the whole building and the objects that are on site. When they discover hazardous material, they make notes on plans and describe the material found. Sometimes they take samples that are analyzed in chemical laboratories later. Each time a hazardous material is detected or a sample is taken, the engineer takes a photo of its location. If the site has been inspected before, they need as well access to previous recordings. Post-processing of a HBMI process consists of transforming the data collected on site into a report mainly consisting of specifications of hazardous materials, their locations, quantities, and disposal costs.

The Results

In general the end-users were very satisfied with the prototype and the expected improvements were found to be basically valid. However, field trials and evaluations have shown a more precise and detailed picture than the first expectations. Most remarkable results were:

- When conceiving and developing the MUMMY system, we expected that the substantial advantages would be gained during the mobile phase. Evaluation has shown that the supporting effect of the MUMMY system is spread over different phases of the complete business process and is not restricted to the mobile work itself.
- Although the users liked to work with the MUMMY system, they did not save time in the mobile working phase of the process but collected more and qualitatively better information.
- Actually, the main advantage in terms of time and cost savings lies in the post-processing phase.

More direct statements made by the users can be summarized as follows:
Time: A reduction in time for the mobile part of the HBMI process is not expected (partly because the engineers assume to carry out the MUMMY-enhanced process more carefully and more comprehensively). The engineers, however, expect a time reduction in pre-processing (which proved to be comprehensible and easy for the engineers and the tracer) and mainly in the post-processing phase of the HBMI process (about 1/3 of the current state). The reason is that the collected data do already exist in digital form, the recovery of relations between a note or photo and the corresponding location is inherently supported, and many parts of the final report are generated automatically. The users expect more time savings after more practice with the system.

Quality: End-users expect an increase in the quality of HBMI reports through the use of MUMMY, mainly because of the better possibilities to document their insights in the field by using multimedia annotation. Thus more information can be collected with a higher quality. Also, the engineers can practically skip the error-prone reworking of the collected data and the recovery of relations among them, as opposed to the current state. One point stressed heavily by the end-users, was the value of using advanced multimedia technology for the image of the company.
Costs: Costs are not expected to be reduced substantially. Although some activities done by the engineers themselves can now be done by the secretaries, and other activities need less time, managers anticipate more costs for providing high-end mobile devices.
Staff related: Using MUMMY technology is considered as a facilitation of work by the end-users. The main advantage lies in the fact that all the information is stored in one device. The engineers do not have to carry several devices and/or folders with them. End-users consider the work with the MUMMY system very enjoyable.
Knowledge work: Managers consider using MUMMY as being effective for knowledge-related aspects of the work, mainly because of the enhanced accessibility and presentation of information in context. They also rated the chances for the improvement and enhancement of knowledge sharing or exchange of information between engineers pretty high; a better coordination among various ARCADIS teams and with customer representatives on site is estimated as the immediate consequence.

Figure 2 provides an evaluated overview of these results: the yellow cells contain the direct inputs made by the trial participants and the white cells show the estimations given collectively by their managers and the trial supervisors.

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