

User Profiles for Mobile Technology Applications - A European Perspective

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Abstract

The first findings from a Grounded Delphi study about the future of mobile technology applications in German-speaking Europe are presented. They are based on the opinions of a panel comprising some 50 experts from five universities and 29 enterprises concerned with the application, supply or development of mobile technology. The findings are in marked contrast to the ‘official line’ taken by the 3G providers in Germany, Austria and Switzerland, where the research is domiciled. It seems that UMTS, the predominant technology in Europe, will be overtaken by Wi-Fi technologies and altogether the market will be much smaller than anticipated. Most business users will make do with 2.5G technology, with GPRS for data seen as adequate – because the dominant application clusters are seen to be B2E services/facilities with limited requirements for ultra-broad bandwidths. And most users will be business users: The group who would buy the multimedia applications are teenagers who, however, will not be able to afford them. The predominant user profile in Europe will be the Employee of (large) firms who will make selected Intranet – and Extranet applications accessible through mobile channels. Further refinement is now sought in a second and perhaps a third round of questioning.

Keywords
Mobile technology, mobile business applications, Grounded Theory, Delphi research

Introduction

Applications of mobile technology in Business (further on referred to as Mobile Applications) in the current environment are characterised by a critical reliance on a diversity of highly complex and often competing technologies, infrastructures and architectures. The technical underpinning is thus often less than reliable and intra-compatibility between its components is nearly always an issue. It is no surprise that against this backdrop the technical aspects of mobile business have often appeared to dominate its assessment. However, the many failures of the ‘dot.com’ ventures showed that business activities embarked upon because they could be done technically – rather than support customer needs - are likely to achieve less than anticipated rates of success. Following these insights, a new round of critical assessment
projects and approaches has appeared in the literature. This paper describes such an approach and outlines the first results from the field.

A Grounded and Iterative Approach to Concept Development?

Where a new situation does not allow the carry-over of theoretical frameworks from which to form conceptual ideas, quantitative research methods are often less than satisfactory. Methods are needed that develop interpretations of the data from the data itself and go on to build coherent and comprehensive mental pictures of what is happening inside the phenomena studied. One of the approaches specifically useful for the investigation of mobile applications would be the discovery of ‘Grounded Theory’ as it is specifically designed for situations where no previous experience or theory dominates. What will happen in the field of mobile applications will furthermore be determined by the deliberate actions of a number of actors, rather than develop in an evolutionary way. ‘Delphi’ approaches, with their roots in Future Research are appropriate for such an environment – albeit not often used in qualitative settings. In the following paragraphs both are briefly introduced and their combined use discussed.

Grounded theory is "an inductive, theory discovery methodology that allows the researcher to develop a theoretical account of the general features of a topic while simultaneously grounding the account in empirical observations or data." (Martin and Turner, 1986). The major characteristic of grounded theory is its systematic approach to constant comparison of data and concepts in a continuous interplay between data collection and analysis.

Linstone and Turoff (1975) maintain that a ‘Delphi’ research approach, based on multiple question and feedback techniques, is appropriate in situations where:

- The problem does not lend itself to precise analytical techniques but can benefit from subjective judgments on a collective basis;
- The problem at hand has no monitored history or little adequate information on its present and future development;
- Addressing the problem requires the exploration and assessment of numerous issues connected with various options where the need for pooled judgement can be facilitated by judgmental techniques.

This describes the situation with mobile technology fairly accurately and therefore seems to encourage the use of a Delphi approach in this field. Traditionally, however, the Delphi method had been applied with a quantitative bias – with the aim of consolidating the frequency distributions of related answer clusters and to reduce the variance among the responses (Ziglio 1996: Delbecq 1975, p. 10). Since its development in the 1950's by the Rand Corporation for use in military planning and forecasting (Warters, 1999), the Delphi method has been applied many times to a wide range of issues (Baumann et al. 1982, Adler and Ziglio 1996, Deloe 1995; Wilenius 1997). However, asking questions about such – practically – non-quantifiable issues as technology standards, application types and business models makes a quantitative approach inappropriate. Applying a Grounded Theory paradigm for the conceptual analysis of qualitative responses seemed therefore a good complement to the iterative, feedback driven data/information capture inherent in the Delphi approach. In combination, both methods have proven to work well in tandem.
A Delphi Study of the Future of Mobile Technology Applications

Directed from the Centre of Mobility and Information at the University in Regensburg, a multiphase study in the Delphi tradition was started in July 2002. The panel of participants comprises researchers and academics, industry people from ‘application’ providers and in a ‘user’ capacity and representatives of the ‘supply’ industry (telecommunications companies and network operators) across Germany, Austria and Switzerland as shown in the table below.

<table>
<thead>
<tr>
<th>Type</th>
<th>Firms</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>Supply</td>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>Research</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>34</td>
<td>52</td>
</tr>
</tbody>
</table>

*Figure 1. Participants of the Study by Type*

The firms and universities that participate are a good cross section of enterprises with a substantial stake in mobile technology applications, as the following table shows:

| 12snap Germany GmbH | Lucent Technologies, Inc. |
| AM3 AutoMotive MultiMedia AG | Lycos, Inc. |
| Augsburg (Universität) | MAP&GUIDE GmbH |
| Bertelsmann AG | MindMatics AG |
| C_sar - Consulting | MOBILETECH GmbH |
| CAS Software AG | O2 (Germany) GmbH & Co. OHG |
| clever-tanken GmbH | Regensburg (Universität) |
| ERICSSON GmbH | SAP AG |
| Fraunhofer-Institut | Sapient GmbH |
| Hewlett-Packard GmbH | Siemens AG |
| IBM | St. Gallen (Universität) |
| Köln (Universität) | sunrise / TDC Switzerland AG |
| KPMG Consulting AG | Vodafone Pilotentwicklung Ges.m.b.H. |
| | WebDynamite IT Solutions GmbH |

*Figure 2. Firms and Universities participating in the study*

The participants were asked to prepare - and return - exposés, based on their own experience and/or research that expressed their considered opinion on what would be the situation over the next 5 to 7 years with reference to the following topics:

(a). Which will be the dominant technologies?

(b). What will be the user/customer/market structure?

(c). What will be the dominant applications of mobile technology?
(d). What will be the prevalent business models?

(e). Who will be the dominant players/powers in the market?

(f). Will there be significant national differences – and where?

The replies were substantial: Over 80% of the panel replied on time and the average answer to the detail questions were essays of about 800 words. The responses are being analysed in two ways:

- ‘Open Coding’ in the Grounded Theory tradition is applied to the data and commonalities are conceptualised from it;
- The set of concepts will then be built into a set of scenarios, assembling concepts of like content, and will be tested for contrasts between and/or within groups.

The results will then be summarised and sent back to the panel for a new opinion, now commenting on the scenarios that have emerged. After two more iteration it is expected that clear scenarios and opinion groupings will have emerged that reflect the consensus or agreement-to-differ to such an extent that further feedback/loops would not yield any more significant movement of the issues – they will be “saturated’ in terms of Grounded Theory technique.

In the following paragraph an overview of the first summaries to the top three topic groups is presented as a demonstration of the method.

Views on the Future Technology Trends

Seven conceptual groupings emerged from the answers to the technology question. The key response was that firstly, wireless technology will be dominant in the near future, long before 3G\(^1\) (still assumed to be 4 to 7 years away) will have found widespread acceptance. Furthermore, WLANs\(^2\) are expected to dominate the urban landscape, relegating 3G to the countryside – a reversal of what is seen as the only economically feasible way of rolling out 3G. The other technologies too will remain in use: 2.5G seen as adequate for most B2E/B applications, which account for 3 out of 4 users. This makes it imperative that ‘roaming’ between technologies is possible. There is a split of opinion whether specialised handsets for different applications or one type of general-purpose appliance will dominate the market.

Table 1 below shows this summary.

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1 1G=1\(^{st}\) Generation of **analogue** mobile technology; 2G= **digital** mobile technology; 2.5G=compromise technologies (Generic Packet Radio Standard, GPRS, is one of them) to fill the gap until 3G=**wideband** technology is made public. In the European context 3G is the set of Universal Mobile Telecommunications System (UMTS) Protocols

2 Wireless Local Area Network(s)


**Technology Trends**

<table>
<thead>
<tr>
<th>Trend</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UMTS/3G</td>
<td>is still 4-5 years away before useful “industry-strength” applications will be available</td>
</tr>
<tr>
<td>WLAN dominates in the near term</td>
<td></td>
</tr>
<tr>
<td>WLAN and UMTS co-exist; WLAN dominates urban centers (“Hotspots”) and UMTS available in remote/country regions</td>
<td></td>
</tr>
<tr>
<td>2.5G will be enough for most B2E/B applications and will dominate (70%)</td>
<td></td>
</tr>
<tr>
<td>Roaming between 2, 2.5 and 3G as well as WLAN will be of key importance</td>
<td></td>
</tr>
<tr>
<td>Small handsets, using a mix of technology standards and running specialised applications will emerge:</td>
<td></td>
</tr>
<tr>
<td>• Voice still on 2G,</td>
<td></td>
</tr>
<tr>
<td>• WAP types services on 2.5G and</td>
<td></td>
</tr>
<tr>
<td>• Multi-Media-Services (MMS)/”I-mode” type on 3G</td>
<td></td>
</tr>
</tbody>
</table>

**Significant minority view:**

The dominant appliance will be a hybrid of mobile-phone-type handset and personal-digital-assistant (PDA) - will be designed to cater for all applications;

**Table 1. First-Round summary of forecast technology trends**

**Who will be the dominant users?**

A similar conundrum for the network suppliers characterises the forecasts about the user community: the most likely users to want to avail themselves of the 3G wideband applications such as audio, video and multimedia messaging are the teenagers – who cannot pay for them. The user group with the largest growth rate are believed to be the young(ish) professionals, male and aged 25 to about 40. Their business uses can, however, be supplied adequately with 2.5G technology and they, too, will not pay for wider bandwidth.

This is borne out by current developments: The German and Belgian ‘i-mode’ networks (the closest approximation of 3G network services) will only be signing up some 300,000 users in their first year – compared with Japan’s 30 million in three years. At an annualised rate, Europe this is a take-up rate of less than 3% of what i-mode experienced in Japan some three years ago (deLussant, 2002, Scott-Joynt, 2002). A significant minority view looks at a group of special-needs users as a major application area for 3G services (see Table 2.).
**User Community Trends**

UMTS users will be teenagers and young adolescents – however: majority of this age group will not be able to afford the cost of UMTS services on a broad base

Majority users will be male, 25-40 age group, professional/business executive types; using B2E type functionality – will run on WLAN and/or 2.5G; this will be where the large growth in mobile applications usage will come from;

Wideband services (WLAN/UMTS) will stay a minority; traditional telephone on 2G, occasional 2.5G application on a pay-by-transaction basis;

Significant minority view:
Large group will comprise of special needs users: Handicapped, aged, convalescents, parents of children/adolescents;

*Table 2. First-Round summary of the forecast trends in the user community*

**Forecasting Mobile Technology Applications**

When it comes to predicting what will be the most successful/useful, i.e. the “Killer” applications, there is no easy consensus visible. There is some accumulation in the view that business applications will dominate, of the type that not only sales people can use, but also application clusters that will be of assistance to mobile workers, such as repairpersons and travelling supply contractors. In general, these applications will be useful, interactive and often essential for the mobile workforce in a wider context. There are very few consumer applications named that would provide a feasible customer base for mobile technology. Small payments and ad-hoc ticketing/reservations services are the more commonly mentioned consumer-type applications. This trend is summarised in Table 3.

*Table 3. First-Round summary of the forecast trends in the mobile applications area*

<table>
<thead>
<tr>
<th>Application Trends</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2E/B type applications centred around messaging: voice, e-mail, short-message-service (SMS) – will be upwards of 70% of all applications</td>
</tr>
<tr>
<td>Specific sub-group of B2E, B2B, E2E will involve applications for the mobile workforce (MRO(^3) type work as well as Marketing/Sales type work</td>
</tr>
<tr>
<td>Small payments (B2C) and ticketing/reservation type applications (C2B)</td>
</tr>
</tbody>
</table>

\(^3\) Maintenance, Repair and Operations
Application Trends

**Large number** of “Other” applications (often information services of various types, sometimes with a Location-Based-Service characteristic; and multiple **minority views**

The predominant user of the mobile technologies will thus be the employee of companies who will make certain of their existing ERP and, to some extent, their extranet applications accessible through mobile and/or wireless channels. In the first instance, large companies will spearhead this development, but – potentially, at least – this ‘mobilisation’ of critical ‘back-office’ systems is seen as particularly important for Small and Medium-sized Enterprises.

In principle, though, this can therefore be seen as a close extrapolation of the existing applications on offer: Of all the possible positions in the applications grid between Business, Consumers, Employees and Administration (i.e. local and central government) only a few cells are seen to be viable applications markets, as Figure 3 shows.

![Figure 3. Forecast applications trends (after an application matrix by Diederichs, 2002)](image)

**Conclusions and First Pointers**

Deductive, quantitative research approaches do not perform well in the process of ‘sense making’ in the area of mobile technology applications. In order to foster understanding and explanation of the phenomena in this field, a qualitative, grounded method is needed. This was further strengthened when a Delphi research approach was adopted, i.e. if data collation and analysis was carried out in multiple iterations among a setting of expert participants, who are also stakeholders in the substantive area of mobile technology applications.

Following these considerations, a Delphi research project had been started in three European countries with the aim of establishing some fundamental insights into the demand for, the nature of and the relationships between the elements of mobile technology applications. An analysis of the three more pressing questions, i.e. the dominant technology, the largest user group and the “killer” application is outlined below. Two observation have been made immediately: Firstly, the overwhelming majority of participants shows clear and precisely articulated opinions, often underpinned with their own investigations, experiences and
research. This makes for clear groupings of results and often sharply divided minority standpoints.

The second key characteristic of the first summary forecasts of the face mobile technology will present in the next 5 to 7 years is that they are surprising in a number of ways:

- UMTS, the predominant mobile technology in Europe, is not seen to be successful, or at least not in the next 5 to 7 years. On the contrary, wireless network technologies will take over the market in the near term, especially in the urban areas with high user densities;
- Moreover, the 3G market as a whole is considered to be much smaller than commonly – or “officially” – foretold; the main reason for this is that
- The largest user group will be male, 25 to 40 year old professional business users; they will, however, use mostly 2.5G services, which are seen as greatly sufficient for business applications;
- The dominant application clusters are thus B2E services/facilities with limited requirements for graphical, audio and/or video sophistication; teens, the only group with a presumed interest in genuine 3G capable services (such as games, audio and video products and messaging), will however not be prepared (or able) to pay the required tariffs and rates for them;
- Consumer applications with the exception of electronic ticketing and payments, show a wide spread and there is little consensus among the participants.

These findings are in conflict with the official “line” taken by the 3G providers in Germany, Austria and Switzerland, where the research is domiciled – they do however show similarity with the findings of professional Internet research firms. Forrester, for one, predicts in their latest market assessment (de Lussanet, 2002) that the number of 3G subscribers will only amount to about 20% of what network operators expect by 2007. Therefore, the average operator in Germany, Austria and Switzerland will not be breaking even before 2014 – assuming that they can achieve maintaining the exorbitantly high rates they need to charge because of the extravagant prices they paid for their licenses three years ago. Even then, the break even point will occur are just a few years before their licenses run out.

The results have now been summarised and given back to the panel who will be asked to comment on them and, in the light of these first results, perhaps modify their points of view/opinions and forecasts. Depending on the degree of ‘movement’ in the second round of answers, a third round might be needed to consolidate the final results. The project is currently scheduled to finish in late March 2003. Certainly the refined results from the second round, and most likely the majority of the final results, will be available for presentation at the Congress in mid-February.
References:


