

First Steps in the Design of Two UMTS Applications

Dr. Kerstin Keil,

Ericsson Consulting GmbH, Fritz-Vomfelde-Str. 26, D-40547 Düsseldorf, Germany
Kerstin.Keil@ericsson.com

Abstract

This paper reports experiences from the early development phase of two UMTS applications, a Personal Organiser and a Leisure Planner. Telephone interviews were conducted with two samples because the target groups for each application were somewhat different. This paper reports the results of the survey. In particular, those aspects are highlighted where project team members and interview partners' evaluations of the attractiveness of application features differed considerably. The final section presents possible explanations and ideas for a future research agenda.

Key words: User needs assessment, UMTS, telephone survey, consumer applications.

1. Background

Currently, the telecommunications industry is facing a major challenge in combining the success of mobile telephony and the Internet in order to create the Mobile Internet. The development of SMS into a revenue driver has inspired the hope for a steadily growing customer basis for GSM data services. However, first attempts to introduce WAP-based mobile data services have not met customer expectations. The main points for criticism are bad usability of services, poor information quality, bad presentation of content and high tariffs (e.g. Duda et al., 2001; Nielsen, 2000). As a result the acceptance rate for WAP services is fairly low and customer figures are well below the forecast.

Ahmed & Hurst (2000) have phrased questions that clearly point to evaluation criteria for any type of mobile application:

- Does it save time?
- Is it expensive?
- Is it fun to use the service?
- Are there alternatives readily available?
- Is it easy to use?
- Is it new?
- Is it fast?
- Does mobility add value?

It seems that the importance of such aspects has been widely ignored during the first phase of the Mobile Internet.

Telecommunications companies are now worried that their large investments in licence costs and infrastructure for 3rd generation mobile systems will not automatically lead to a speedy adoption of UMTS services. It is frequently stated that applications will be the critical success factor for

UMTS. However, apart from e-mail there is no agreement on future “killer applications” and what they should look like.

This paper reports results of a project on UMTS application development that was formed with the intention to include user aspects right from the start.

2. General approach

The project started off with an idea generation phase whereby possible UMTS applications were described at a fairly high level. The extensive list resulting from brainstorming exercises was then being evaluated by applying several criteria. Important factors for the prioritisation of applications were market potential, anticipated competitive intensity and feasibility.

Two applications, a Personal Organiser and a Leisure Planner were selected according to their assumed market potential. The application descriptions were translated into functional specifications. All functional specifications were rated concerning their suitability for the different end user devices portable computer, Personal Digital Assistant and mobile phone. As a result a number of functions were discarded because they were only suitable for portable computers and this would unnecessarily reduce the number of target customers.

It was decided to test the suitability of the application ideas by presenting the functions to users. In the absence of any visual design prototypes it was decided to conduct telephone interviews in order to obtain quantitative data. The main advantages of telephone interviews are that a large number of study participants can be interviewed in a relatively short period of time.

3 The telephone survey

3.1 Goals

The goals of the telephone interview survey were:

1. To assess potential users’ perception of the suggested applications in terms of their usefulness.
2. To evaluate the matching between user requirements and functionality.
3. To be able to prioritise different functionality aspects.
4. To obtain quantitative data as input for the business models.

3.2 Questionnaire description

For each application, the Leisure Planner and Personal Organiser, there was a separate questionnaire. Both questionnaires had an introductory section with 10 items covering general mobile communication behaviour. The questionnaires did not only refer to mobile phones as end user devices but also to PDAs and to the use of PCs.

In general, 4 point scales were used with an omitted middle category. It was decided to force respondents choice towards the positive or negative side in order to avoid a tendency towards the middle.

3.3 Selected results

3.3.1 The Personal Organiser questionnaire

Altogether this questionnaire had 24 items. The interview took between 10 and 15 minutes. The following aspects were covered:

- General introduction
- Contacts

- Agenda
- Synchronisation
- Unified Messaging
- Location
- Willingness to pay

Respondents were asked mainly how useful they would find certain functions and also how important they considered them.

3.3.2 The Personal Organiser sample

Altogether 53 mobile phone users completed the telephone survey concerning the Personal Organiser. 30% of this sample had already used a PDA such as the Palm Pilot. 63% out of these 30% owned such a device.

About half of the sample were 25-34 years old and the other half between 35-45 years old. The average age was 33.6 years. 62% were male and 38% female respondents. About half of the interviewed persons lived in places with between 100 000 and 1 000 000 inhabitants whereas the other half lived in Berlin, Hamburg, Munich or Cologne.

3.3.3 Personal Organiser responses

Contact list

The majority in this sample (57%) had more than 50 contacts stored in various electronic devices. The majority of interviewees used their contact list on a daily basis: 65% consult the list 1 –8 times per day, 12% even more than 8 times per day. Also, the contact list is usually changed quite frequently: 80% report between 1-10 changes per month, 12 between 11-40 changes. The personal schedule or agenda is also changed quite often: altogether 53% make changes at least once a day but some edit their agenda even up to 8 times per day.

Agenda

Respondents had a fairly clear view on whether it would be useful if others had access to their agenda: 72% said it would be completely useless and 13% somewhat useful. Only 15% considered such an option fairly or extremely useful.

The idea of a single agenda for the interviewee and related others was considered more favourably. Still 53% thought it was completely useless, 21% considered it somewhat useful. Altogether 26% saw it as quite or extremely useful.

Synchronisation

Most interviewees greeted the synchronisation of mobile phone, PC and PDA: 47% considered it extremely useful and 21% as quite useful. Still, 21% thought it was completely useless and 11% only somewhat useful.

The option to send part of the contact or agenda information directly to someone else was considered as extremely useful by 34% and quite useful by 32%. The remaining third did not really see the usefulness of such a function.

Location

The question whether interviewees would like more information on friends and relatives such as their current location was greeted with mixed responses: 23% considered it completely useless

and 30% somewhat useful. This is more than half the sample. In contrast 26% viewed it as quite and 21% as extremely useful.

Altogether 64% would welcome a location-based task reminder function in their mobile device. 23% saw no use in it and the other 13% viewed it as only somewhat useful.

Unified messaging

More than half of the respondents, 57%, would like to receive messages in the format of their choice. The other 43% considered such an option not very important.

Even more respondents, 69%, see it as important to receive messages independent of device. Only 30% considered this of minor importance.

62% considered a message broadcasting option as important or very important. 21% considered it somewhat important and 17% as not very important.

Willingness to spend

A large number of respondents were willing to pay for a service with the described functionality. It should be noted that the pricing model (e.g. flat fee, usage based) was not specified. Only 32% would not like to pay anything. 25% were willing to spend 1-15 DM per month, 25% 16-30 DM and 17% even more than 30 DM per month.

3.4.1 The Leisure Planner questionnaire

Altogether this questionnaire had 37 items. The interview took between 20 and 25 minutes. The following aspects were covered:

- General introduction
- Introduction to the topic of leisure planning
- Personal history
- Personal support
- Intelligent agent
- Event agent
- Route planning
- Location
- Help
- Overall summary

Respondents were asked mainly how frequently they enacted a certain behaviour, how useful they would consider certain functions and also how important they judged them.

3.4.2 The Leisure Planner sample:

57 mobile phone users completed the telephone survey concerning the Leisure Planner application. 32% of this sample had already used a PDA such as the Palm Pilot. Half of those who said that they had already used a PDA stated that they own such a device. 51% of the sample were 18-24 years old and 51% 25-35 years old. The average age was 25.4 years. 60% were male and 40% female respondents. Half of the respondents lived in places with between 100 000 and 1 000 000 inhabitants whereas the other half lived in Berlin, Hamburg, Munich or Cologne.

3.4.3 Leisure Planner responses

Opening

The interview sample consisted of many active *cinema* visitors: Only 23% either went never or less frequently than once a month. 54% went to see a film 1-3 times per month, 23% even more frequently.

In contrast, 84% rarely or never went to see an *opera* but still, 12% reported a visit once a month.

60% said they rarely or never go to *sports events* but 26% reported to attend such events 1-3 times a month.

67% rarely or never visit a *museum, exhibition or fair* but 28% pay a visit 1-3 times a month.

61% of the sample go to a *restaurant* 1-3 times per month. Only 9% rarely or never consider this activity.

21% rarely or never visit *bars and discotheques*, but 38% go out 1-3 times per month. 18% visit such places once a week and 23% even more often.

The majority of respondents, 79% rarely or never attended *concerts or live music*. Only 14% went to such events 1-3 times per month.

A large number of respondents have a clear plan of what they want to do when they go out. 28% often had plans, 37% always planned ahead. Only 18% rarely had a plan and 16% never or almost never.

Most interviewees of this sample were involved in the planning activities: 65% were always involved and 25% participated frequently in planning. Only 10% rarely or never contributed to planning.

Personal history

Respondents were not very interested in keeping a memory of their past activities. Whereas 75% considered it useless or only somewhat useful merely 25% saw at least considerable use in such a function.

Personal support

The ratings somewhat increased for access to one's personal assessment of restaurants or events. 37% saw it as quite or extremely useful. Still, 63% viewed such a function rather sceptically.

The picture changes when restaurants, theatres and events can be chosen according to price. 60% thought that this was quite useful or extremely useful. Only 18% considered it completely useless and 23% somewhat useful.

The question concerning the selection of restaurants, theatres and events according to location split the sample nearly in halves: 51% saw this as quite useful or extremely useful, the others detected little use in such a function.

The availability of tickets or seats at events and in restaurants was considered a quite or extremely useful criterion by 69% of the respondents. The other 31% saw this as low in usefulness.

The idea of selection of restaurant, theatre or event by category (e.g. style of cuisine, music or type of film) was welcomed by 74%. 18% still considered it somewhat useful and only 9% stated that it was completely useless.

Event agent

The responses concerning a 2 minute film preview on the mobile device were as follows: 58% considered it quite or extremely useful, 19% as somewhat useful and 23% as completely useless.

Only 19% were willing to pay for such a service, 72% definitely declined and 9% did not know.

65% saw it as quite or extremely useful if their mobile device gave them an indication of the availability of tickets, seats, etc. 35% considered it as somewhat useful or completely useless.

The question concerning the purchase of tickets by mobile phone elicited a similar response: 66% saw this as quite or extremely useful and 34% as not so useful.

Selling extra tickets to others by mobile phone was seen as useful by 40% whereby 60% saw little use in it.

However, when asked about the frequency of wanting to sell extra tickets the picture was fairly clear: 77% almost never and 21% rarely had extra tickets.

26% of the Leisure Planner sample frequently search for information on *cinemas and films* when they are out, 5% do that almost always. 42% rarely and 26% never search for information.

65% of the sample are never interested in *opera and theatre* information while they are out. 33% reported a rare interest.

Information on *sports events* while being mobile also does not attract much attention. 49% said that they'd never use it and 35% could imagine using it rarely. Only 16% considered frequent use of such information.

Information on *museums, exhibitions and fairs* while being mobile would be popular with 14% of the interviewees. 44% would rarely and 42% would never use it.

The picture changes when it comes to *restaurant* information while being out. 49% could imagine frequent use, 4% are always looking for information. 30% could imagine using it rarely and 18% never.

People might be interested in mobile information on cinema and restaurants mainly because the experience of "fully booked" is quite common for popular films and places.

Also, respondents were interested in information on *bars and discotheques*. 39% would want this information frequently and 12% would always be interested. 25% would rarely and 25% would never use such a service feature. The interest in this type of application may reflect people's experience that they visit more than one bar or discotheques per night because the place is too empty, the crowd not the right mix, etc.

When it comes to information on *concerts and live music* while being mobile 23% could imagine frequent use and 4% would even always use it. However, the remaining 74% would either show a rare interest or none at all.

Those interviewees who stated that they would frequently use such a service were asked how frequently they would use a PC at home for such search activities. Altogether 40 interviewees made a statement: 23% said that they would always use a PC and 45% reported frequent use. 23% stated that they rarely use it and 10% never use their PC for such purposes.

Intelligent agent

33% of the respondents frequently read reviews of restaurants, films etc. that appear in newspapers and magazines. 7% always do that. 40% rarely read reviews and 19% never do that.

Friends and relatives seem to be a much more consulted source of evaluation for restaurants and films. Only 22% never or rarely ask them for advice. 68% frequently consult them and 11% always ask friends and relatives.

The majority of respondents was not interested in proactive suggestions by the mobile device: 67% showed little or no interest and 31% were rather or clearly interested.

Route planner

When asked whether they need to see a map or ask somebody to get directions to a location 40% said they never need help and 42% stated that they rarely require assistance. Only 16% report frequent use and 2% always need assistance. There may be a question whether there was a strong bias towards social desirability (it is considered negative to need directions) or whether people really do know where to go most of the time.

Nonetheless, when asked how useful they'd find a route planner 30% considered it rather and 30% extremely useful. Only 23% viewed it as completely useless and 18% saw little use in it.

When asked whether they would be willing to pay for such a service 37% said yes, 60% no and 4% were undecided.

Out of those persons who were willing to pay 87% said 1-15 DM and 13% 16-30 DM per month.

Locator

18% of the respondents would find it quite useful and 18% extremely useful to get to know the location of friends and relatives. 47% would find this completely useless and 18% would see it as somewhat useful.

Such a function would not be widely used: 83% said that they would rarely or never use it and only 17% would frequently or always want to know other people's location.

Help

When asked whether they would like step-by-step instructions for Leisure Planner 56% said it was of little or no importance. 33% considered it quite important and 11% saw such a help function as extremely important.

Summary

72% said that Leisure Planner could make planning leisure activities easier. 19% thought it would be more difficult and 9% did not know.

25% said that they would go out more often with such a service at hand whereas 75% said that it would probably not change their behaviour.

When asked whether they thought this type of service supports leisure activities 14% said definitely, 28% probably, 35% perhaps and 23% said it would have no effect.

It does not really matter for the evaluation of application features whether people live in a smaller or larger community. The effects are rather small. Therefore, any analysis comparing sub-samples are omitted in this paper.

2.2 Interpretation of results

The telephone survey has shown that several features that were considered attractive by the application team (e.g. agenda sharing or providing information while being mobile) only met with mixed responses. Also, there are very few functions that could be seen as a clear success with the target user group at this abstract level of description. There are several explanations for this finding:

- It is widely assumed that a combination of communication, personalisation and localisation components will make 3G services a success. However, telephone surveys are not appropriate for testing the attractiveness of features that “live” from visualisations. Some of the aspects may appear rather abstract and could better be demonstrated by employing different methods.
- The telephone survey is an appropriate method for obtaining a first impression of people’s view of the application features. However, it is not easy to describe functions properly in one sentence. Therefore, in some cases it is doubtful whether the level of understanding has been appropriate for the described features.
- Even though the different target groups for the Personal Organiser and the Leisure Planner application were well chosen they might be less homogeneous than anticipated.
- The features as such may not be as attractive as anticipated because the “value added” is not obvious. A fair amount of effort might have to be spent on selling the applications to target customers.

Personal Organiser summary

The synchronisation and unified messaging functions received favourable responses. However, only half of the sample saw some use in a localisation function for friends and relatives. A location-based task reminder was seen as attractive but such a function is not easily implemented.

Interviewees’ willingness to spend money on such a service (50% who would pay between 1 and 30 DM per month and 17% even more than that) show that there is a definite target group. However, the size of this group needs to be further specified and also the issue how much exactly they are willing to pay in relationship to the features.

Leisure Planner summary

The results show remarkable scepticism with respect to many of the Leisure Planner features. There is a good chance that several features could elicit more positive responses if they were visualised. For example, there was no strong interest in the event evaluation function but nonetheless, respondents were fairly interested in the assessment of their friends and relatives. If the ratings of this relevant group could be made easily accessible to Leisure Planner users the feature could be considered fairly attractive.

Going out to the cinema and to a restaurant are the most popular pastimes. The question is whether the other leisure activities covered by the questionnaire only play a niche role and can be neglected or whether they have importance for specific content packages.

As mentioned above, leisure activities having to do with cinema seem to be quite popular in this group. Also, the feature of a 2 minute film clip would be appreciated. However, the majority of respondents would not want to pay for such a feature. It can be assumed that many respondents use the PC for viewing such clips and in this context it is “for free”. Since the quality is not likely to improve over the mobile device people may not see it as sufficient in terms of value added.

The overall summary shows that respondents in general view such an application as positive but the question of personalisation needs to be addressed in more detail. Otherwise, usage figures may be somewhat low.

2.3 Issues and next steps

The telephone survey has not only led to more clarity regarding certain questions it has also raised some more issues. For example:

- Are the chosen samples clearly representative of the envisaged target groups for the applications, e.g. does place of residence really have such a low impact on people's leisure behaviour?
- Would respondents' reaction to some of the features be the same if they had seen a visualisation of the Leisure Planner or Personal Organiser?
- What are important determinants of people's willingness to pay, what makes the difference between "nice to have" and perceived added value?

In order to tackle these questions different research methods need to be employed. The attractiveness of a given application such as Personal Organiser or Leisure Planner could be evaluated with the aid of **focus groups**. **Usability testing methods** could be used to see whether the applications meet the criteria of effectiveness, efficiency and user satisfaction. **In-depth interview studies** are a method to obtain people's reasons for evaluative statements.

For example, in order to illustrate the functions and the possible "look and feel" several aspects of the Leisure Planner application were visualised based on a short scenario. The next step could be to allow potential users to interact with the application and to carry out usability tests. This could take the form of html pages with "fake" functionality on a PC. However, depending on the availability of UMTS end user devices it would be better to implement the visualisation handheld device and have a realistic demonstrator. A visualisation on a PDA would be an "in between" solution.

It is planned to conduct studies with a variety of methods in order to determine likely user behaviour for the future mobile applications.

References

Ahmed, Z. & Hurst, M. (2000) The wireless customer experience. www.creativegood.com

Duda, S., Schießl, M. & Hess, J.M. (2001) Mobile usability report. Book on demand. www.businessvillage.de

Nielsen, J. (2000) WAP Field Study Findings. WWW.useit.com and WAP Usability Report: field Study Fall 2000. WWW.nngroup.com.