

WAP for business travellers

- Results and methodology of an international online expert survey

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Introduction

This paper contains a presentation and discussion of the results of a WAP survey among a virtual panel of 80 real experts from 26 different – mostly European - countries. The WAP survey was conducted via the Internet (using e-mail and a Web Form) over a period of about 4 months from 12th Oct. to 20th Feb. 2001.

PART I contains a review of the results, including these three elements:

- Importance and performance analysis – now and year 2003: i.e. the importance of 14 basic attributes or conditions for m-commerce and m-content. At the moment, how is the performance of each of these attributes, and what is the expected situation in the year 2003? Where are the greatest improvements?
- Web and WAP application for business travel related services: Which of 22 different types of information or transaction – relating to air/train/car transportation, hotel accommodation and staying in touch - have been undertaken on the Web? What would the travellers like to be able to do on a WAP-enabled mobile phone? Which of these different things do they think is currently possible to suit their needs, and what have they already done on a WAP-phone.
- What concepts and functions, i.e. that types of information and transactions, are considered to be the most fruitful specifically in connection with WAP-sites for hotels? This is assessed both by a series of 16 pre-defined rating-scales as well as an open-ended question.

Part II contains background information and discussion:

- There are a number of background variables, which allow the drawing of basic profiles of respondents, the experts. It is also possible to see if, for example, if there is any difference between responses from the two main groups of experts, the WAP/mobile group and the IT/travel group.
- Response rates are presented and the effectiveness of different ways of collecting questionnaires via the Internet are discussed.

PART I – RESULTS

Importance - and performance (2000 and 2003).

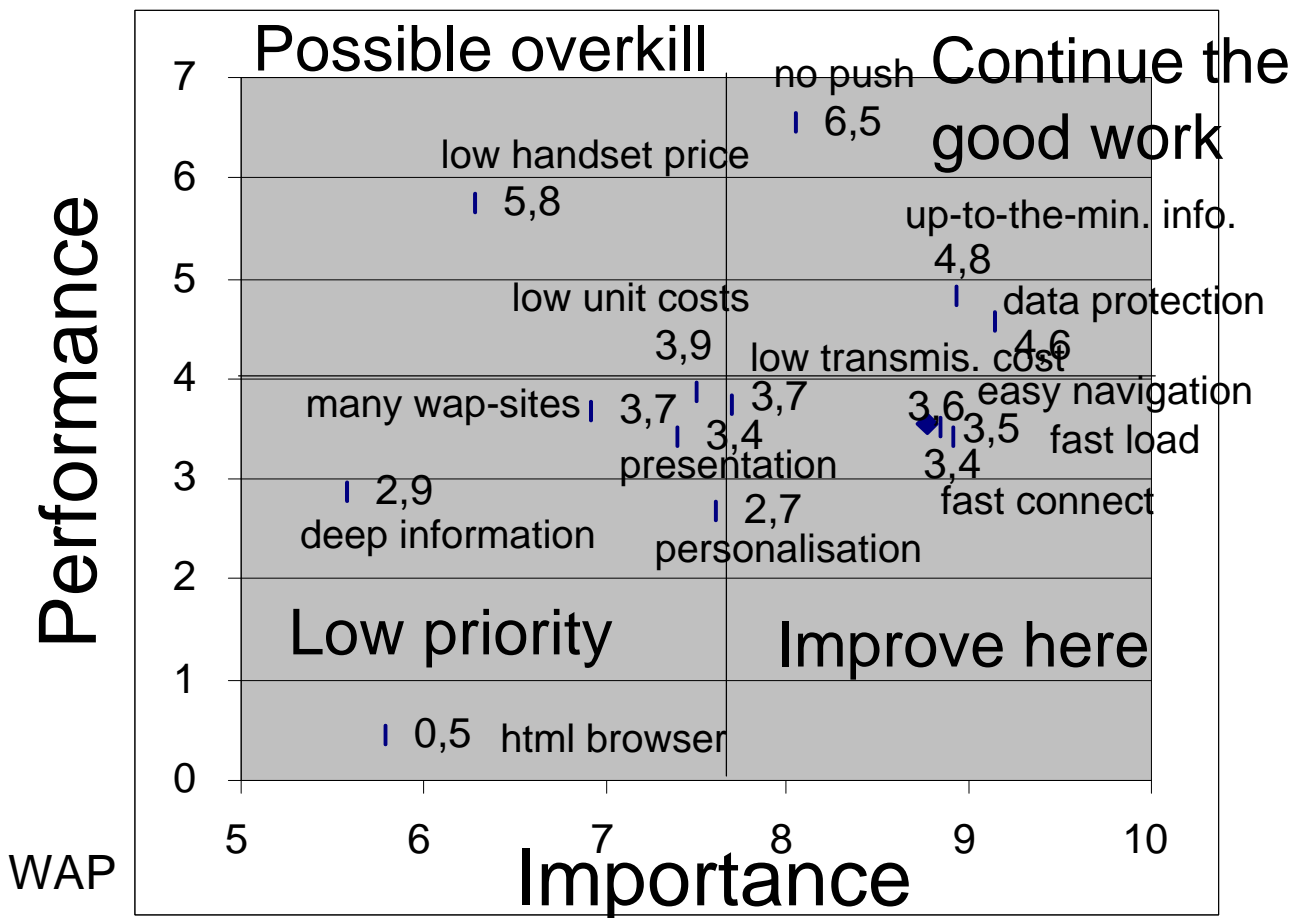
Table 1 Importance - and performance (2000 and 2003).

Attributes	Importance-	Perform.	Perform.	Score	Score	Absolute increase in score	Relative increase in score
	W	P (2000)	P (2003)	W*P (2000)	W*P (2003)		
1 many wap-sites	6,9	3,7	8,2	25	57	31	123%
2 deep information	5,6	2,9	7,4	16	41	25	156%
3 up-to-the-min. info.	8,9	4,8	8,6	43	77	34	<-B 79%
4 fast connect	8,9	3,4	8,3	30	74	43	<-A 143%
5 fast load	8,8	3,5	8,3	31	73	42	<-A 135%
6 low handset price	6,3	5,8	8,3	36	52	16	44%
7 low transmis. cost	7,7	3,7	7,6	29	58	30	104%
8 low unit costs	7,5	3,9	7,3	29	55	26	89%
9 personalisation	7,6	2,7	8,1	20	61	41	<-A 201%
10 no push	8,1	6,5	4,1	53	33	-20	<-Z -38%
11 html browser	5,8	0,5	6,8	3	40	37	<-B 1419%
12 data protection	9,1	4,6	6,6	42	60	19	44%
13 presentation	7,4	3,4	7,6	25	56	31	123%
14 easy navigation	8,8	3,6	7,7	31	67	36	<-B 116%
Average* (n=80) (*weighted)	7,7	3,9	7,5	414	805	391	95%
MAX score				1074	1074		
Percent of max.		-----	-----	39%	75%		

Figure 1 Importance and performance analysis: The text-book guidelines - after plotting attributes according to their importance and performance

Good performance	Possible overkill	Continue the good work
Poor performance	Low priority	Improve here
	Not very important	Very important

Figure 2 Importance and performance analysis for WAP – now



Importance

The five most important basic conditions of m-commerce are:

- Data protection. 9.1
- That information is up-to-the-minute. 8.9
- That the *connection can be established swiftly*. 8.9
- That WAP-sites can be *loaded quickly*. 8.8
- That WAP-sites are *easy to navigate*. 8.8

The only other attributes of above-overall-importance (of 7.7 on the 0-10 scale) is that content providers abstain from pushing general advertising for which users have not opted-in (8.1).

Performance 'now' – year 2000

On a scale from 0 to 10 the overall average performance score for the 14 different attributes is 3.9, i.e. 39% of maximum. The most positive thing there is to say about the 'performance' of WAP sites by the end of year 2000 is that content providers *currently abstain from* pushing information on to peoples mobile phones, without prior permission (score of 6.5 in 2000). The next most positive thing is that the price of a WAP-enabled phone is considered to be fairly low (score of 5.8 in 2000).¹ This, however, should be seen in light of the fact that as many as 65% of the respondents have got at least one company financed mobile phone, which is often a WAP-enabled one.²

Performance 'in future' – year 2003

While content providers abstained from pushing un-requested information on to people's mobile phones in the year 2000, this situation is totally reversed by the year 2003. By that time 'no-push' is clearly the worst scoring of all 14 attributes. I.e., the expert panel does not expect content providers to abstain from pushing un-requested information on to peoples phones by the year 2003. This is the only attribute where there is a negative development in performance from 2000 to 2003.

Six of 14 attributes score more than 8.0 (i.e. more than 80% of max.) in projected performance by 2003. These are, with the best performing attribute mentioned first:

- Up-to-the-minute information 8.6
- Fast connection time 8.3
- Fast loading time 8.3
- Low handset price 8.3
- Many WAP-sites 8.2
- Personalisation 8.1

¹ The average performance score is not above 5 for any other of the 14 attributes by the end of year 2000.

² 75% of those who have got at least one company financed mobile phone, have got at least one WAP enabled phone (i.e. 39 of 52). 39% of those respondents who have got a privately financed mobile phone only, have got a WAP-phone (i.e. 11 out of 28). Overall, 63% of respondents (50 of 80 have got at least one WAP enabled phone).

After weighting the *improvement in performance* from the year 2000 to the year 2003 with the *importance* of the different attributes, the most significant improvements (in absolute terms) are in the following six fields:

Primarily:

- Fast connection time.
- Fast loading time.
- Personalisation.

Secondarily:

- html-browser (in addition to wml-browser)
- Ease of navigation.
- Currency of information (up-to-the-minute info.)

By the end of the year 2000 only two types of handsets contained a html-browser, in addition to a wml-browser or a combined html/wml-browser, namely the Nokia 9110i and the Sony Z5, and only a few respondents had any of these device (3 of 80). The score for 'html-browser' in handset by 2003 was 6.8. A simplistic interpretation of this is that two thirds are sure their handset (by 2003) WILL contain a html-browser, whereas one third are sure their handset will NOT contain a html-browser (by 2003).³ This is the most dramatic change (in relative terms) in any of the attributes compared with the current situation.

In relative terms the next greatest improvement will be in the field of personalisation, where the improvement will be about 200%. - The overall improvement, across all attributes, in the basic condition of m-commerce from 2000 to 2003 is 95%, from 3.9 to 7.5 on the 0-10 scale. In other words, from 39% to 75% of max.

WAP applications for business travel related services

Overview

In the following we shall review 22 different business travel related services. These can be classified into five main groups, namely

- 1) air travel related (five services)
- 2) train travel related (two services)
- 3) car travel related (two)
- 4) hotel related (six)
- 5) staying informed - staying in touch (five)

For each of the 22 different services, respondents have been asked whether or not they

- A) have accessed the service on the Web

³ The picture is actually somewhat more varied: Only 5 of 80 are sure their mobile phone by 2003 will NOT include a html-browser. Almost four times as many, 19 of 80, are sure it WILL. The rest (i.e. the majority, 80-5-19=56, or 70%) are actually not completely sure if it will or not (including one who just don't know).

- B) would like to be able to access the service on WAP
- C) think it is currently possible on WAP to a degree which suits their needs
- D) have already accessed the service on WAP

Would like to be able to do on WAP

Most desired WAP applications – What most say they would like to be able to do on WAP.

The things that business travellers (i.e. those in the expert panel) say they would like to do on a WAP-enabled phone, although not necessarily done at the moment, are ... largely everything! 99% would like to be able to check flight delays. There are 7 additional things which more than 90% of respondents say they would like to be able to do on WAP. - Even the least desired out of 22 different applications, namely the ability to buy/sell shares via WAP, is a facility desired by almost half of respondents (49%).

Table 2 Web and WAP usage – Overall ranking by "like to do on WAP"

(n=80)	A Done so on Web	B Like to do on WAP	C Possible on WAP	D Done so on WAP
1 Flight delays	54%	99%	33%	18%
2 Traffic situation	46%	94%	30%	24%
3 Weather / road	80%	94%	42%	25%
4 Hotel phone nos.	85%	94%	43%	31%
5 Flight schedules	88%	93%	37%	29%
6 News headlines	98%	91%	60%	55%
7 Check e-mail box	91%	91%	46%	44%
8 e-mail corres.	94%	91%	51%	48%
9 What's on tonight	73%	90%	36%	28%
10 Restautant info.	78%	90%	27%	25%
11 Train schedules	75%	89%	32%	23%
12 Driving directions	65%	89%	18%	21%
13 Room availability	69%	88%	22%	10%
14 Exchange rates	93%	88%	43%	28%
15 Change flight	29%	85%	8%	5%
16 Book hotel room	65%	85%	17%	10%
17 Book flight	63%	80%	12%	5%
18 Hotel amenities	76%	75%	27%	18%
19 Share prices	76%	75%	50%	34%
20 Train reservation	31%	69%	14%	1%
21 Bonus points	54%	68%	17%	6%
22 Buy/sell shares	43%	49%	22%	4%
Average	69%	85%	31%	22%

Table 3 Web and WAP usage

(n=80)	A Done so on Web	B Like to do on WAP	C Possible on WAP	D Done so on WAP
Airtravel				
1 Flight schedules	88%	93%	37%	29%
2 Book flight	63%	80%	12%	5%
3 Change flight	29%	85%	8%	5%
4 Flight delays	54%	99%	33%	18%
5 Bonus points	54%	68%	17%	6%
Train travel				
6 Train schedules	75%	89%	32%	23%
7 Train reservation	31%	69%	14%	1%
Car travel				
8 Driving directions	65%	89%	18%	21%
9 Traffic situation	46%	94%	30%	24%
10 Weather / road	80%	94%	42%	25%
Hotel related				
11 Hotel amenities	76%	75%	27%	18%
12 Hotel phone nos.	85%	94%	43%	31%
13 Room availability	69%	88%	22%	10%
14 Book hotel room	65%	85%	17%	10%
15 Restautant info.	78%	90%	27%	25%
16 What's on tonight	73%	90%	36%	28%
Staying in touch				
17 News headlines	98%	91%	60%	55%
18 Exchange rates	93%	88%	43%	28%
19 Share prices	76%	75%	50%	34%
20 Buy/sell shares	43%	49%	22%	4%
21 Check e-mail box	91%	91%	46%	44%
22 e-mail corres.	94%	91%	51%	48%
Average	69%	85%	31%	22%

- Within the field of staying in touch and staying informed, e-mail is the most desired WAP-application (send and receive e-mails, and checking the e-mail box back home at the office), along with getting news headlines, each desired by 91%.
- Within the field of air travel the most desired application is information about flight delays (99%), followed by ability to check flight schedules (93%).
- Within car travel, the most desired features are the weather/road conditions and information about the current traffic situation (94% each).
- Within train travel to get the schedules is a rather much desired application (89%).
- Within the hotel related services, the most desired type of information on WAP is the ability to get basic contact details such as phone numbers of conveniently located hotels (94%). Restaurant information and what's on tonight info. is desired by 90% each. Room availability by 88%, and room booking by 85%.

Done on fixed line Internet

More than 90% of respondents have done the following on the fixed line Internet (while being on the go on business, involving at least one night stay at a hotel):

- Get news headlines 98%
- Correspond by e-mail 94% (while one the go)
- Check ordinary e-mail box 91% (while one the go)
- Check exchange rates 93%

More than 80% have done the this on the fixed line Internet (while being on the go):

- Check flight schedules 88%
- Find phone nos. of hotels 85%

Already done on WAP

The five things which more than 30% of all respondents have **already done on WAP** are the following:

1. Get news headlines 55% (of a max. of 63%, cf. below comment)
2. e-mail correspondence 48%
3. check ordinary e-mail box 44%
4. check share prices 34%
5. hotel phone numbers 31%

Other business travel related WAP services with above average actual usage among respondents:

6. flight schedules 29%
7. exchange rates 28%
8. what's on tonight 28%
9. restaurant info. 25%
10. weather / road conditions 25%
11. traffic situation 24%
12. train schedules 23%

Just below the overall average (of 22%):

13. driving directions 21%

Since 63% of respondents have got at least one WAP enabled phone the above percentages mean that largely **all** those how have got a WAP phone have tried to get the **news** headlines on WAP, which is not surprising. – After news and e-mail, current WAP usage levels somewhat off: About 34% (of the max. of 63% who have got a WAP phone) have tried to check share prices and flight schedules). More than half of those which have got a WAP phone, have done the mentioned things on WAP.

How should we define great WAP-applications anyway?

Great WAP-applications can be defined in many ways:

- Most desired WAP apps (B – in Table 3 to Table 4)
- Currently most available (C)
- Currently most used (D)
- **Highest volume** (killer apps)
- Most lacking
- Most in need of improvement (sub-standard apps)
- Dedicated / inherent / unique ('WAP only' apps)

Table 4 Great WAP-applications: How to define them – and what are they?

(n = 80)	Killer apps A*B	Latent apps B-C	WAP only apps B-A	Used Web apps: A	Desirable WAP apps: B	Existing WAP apps: C	Used WAP apps: D
Airtravel							
1 Flight schedules	81%	55%	5%	88%	93%	37%	29%
2 Book flight	50%	68%	18%	63%	80%	12%	5%
3 Change flight	24%	77%	56%	29%	85%	8%	5%
4 Flight delays	54%	65%	44%	54%	99%	33%	18%
5 Bonus points	36%	51%	14%	54%	68%	17%	6%
Train travel							
6 Train schedules	67%	57%	14%	75%	89%	32%	23%
7 Train reservation	21%	55%	38%	31%	69%	14%	1%
Car travel							
8 Driving directions	58%	71%	24%	65%	89%	18%	21%
9 Traffic situation	43%	64%	48%	46%	94%	30%	24%
10 Weather / road	75%	52%	14%	80%	94%	42%	25%
Hotel related							
11 Hotel amenities	57%	48%	-1%	76%	75%	27%	18%
12 Hotel phone nos.	80%	51%	9%	85%	94%	43%	31%
13 Room availability	60%	65%	19%	69%	88%	22%	10%
14 Book hotel room	55%	68%	20%	65%	85%	17%	10%
15 Restautant info.	71%	63%	11%	78%	90%	27%	25%
16 What's on tonight	65%	54%	18%	73%	90%	36%	28%
Staying in touch							
17 News headlines	89%	31%	-6%	98%	91%	60%	55%
18 Exchange rates	81%	45%	-5%	93%	88%	43%	28%
19 Share prices	57%	25%	-1%	76%	75%	50%	34%
20 Buy/sell shares	21%	27%	6%	43%	49%	22%	4%
21 Check e-mail box	83%	46%	0%	91%	91%	46%	44%
22 e-mail corres.	85%	40%	-3%	94%	91%	51%	48%
Average	59%	54%	15%	69%	85%	31%	22%

Highest volume applications (killer applications)

Content providers may be more interested in developing those applications which are likely to actually generate the greatest traffic volume on their WAP site rather than those which the greatest proportion of potential users say they would like to be able to access on their WAP phone. If we use what people currently do on the fixed line Internet as an indicator for the level of WAP traffic to expect, and multiply that the desirability of each these applications on WAP, some of the same applications come at the top once again:

- 1) news headlines
- 2) e-mail (send/receive, and check box back home).

Other candidates for high volume WAP applications are:

- 3) exchange rates
- 4) flight schedules
- 5) hotel phone numbers (basic contact details)
- 6) weather / road info.
- 7) restaurant info.
- 8) train schedules
- 9) what's on tonight

However, although largely every respondent said they would like to be able to check flight delays, it seems unlikely that this application will actually be used very much.

Most lacking applications

The *most lacking application*, i.e. the application where the greatest gap between desired applications and existing applications is found, is the ability to change flights: It is desired by 85%, but only 8% this is currently possible to suit their needs. – Also in the area of driving directions there is a great gap between the desired level and what is believed to be possible on WAP at the moment (89% vs. 18%).

Applications which are ‘born for WAP’ - Dedicated WAP-applications

Finally, the *WAP-only applications*, i.e. the applications desired by rather many on WAP, but only used by few on fixed-line Internet, are the following three:

- Ability to change flights
- Ability to get the current traffic situation.
- Flight delay info.

Applications in most need of improvement – Sub standard applications

It turns out that for one application there are less people who find that this is currently possible to suit their need than there are people (among respondents) who have actually tried to do this on WAP. In other words: One WAP services appear to be below the desired minimum standard.

- Driving directions -3%

It is noteworthy that the percentage of respondents, who have actually tried to get driving directions on WAP is larger than the percentage of respondents who believe that this is currently possible to a degree which suits their needs.

This gives reason to make a specific dissatisfaction analysis. In doing so we shall focus on those respondents who have actually tried to do specific things on WAP.

There is a more detailed dissatisfaction analysis in a separate section below.

Dissatisfaction analysis among current users - Happy vs. unhappy WAP current users

The overall picture – across 22 different travel related WAP applications

Respondents have been asked about

- whether or not they would like to be able to do 22 different travel related things on WAP
- whether or not they think each of these things are currently possible to suit their needs and
- whether or not they have actually already done each of these 22 different things on WAP.

This gives a total of 8 possible combinations of answers. The first four combinations consist of those answers, where respondents say they would like to be able to do something on WAP, and the four last combinations can be lumped into one group, consisting of all those instances where respondents say they would not like to do certain things on WAP.

Figure 3 Classification of answering pattern for WAP applications

1	2	3	4
Want to see development	Potentially happy users	Happy users	Unhappy users
Would like to do on WAP	Would like to do on WAP	Would like to do on WAP	Would like to do on WAP
Currently NOT possible on WAP to suit needs	Currently possible to do on WAP to suit needs	Currently possible to do on WAP to suit needs	Currently NOT possible on WAP to suit needs
Have NOT yet done on WAP	Have NOT yet done on WAP	Have already done on WAP	Have already done on WAP
49%	14%	16%	6%

5-6-7-8: Would NOT like to do on WAP: 15%

Want to see development, 49%: The most common answering combination is the one where respondents say they would like to do certain things on WAP, but they don't think it is currently possible to suit their needs, and they have not done it on WAP. This group consists of almost half of the responses.

Potentially happy users, 14%: The next group of combinations of replies where people would like to do something on WAP, they think it is currently possible to suit their needs, although this is not certain, since they have not actually tried out the specific WAP applications.

Happy users, 16%: This is obviously the ideal situation where users find that specific things are currently possible on WAP to suit their needs, and this is a fact, since the applications have actually been tried out.

Unhappy users, 6%: For this group of answer combinations respondents have actually tried out specific WAP applications, but do not find that the WAP services are good enough to suit their needs.

Those who have actually tried to do certain things on WAP consist of the 16% happy users and the 6% unhappy users, i.e. about 22% in total. So, a typical respondent in the expert survey have tried out about two out of nine WAP applications. What is worrying – or challenging – is the fact that the

group of unhappy users is so large compared to all actual users: 6 of 22 (after rounding). Before rounding the numbers are 6.5% unhappy users (or unsatisfactory applications) out of 22.4% actual users. So, $6.5/22.4=29\%$ of users are unhappy with the WAP applications which they have tried out. In other words: *Almost 30% of WAP applications are found not to be up a standard, which is good enough to suit the needs of the actual users.*

Happy vs. unhappy users for each of 22 travel related WAP applications

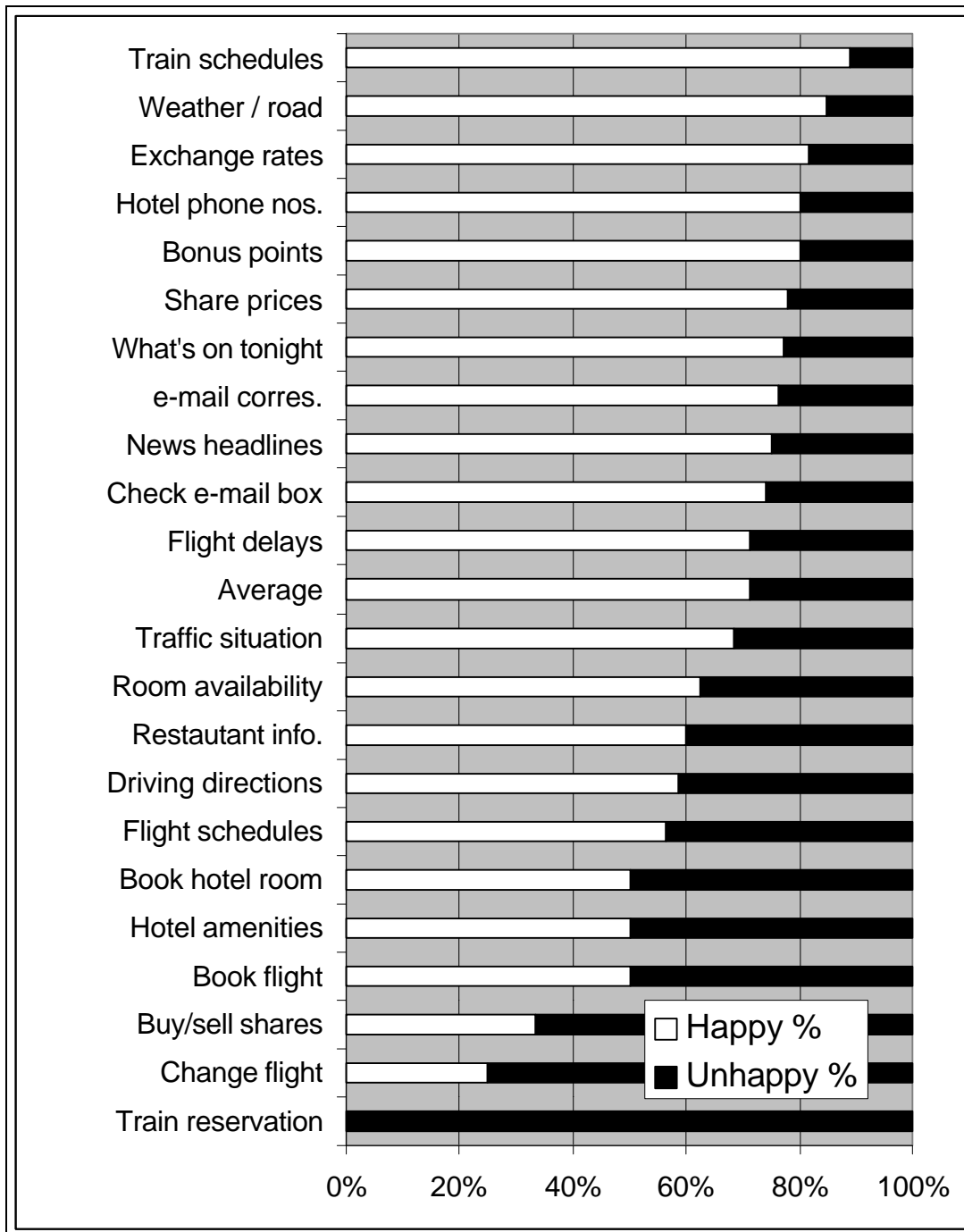
Out of 80 respondents, of which 50 have got at least one WAP enabled phone, the number of those who have actually tried to do certain travel related things on WAP ranges from a high of 44 (for news headlines) and a low of just single one (for train reservation) who was in fact not happy with that service. The highest percentage of happy users we find in the area of train schedules, where almost 90% (16 out of 18) of those who have tried out that service on WAP are happy with the way it functions. Also a high percentage are happy with the function of weather forecast on WAP.

Table 5 Happy vs. unhappy current WAP-users

(n=80)	Happy (%)	Unhappy (%)	Users: Happy	Users: Unhappy	Users of WAP
Airtravel					
1 Flight schedules	57%	43%	13	10	23
2 Book flight	50%	50%	2	2	4
3 Change flight	25%	75%	1	3	4
4 Flight delays	71%	29%	10	4	14
5 Bonus points	80%	20%	4	1	5
Train travel					
6 Train schedules	89%	11%	16	2	18
7 Train reservation	0%	100%	0	1	1
Car travel					
8 Driving directions	59%	41%	10	7	17
9 Traffic situation	68%	32%	13	6	19
10 Weather / road	85%	15%	17	3	20
Hotel related					
11 Hotel amenities	50%	50%	7	7	14
12 Hotel phone nos.	80%	20%	20	5	25
13 Room availability	63%	38%	5	3	8
14 Book hotel room	50%	50%	4	4	8
15 Restautant info.	60%	40%	12	8	20
16 What's on tonight	77%	23%	17	5	22
Staying in touch					
17 News headlines	75%	25%	33	11	44
18 Exchange rates	82%	18%	18	4	22
19 Share prices	78%	22%	21	6	27
20 Buy/sell shares	33%	67%	1	2	3
21 Check e-mail box	74%	26%	26	9	35
22 e-mail corres.	76%	24%	29	9	38
Average	71%	29%	13	5	18

Overall it seems that the relatively simple (travel related) WAP services are those which function best, and therefore have the highest percentage of happy users. On the other hand all the more complex transactional WAP services have got the smallest proportion of happy users: Reservation and change of flight, hotel booking and train reservation as well as buying/selling of shares.

Figure 4 Happy vs. unhappy users – among actual users of the different WAP services



However, also some simple WAP services have a high proportion of unhappy users, which is the bad news, but the good news is that it should be easy to improve these simple WAP services: Restaurant info., flight schedules, hotel amenities.

Developing WAP-sites for hotels

Most promising concepts – A numerical expression

The participants in the virtual panel of real WAP and/or travel/tourism experts have been asked about which concepts etc. they think are most promising in connection with developing WAP sites for hotels (i.e. for hotel chains, destinations and electronic hotel guides, but not for individual hotels).

The three most promising concepts/functions/features for hotel WAP sites are:

1. Room availability on WAP
2. Integration of Web-site and WAP-site
3. Booking on WAP.

Table 6 Promising concepts for hotel WAP-sites.

Room availability on WAP	8,3
Integration of Web-site and WAP-site	8,2
Booking on WAP	8,1
Basic contact details	8,0
Location based services	8,0
Driving directions	7,8
Last minute hotel accommodation offers	7,6
Targeting members of loyalty programs	7,3
Personalisation	7,3
What's on, in or nearby hotel	7,2
Distances to xyz	7,0
Basic descriptions of amenities	6,8
Last minute restaurant offers at the hotel	6,8
XML	6,7
One-to-one marketing	6,6
Corporate agreements with chains	6,5
Overall average (n=80)	7,4

Other concepts etc. which are relatively promising are:

- Provision of basic contact details
- Location based services
- Driving directions
- Last minute hotel accommodation offers.

How hotels can make innovative use of WAP – A verbal expression

Finally respondents were asked to explain, in their own words, how hotels can make innovative use of WAP at the moment and during the coming 12 months. Almost 70% of respondents were able to express their points of view about this, which is one of many indications of the respondents' actual expertise in the relevant fields (WAP and/or IT for travel/tourism). Most of the views were positive, and explained the perceived current possibilities, whereas a minority chose to emphasise the current limitation of WAP.

Summary of review of WAP applications

In short, these WAP applications are probably those business travellers would actually use most:

The currently most used applications – all from the “staying in touch” group - are fundamental:

- News headlines
- e-mail: send/receive e-mails – and check what is in the ordinary e-mail box ⁴

Several other widely available WAP information services are also much used at the moment:

- Financial info.: Share prices and currency exchange rates
- Flight schedules
- Hotel phone numbers (basic contact details)

Furthermore, current Web-usage indicates that these types of info. could be high in demand on WAP as well:

- Weather / road conditions
- Restaurant info.
- Train schedules

There is one application which each and every respondent (except one) say they would like to have on WAP, but since this is something relatively few respondents have actually on the PC already, it cannot be taken for granted that this application will actually be used very much on WAP:

- Flight delay info.

We can continue the list of applications – mentioning different reasons. There are several applications which are currently very underdeveloped, i.e. there is a huge gap between the desired and existing applications. The most marked of these is this, which 90% desire, but which only 10% believe is currently available on WAP to suit their needs. This is also the service where there is the greatest margin in favour of WAP – compared to ordinary Web-usage:

- Change flight - Followed by:
- Hotel room availability check and hotel room booking.
- Driving directions.

⁴ This latter market seems to be what Ericsson Microsoft Mobile Venture AB, <http://www.em-mobileventure.com/>, is trying to tap into: "NetCom, Norway, will be the first operator in the world to launch Moso™, the mobile e-mail solution from Ericsson Microsoft Mobile Venture. The solution will enable NetCom's enterprise users to gain secure mobile access to their corporate e-mail and personal information management functions, such as calendar and contacts. The commercial launch is planned for first half of 2001." (Press Release 15 December, 2000).

Other 'true wireless' applications (in addition to 'change flight') are these:

- Current traffic situation
- Flight delays (again)
- Train reservation

A couple of services mentioned above will have to await the commercial availability of LBS support:

- Driving directions
- Restaurant info.

PART II Profile of respondents and methodology

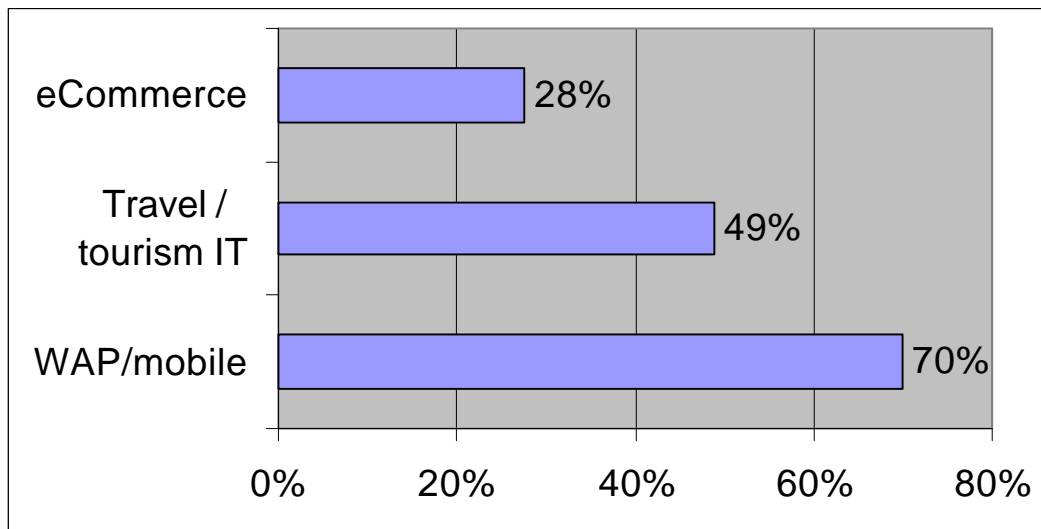
Profile of the respondents – the virtual panel of real experts

All respondents were experts in either IT for travel/tourism or in WAP and mobile telephony. And on top of this some had expertise in general e-commerce (i.e. not necessarily for travel/tourism). 61% of respondents had expertise mainly in one field, 31% had expertise in two fields, and 8% in all three fields.

Of the 80 respondents ..

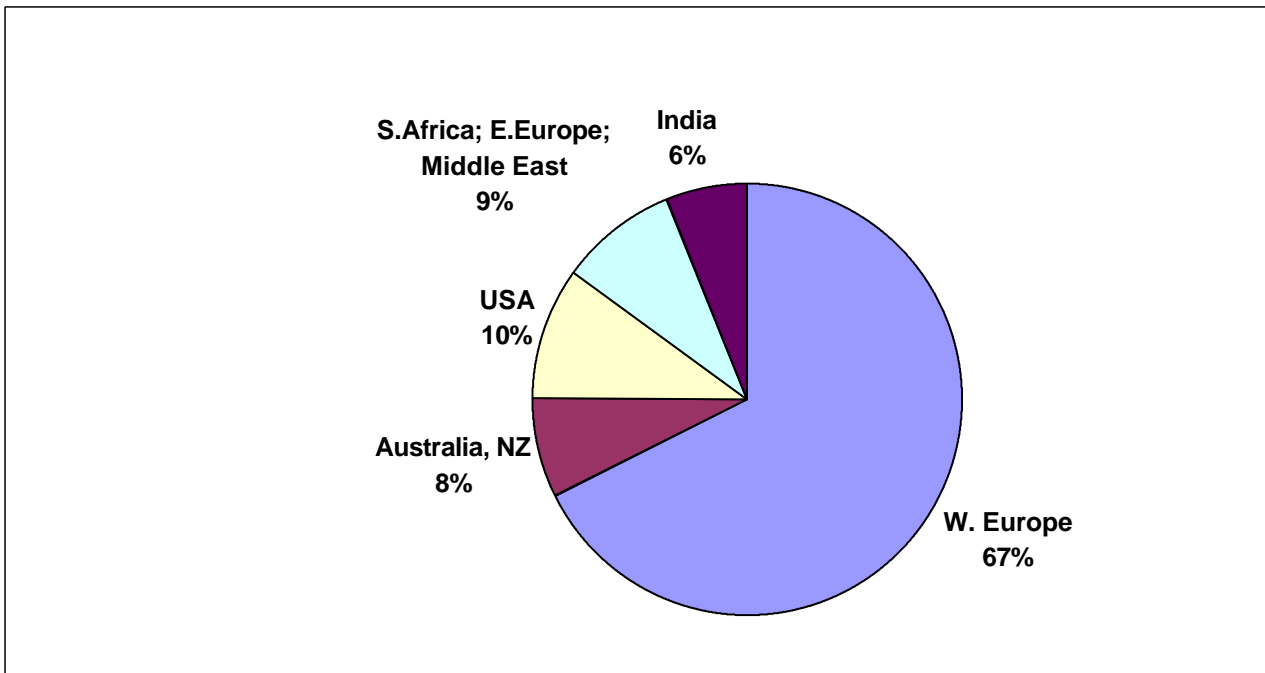
- 70% regarded themselves as being experts in WAP and mobile telephony.
- 49% are experts in the IT applications for travel and tourism.
- 28% have got expertise in general e-commerce, IT and telecom.

Figure 5 Expertise of the respondents (n=80)



The respondents represent 25 different countries. All 18 Western European countries (EU 15 + Switzerland, Norway and Iceland) are represented in the WAP survey, except Luxembourg. The UK contributed 12 of 80 respondents; the USA 8; India and Austria 5 each; Germany, France, Switzerland and Australia 4 each. Five countries contributed with 3 each: Italy, Finland, Norway Netherlands, and South Africa. Other countries: Sweden, Denmark, Iceland, Belgium, Greece and New Zealand. Finally, also represented: Spain, Portugal, Ireland, Czech Rep., Slovenia, Israel and Kuwait. In total 54 of 80 respondents (exactly two thirds) are currently based in Western Europe.

Figure 6 Break-down of respondents by current country of residence (n=80)



Using the number of ordinary mobile Internet users as yardstick, the following can be stated:

Over represented: India; Australia/NZ; Western Europe; Eastern Europe, Middle East, S. Africa
Slightly underrepresented: USA
Not represented at all: Japan, S. Korea, China

In an expert survey the idea is not to get a sample which is representative of users in general. So, the term representativeness can only be applied in the sense geographic representativeness. Even in this limited since it is difficult to measure representativeness of the experts in the sample, since that would require that we know how the experts in the field are located. There are very few ordinary WAP-users in India. There are many software programmers in India, which explains why India is well represented among the respondents in WAP expert survey. Overall, the anglo-phone part of the world seems to be over represented, which is no problem seen from a European point of view as far as the applicability of the results are concerned. South East Asia, notably Japan, S. Korea, and China is not represented at all in the expert survey. Briefly, the results are simply not applicable to these major countries which are not represented. In fact one expert from China did agree to take the survey, but unfortunately never got around to responding.

In Japan there are almost twice as many mobile Internet users as in all of Western Europe. However, in Japan i-mode (and the associated proprietary web page programming cHTML) is the dominating approach to mobile Internet usage, i.e. *not* WAP (and the associated web page programming language wml). In Japan the mobile networks in use at the time of the survey were also more progressed than those in use in the rest of the world including Western Europe. All in all it eases interpretation of the results that the WAP expert survey does not cover Japan at all.

The average number of mobile phones used by each respondent is 1.32. One respondent (an education consultant) reported that he uses five different mobile phones, all of them WAP-enabled

(two of them allegedly privately financed), and another respondent uses four mobile phones, three of which WAP-enabled (for testing purposes). Just 14% of respondents have got one personally financed pre-paid phone, and about 40% have got one (or two) personally financed post-paid phone(s). 69% had at least one company financed mobile phone, and three had more than one company financed mobile phone (cf. above). In average, there were 0.78 WAP-enabled mobile phones in use per respondent.

All the respondents have at least one mobile phone. As many as 63% of the respondents had at least one WAP-enabled phone each, typically company financed. 70% carries laptop computers on business trips, and 45% PDAs. Although not included in the WAP-questionnaire, the writer became curious about why a PDA was carried on business trips, but not a portable PC, and got this illuminating reply:

“What I need when I travel is primarily e-mail, calendar and access to notes and address book. These are matters which my WAP-phone * cannot fully handle, but my Palm V can. The ability to surf Web-pages which I to some extent is missing, but in most instances this can be covered by a computer available at the hotel, e.g. in the lobby. I do not feel any need to work with or handle files of different sorts on a PC when I travel.** In some instances I do bring a PC with me, but then it is normally because I must have it with me in order to show a PowerPoint presentation at a location where they do not have a PC which I can borrow.”

*) A Nokia 7110, in fact, like many other respondents.

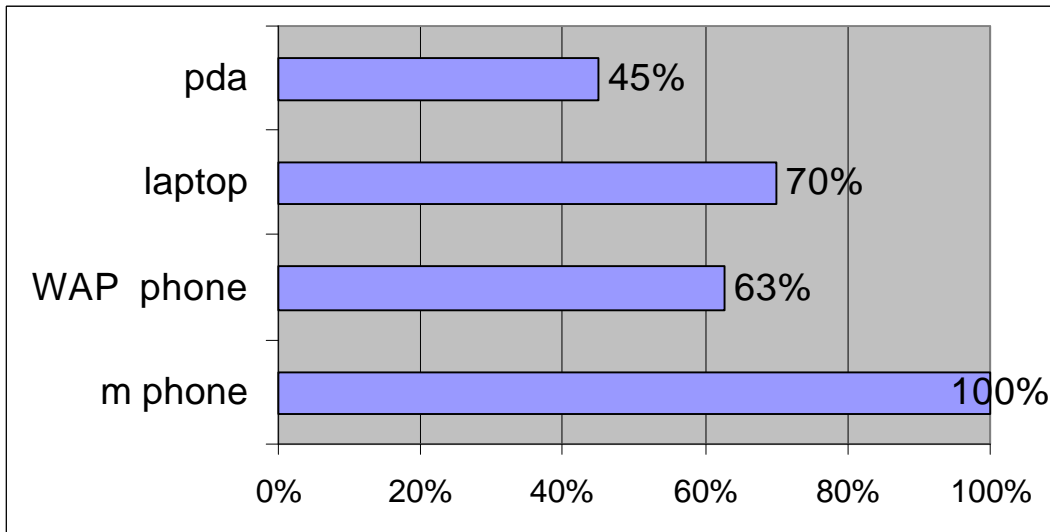
**) Who wouldn't like to be this well organized? :-)

The fact that as many as two out of three carry a lap-top computer with them means several things:

While being in their hotel room, these 70% of the business travellers carrying a laptop, would probably like to have high-speed, fixed line, Internet access from there, simply by being able plugging in their own laptop, both for e-mail communication and for Web-access. In future most lap-top computers will be with a built-in modem, i.e. with wireless Internet access, cf. Comdex 2000. (*)

(*) “You don't find many stationary PC's at the Comdex computer show 2000. It is mostly portable PC – and almost all of them with wireless Internet access. ... But Hellström, the President of Ericsson, does not believe that it will be wireless and portable PC's which will win the battle of the future Internet.” (Aftenposten, Norway, 15th Nov. 2000).

Figure 7 Hardware carried by respondents (n=80)



Among the WAP-enabled phones in use by the experts participating in the WAP-survey, the Nokia 7110 was very dominating: 44% (i.e. 27 of 62 WAP-enabled phones in use by the respondents). - Marcussen (2000) estimated, that the Nokia 7110 had a 33% share of the WAP-phone market in Western Europe by the middle of year 2000, at which time there were 11 different WAP-enabled phones on the European market (specifically in the online shops of the mobile network operators). - One reason for the even greater dominance of the Nokia 7110 among the (mostly European) respondents in this WAP survey than in the W. European market in general is that WAP-site developers, constituting a rather large number of respondents, frequently use the Nokia 7110 for optimising purposes, since this model was the most sold WAP-enabled in the world in the year 2000.

In average, the respondents had had their current (newest) mobile phone for 7.8 months. More importantly, since as for as many as 79% of the respondents, their current mobile phone was *not* their first, the respondents had their *next newest* mobile phone for an average of 15 months. This is a number not found many places in articles etc. about mobile phones. Marcussen (2000) estimated that the average lifetime for mobile phones was 24 months worldwide back in year 2000. The expert group in the WAP survey, had their next newest mobile phone for just 15 months before they replaced it. It seems fair to assume that these particularly technologically minded people have changed their old mobile phone a earlier that the typical mobile phone users, in some instances no doubt simply to get a WAP-enabled phone, such as the Nokia 7110, almost a must-have for WAP-site developers, and initially, i.e. till about April 2000, the only one at the market.

As many as 84% of the respondents are men. The average age was 35, ranging from 20 to 58 - with the 20-year old guy being one of the fastest to fill-in the WAP questionnaire, and very knowledgeable as well. There was also one single represent ant for the SMS-generation, sixth form student aged only 17, who were not really a business traveller, but his replies were just a sensible as those of all the rest – with a burning interest in the topic - so the writer would not exclude him just because of his young age.

The average number of nights spend away from home on business (or study) during the last past 12 months were 34 nights, nine reporting 100 nights or more (at hotels), and only four out of 80 respondents were not away on business any nights. Excluding these constant travellers and the non-travellers, leaves 67 or 84%, were away for between 2 and 60 nights, with 22 nights per year as the average.

Each and every respondent have an e-mail address (otherwise they could hardly participate). 95% represent a company which has a Web-site, whereas only about 31% of these organisations had a WAP-site. Another 3% stated that their firm were building a WAP-site. The latter statements were unprompted, so there could easily be more who are currently building WAP-sites.

Table 7 The positions of the respondents

WAP developers and IT managers	24%
University related *	22%
Directors, owners, VP's	24%
Consultants	15%
Others **	<u>15%</u>
Total	<u>100%</u>

* Professors at different levels, project leaders, , research assistants, PhD students and one single master's student.

** Sales / marketing / research / QA managers; business planning analyst; Dr of Law.

How respondents found out about the Internet based WAP survey

The people who were invited to take the WAP survey are experts in either WAP, or IT/travel, or both. Their knowledge about WAP is much higher than that of ordinary people. They all had at least one mobile phone, 63% had at least one WAP enabled phone. The latter is 10 times as high a percentage as for all mobile phone users in Western Europe, since only 6% of these had a WAP-enabled phone by the end of year 2000, and no more than half of them actually used the WAP function (Marcussen 2001a; 2001c). They travel much more (on business) than ordinary people. They are not representative for the general population. This should be kept in mind when interpreting the results. In an expert survey such as this where the purpose is to predict future situations and to suggest how to exploit existing and technologies in innovative ways, ordinary people and ordinary mobile phone users (and to some extent even ordinary WAP users) are simply incapable of answering. Only real experts could possibly answer all the questions. The strength of the virtual panel of real experts is their expertise in precisely the fields of particular relevance to this study. The group of experts are able to give us a fair evaluation of the current status of WAP applications, and the direction of the development of the different aspects of WAP during the next three years, in particular from a business travel perspective.

The respondents are people which airlines, train operators, car rental companies and hotel chains alike will be most eager to please – being frequent travellers – and which WAP-technology developers would be very interested in listening to – given their expertise in WAP and/or travel-IT. There are relatively few respondents in this WAP-study, compared to ordinary consumer surveys. But although the quantity of respondents is small, the quality of responses (i.e. the knowledge of the respondents in their respective fields of expertise) is great.

Table 8 How respondents found out about the WAP survey (n=80)

4 lists on net	41	51%
Web	21	26%
3 conferences	9	11%
@ invitation	6	8%
At interview	3	4%
Total	80	100%

Note: For one of the conferences contact was established via e-mail after the event.

About half of the respondent (51%) found out about the WAP survey via one of four discussion lists on the internet, of which (1) IFITT 21%; (2) INFOTEC-travel 14%; (3) Anywhereyougo 14%; (4) WAP-board 2%.

- (1) The IFITT list is used for circulation of information *to* the members of International Federation for IT & Tourism. The membership of the list is European dominated. There are about 200 people on the IFITT list, generally experts in IT and tourism, but typically not experts in mobile telephony.
- (2) INFOTEC-travel is now an un-moderated discussion list. It was founded back in 1994 by Marcus Endicott (www.mendicott.com/). The list currently counts more than 650 subscribers. The members are generally IT and travel experts, but typically not experts in mobile telephony. The membership of the list is American dominated.
- (3) Anywhereyougo.com is an American based website, which hosts a very active e-mail list for WAP developers. In the month of November 2000, when the writer circulated two messages on this list, as many as 225 different persons circulated an average of three messages each, i.e. 773 messages in total or 26 per day. Members come from all around the world, for example from India, where there are many software programmers in general, including WAP developers. There are about 300 members of the Anywhereyougo list, all experts in WAP of course, but typically not in travel or tourism.
- (4) The WAP-board was a site hosted by one very large mobile phone manufacturer. The site is no longer live. People only saw messages at this online board if they actually visited the site. There was no sending out of messages by e-mail from the WAP-board, unlike the other three lists.

25% of the respondents found out about the WAP survey by online reviews about a *WAP study* called *Mobile Phones, WAP and the Internet* (Marcussen, 2001a), and then decided themselves to volunteer to take the survey by clicking on a hyperlink at the WAP study site (www.rcb.dk/uk/staff/chm/wap.htm), which took them to an online version of the WAP questionnaire, a Web form.

11% of the respondents got their invitation to take the WAP survey either in person at one of two conferences or by e-mail after a conference where the writer had appeared. 8% of the respondents were invited directly by a personal e-mail (i.e. not via any sort of list, but handpicked and individually selected). The writer knew that these persons were experts either in WAP or in IT for travel/tourism, either having met the potential respondents or found WAP-related information about them or their firm on the Web. The last few respondents were invited to take the WAP survey (online) during a personal interview with them about their WAP site for travel/tourism services. So these last people were experts in both of the fields relevant to the study, namely both travel/tourism and WAP.

How respondents received and returned the questionnaires

Those who actually responded had received the questionnaire in one of four different ways:

- | | |
|---------------------------------------|---|
| (a) e-mail | - either with or without prior commitment |
| (b) Web form | - either with or without prior commitment |
| ---- | |
| (c) dumb Web page | - without prior commitment |
| (d) off-line (personal, face-to-face) | - with prior commitment |

(a) The WAP survey ran for about 4 months. In the first instance, i.e. during the first month, the survey was run by e-mail only. Invitations to participate in the WAP survey were circulated on the mentioned e-mail discussion lists. A questionnaire was sent to those who agreed to take part in the

survey, as a word document attached to an e-mail. Most of the replies were received in the same manner, although some preferred to fill-in the questionnaire by hand, and then fax it back.

(b) After the WAP survey had been running for one month, a Web form version of the questionnaire was finally established, after which the e-mail approach was phased out. The reason why the Web form was not ready from the beginning was simply a delay in access to the necessary software plus the time required to transform the questionnaire into a layout suited for the Web form, a entirely administrative task which had to wait for its turn.

(c) During the first 30 day period no real Web form was available. During this period the WAP survey was run entirely via e-mail, with two exceptions, one of which was mentioned above. The second exception was that a dumb text version of the questionnaire was put on the Web from the outset. It was available as a Web-page during the first 30 days, mainly just to enable potential respondents to see the questionnaire before they committed themselves (by e-mail) to take the survey. People had to click on a hyperlink to actually see the questionnaire. Perhaps contrary to expectations, one respondent went as far as printing the questionnaire off the web as text, filled it in by hand and then faxed the 9 pages or so back. There was no direct incentive provided for responding in this way, except that a box for ‘please keep me informed of future research results’ could be checked, and then a *moral appeal* along the lines of now that you have had free access to a comprehensive study, in return please volunteer to fill-in a questionnaire.

(d) Only two pilot respondents were handed over the questionnaire in-person, in hard-copy, after having agreed to respond. Both of them responded (one by returning the questionnaire in person, after having filled it in straight away at a conference, the other by snail-mailing it back.

Table 9 Method of getting and returning the WAP questionnaire

Returned via	Got via WWW form	Got via e-mail	Got via dumb form	Got in person	Total
WWW form	35				35
e-mail		33			33
Fax		8	1		9
Snail mail		1		1	2
Personal				1	1
Total	35	42	1	2	80

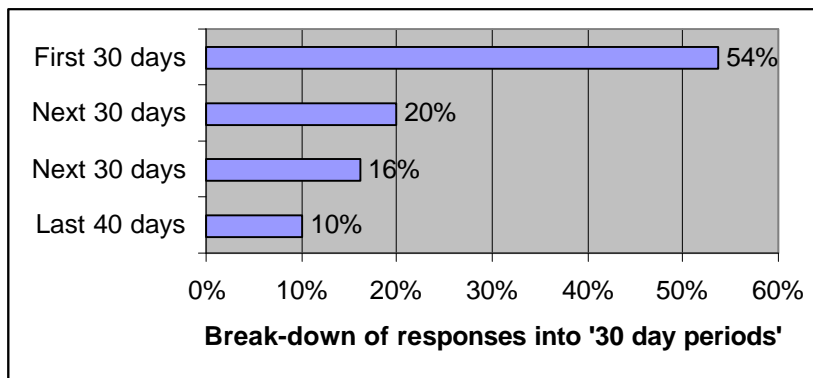
Returned via	Got via WWW form	Got via e-mail	Got via dumb form	Got in person	(%) Total
WWW form	44%				44%
e-mail		41%			41%
Fax		10%	1%		11%
Snail mail		1%		1%	3%
Personal				1%	1%
Total (%)	44%	53%	1%	2.5%	100%

The above table shows that more than 97% (i.e. all except the 2.5% in person) *received* the questionnaire somehow via the Internet. 85% of the respondents used the Internet for *both* receiving *and* returning the questionnaire. These 85% were about evenly split between two groups: (1) Those who went to a website with an online form, filled in the questionnaire online, and finally submitting the Web form (44%) and (2) those who got the questionnaire as a word-document attached to an e-mail, and returned it in the same manner (41%).

As many as one in five of those who got the questionnaire as an attachment to an e-mail preferred to print the document, then fill-in the questionnaire by hand and returning it by fax.

Time-profile of incoming responses

Figure 8 Time-profile of incoming responses (n=80)



This first 30 day period accounted for a little more than half of the responses (43). Most of responses during this first period were received by e-mail (31 of the 43); followed by faxed-back responses (9); snail-mail (2) and personal (1). In one E-mail surveys it was found that 80% of responses were received within the first three days (Yun & Trumbo, 2000). In the WAP survey the process was considerably longer of several reasons: Not all possible respondent solicitation methods were known from the outset, some events with good chances of getting more respondents took place relatively late, and finally self-selection via the Web was used, which is a slower process than merely running an e-mail based survey.

Analysis of the determinants of response rates - in Internet supported surveys

Determinants of response or non-response

Many (specifically ten) different combinations of ways of getting response to the Internet supported WAP expert survey. Each of the combinations could be characterised by either the presence of absence of each of the following four determinants of response:

1. Having met (yes or no)

2. Personal, direct e-mail invitation to take the survey (yes or no)
3. E-mail list invitation to take the survey (yes or no)
4. Incentive to take the survey (yes or no)
5. Ease of taking the survey (Web form vs. less convenient, yes or no)

1. A personal touch A. One important determinant of response rates is the degree of *personal touch* involved in introducing potential respondents to the survey. The personal touch could also be referred to as the level of personal rapport which exist or can be established with the potential respondents. If the researcher and the potential respondent have ever met, this is certainly a personal touch.

2. A personal touch B. Another effectful way of adding a personal touch is by sending a direct personal e-mail (rather than just through e-mail lists), either to persons you have met or someone you have never met. The closer the personal touch involved in introducing potential respondents to the survey, the higher the response rate. This is true both in off-line and online surveys.

3. A third determinant is whether or not potential respondents have been invited by e-mail circulated on an e-mail list to take the survey, with the typical alternative being that they just visited the access website of the survey.

4. A fourth determinant of response rates is whether or not there is a clear incentive to respond.

5. Finally it plays a role how easy or cumbersome the procedure is for the respondents to take the survey. To fill-in a Web form is quite convenient, less to open a document with the questionnaire attached to an e-mail, fill-in, save, and return it.

The determinants of response (the dependent variable, Y) in the current Internet supported WAP survey are thus the following five (independent variables, X1:X5):

1. **Having met**
2. **Pers@**
3. **List@**
4. **Incentive**
5. **WWW form**

The incentive was effective in all instances where respondents were solicited on e-mail lists. The incentive was also effective in instances where respondents had read about the WAP survey at a certain electronic noticeboard, the WAP-board, which was very much similar to an e-mail list, since the functioning of the WAP-board might as well have been set up like an e-mail list. Therefore, in some of the following analysis we shall use only one of these two highly correlated variables, namely incentive.

A data matrix containing *both* responses *and* non-responses

The data matrix for survey data normally contains responses only. But in order to analyse response rates quantitatively, we need a data matrix with both the responses and the non-responses. There should be as many records (rows) in the data matrix as there were changes of getting response. The variables (columns) in the data-matrix is the one and only dependent variable, response, which can take the value 1 or 0, where 1 means that the potential respondent actually responded.

In the case of the current WAP expert survey the data matrix should consist of 6380 records for each of the chances of a response including the two strictly offline off-line pilot respondents.

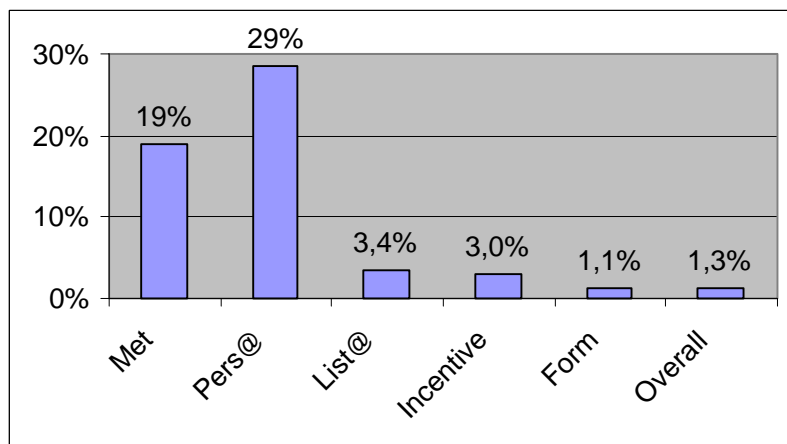
Simple cross-tables - and chi-square

A series of simple 2*2 tables, with response (no or yes) crossed with each of the four dicotomous determinants basically shows the same results as the following correlation analysis will show, i.e. dependence between response and four out of the five determinants mentioned above.

Table 10 Response rates by each of the response determinants

	Met	Pers@	List@	Incentive	Form	Overall
Responded	24	6	42	39	34	80
Chances	127	21	1224	1319	3057	6380
Rate	19%	29%	3,4%	3,0%	1,1%	1,3%
Chi-Square	242	127	58	39	0,96	
Signif.	yes	yes	yes	yes	no	

Figure 9 Response rates by each of the response determinants



It is perhaps slightly surprising that there is greater dependence between response and having met than between response and personal e-mail invitation, since obviously the response rate is higher among those who have received personal e-mail invitation than among those who have met the researcher. This may be down to the fact that the impact of personal e-mail invitation on response is highly dependent on whether you sent the personal e-mail to someone you know or someone you have never met. Response from the former was found to be as high as 80% (4 out of 5), whereas only 12% (2 out of 16) of those who had never met the researcher responded positively to the personal e-mail encouragement.

Table 11 Response rates among those who received personal e-mail invitation

	No resp.	Response	Total	Rate%
Met	1	4	5	80%
Not met	14	2	16	12,5%
Total	15	6	21	29%

Correlation analysis

Table 12 Correlation between response and four response determinants (N=6380)

	MET	PERS@	LIST@	INCENT	FORM
RESPOND	0,226	0,141	0,095	0,078	-0,012
MET		0,090	0,181	0,171	-0,054
PERS@			-0,028	-0,029	0,060
LIST@				0,949	-0,463
INCENT					-0,490

Note: Note: The negative correlation between *respond* and *form* is not significant. The negative correlation between *pers@* and *incentive* plus *pers@* and *form* is sig. at 0.05 level only. All other correlations are significant at the 0.01 level (2-tailed). Pearson's Correlation is used above. For an introduction, see TexaSoft (1999).

There is a significant positive correlation between *response* and these factors (determinants):

1. having *met*
2. *personal* e-mail invitation to respond
3. E-mail *list* invitation to respond
4. *incentive* to respond

These results are as expected – and hoped for. The correlation between response and whether or not a Web form was offered to the potential respondents when they were first introduced to the Internet supported survey, is not significant, and it is even negative. Not because it can possibly really have a negative impact on the response rate to offer a Web form (in stead of any more cumbersome answering format). The reason for this illogical result simply a technical one: There is a high positive correlation between the incentive and E-mail variables, i.e. the incentive was only effective if potential respondents had been provided with the questionnaire via e-mail+Word-doc with relatively few exceptions. For those who filled-in the Web form, the incentive was not effective, since the Web form and the incentive was accessible via the same web-page, and no password was needed to access the incentive report. The only barrier to access the the report used as incentive for responding was knowledge about the address of its access site.

It must in reality be beneficial for the response rate if is fast and easy for the potential respondents fill-in the questionnaire. Future studies could be done to compare the relative effectiveness of the 'convenience factor', by comparing response rates for the Web form vs. the e-mail+Word-doc approaches (or other less than ideal approaches), for *long* questionnaires. For *short* questionnaires the use of the embedded e-mail approach has already been proven to be superior to the e-

mail+Word-doc approach: 8% response rate for the latter vs. more than four times higher for the embedded e-mail approach, other things being equal (Dommeyer & Moriarty, 2000).

Multiple regression analysis

Multiple regression can be used to disentangle the importance of each of any number of possible determinants of response rates. One of the wonderful features of multiple regression analysis is that it can be used as a way to keep everything else (which is included in the analysis) constant. It is thus a very powerful tool. It can even be used with 0-1 dichotomous variables with good result, as we shall see here, in this study of the determinants of Internet survey response rates.

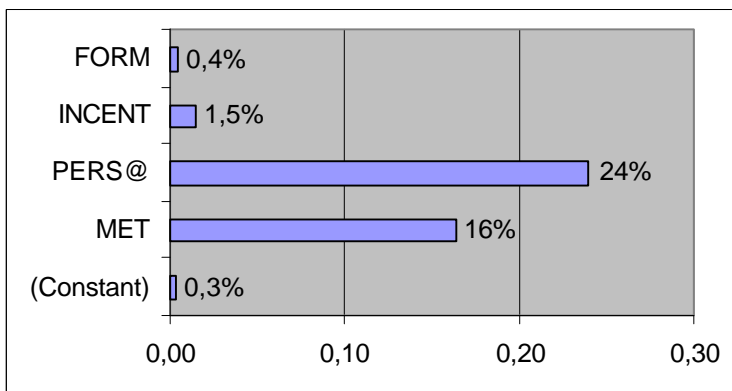
Since the matrix of bivariate correlations in Table 12 showed that two of the determinants are very closely correlated there is no point in including both of them in the multiple regression analysis, which will therefore be based on only four determinants (independent variables), with response as the dependent variable.

Table 13 Multiple regression analysis results

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0,0033	0,0020		1,3870	0,1660
MET	0,1640	0,0100	0,2060	16,7350	0,0000
PERS@	0,2390	0,0240	0,1230	10,1140	0,0000
INCENT	0,0153	0,0040	0,0560	3,9510	0,0000
FORM	0,0042	0,0030	0,0190	1,3450	0,1790

a Dependent Variable: Response.

Figure 10 Multiple regression analysis results – a graphical illustration



The regression coefficients can be interpreted as follows:

1) *Personal e-mail*: All other included determinants being equal, personal e-mail invitation to take the survey was by far the most important determinant of the response rate. Using this tactic added 24% to the expected response rate. Please note that *personal* refers to handpicked individuals or firms to whom an *e-mail* is send which makes it clear why they are contacted. This determinant does not refer to e-mail circulated on e-mail lists.

2) *Having met*: It is found, fortunately one might say, that if potential respondents have ever met or just seen the face of the researcher, this adds to the expected response rate, in fact 16% it seems.

Having met can mean (a) given presentation at small group streamed conference (b) talked with potential respondents at conferences or exhibitions – certainly if there was an exchange of business cards (c) having met people in any one-to-one situation, such as in lobbies or at interviews. These things are counted as having met, fully. (d) However, having giving paper at fairly large single stream conference is not assumed to be enough to say that you have met the entire audience. In an audience of 75 it has been assumed that the researcher established a good rapport with 50%. Another way of arguing the case for approximately 50% of the 75 would be to say that you reach 100% of those at the first two rows, but then gradually loose full touch with those at following rows. Attendees in a one stream conference are given no choice but to attend ‘your presentation’, which may not be their favority topic. This is another argument for reducing *having met* to 50% for a major conference *show-up*.

3) *Effective incentive*: This tactic was typically used in combination with *e-mail encouragement* (via e-mail lists) to take a survey by agreeing to fill-in a Word-doc attached to an e-mail, and at the same time to offer an *effective incentive* in return, this should add 1.5% to the expected response rate.

4) WWW form: Offering a Web form (in stead of just the e-mail+Word-doc combination) improves the expected response rate by about 0.4%, but this result is not significant (i.e. relatively uncertain or unstable).

5) The constant is marginally positive, 0.3%. This is also fine and easy to interpret. On the other hand, it would have been problematic if the constant had been found to be negative, since of course a response rate cannot possibly be negative. The constant indicates what response rate to expect in a worst case scenario, i.e. in the absence of any obvious reason for the potential respondents to actually respond in an Internet supported survey. Even if the researcher fails to do any of the things which should further the response rate, such as the four things represented by the four determinants included in this study, then in spite of this a few enthusiast in every thousand website visitors may respond anyway.

The best case scenario for expected response rate is then equal to

- the worst case response rate (0.3%)
- plus 23.9% for personal e-mail invitation (to handpicked individuals or firms),
- plus 16.4% for having met,
- plus 1.5% for an effective incentive,
- plus 0.3% for Web form in stead of a more cumbersome response format.
- ≡ Total best case response rate: About 42% (in the current WAP expert study).

The regression analysis clearly points towards the personal touch here operationally defined as

1. personal e-mail invitation and
2. having met

as the most important determinant(s) of response in Internet surveys

The ranking of the relative importance of the determinants of response included in this analysis:

1. A personal touch – personal e-mail invitation
2. A personal touch – having met
3. Incentive to respond – typically in combination with e-mail list invitation
4. A convenient way of responding

Multiple regression analysis II – Nobody ever met the researcher

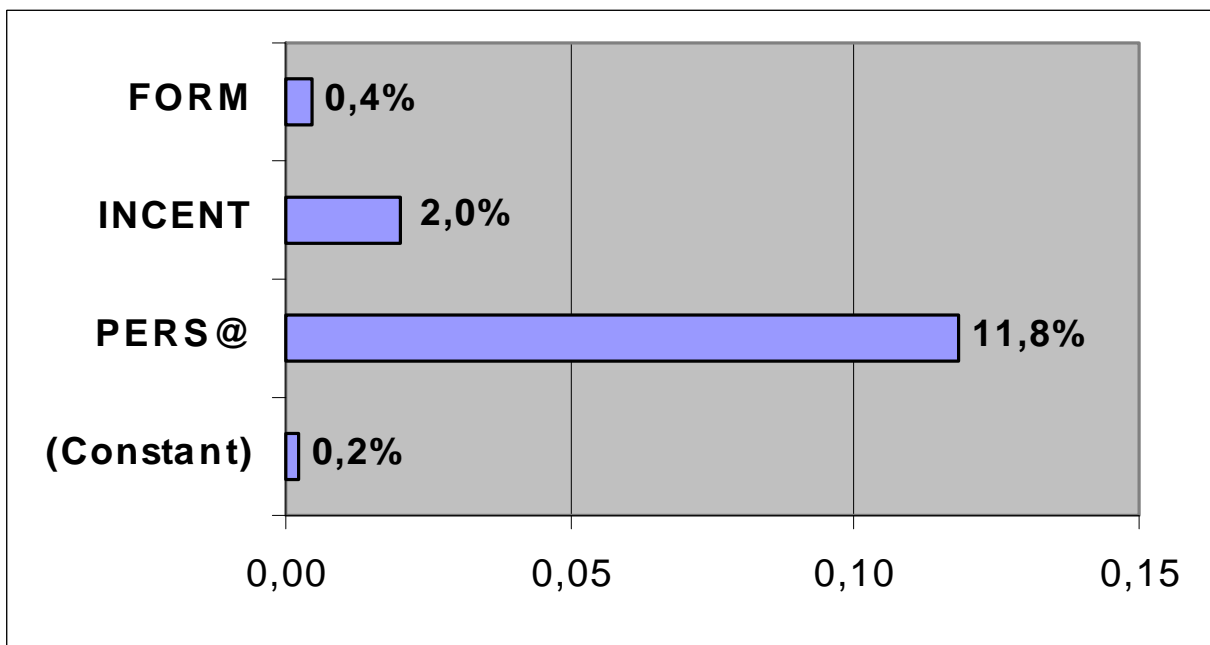
The current study is perhaps unusual, since the researcher have met a fair number of the potential respondents. And we saw in Table 11 that the effect of personal e-mail invitation is highly dependent of *having met* or not, a dependence which may distort the regression results. Let us therefore try to remove all the 122 *having met* records from the datamatrix. The output from a regression analysis then shows the following results where the impact of personal e-mail is now only half as great as in the previous situation, 12% here vs. 24% before.

Table 14 Multiple regression analysis results II – Excluding all *having met* cases

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0,0025	0,0021		1,1916	0,2334
PERS@	0,1180	0,0235	0,0633	5,0203	0,0000
INCENT	0,0202	0,0034	0,0855	5,9614	0,0000
FORM	0,0045	0,0027	0,0238	1,6607	0,0968

a Dependent Variable: Response.

Figure 11 Multiple regression analysis results II – when nobody ever met the researcher



The best case scenario for expected response rate, where the impact of personal e-mail is now only half as great as in the previous situation:

- the worst case response rate (0.2%)
- plus 11.8% for personal e-mail invitation (to handpicked individuals or firms),
- plus 2.0% for an effective incentive,
- plus 0.4% for Web form in stead of a more cumbersome response format.
- About 14.4% (in the current WAP expert study) - total best case response rate among groups of potential respondents who have never met the researcher.

In other words, in situations where nobody in a group of potential group of respondents have ever met the researcher, the positive impact of personal e-mail should only be expected to be 12%, not 24%. – The opposite is true if a personal e-mail is sent to somebody the researcher have met before. In the latter instance as many as four out of five may respond, like in this survey.

Review of response rates – by the main response drivers

In the actual expert survey into WAP for business travellers three different levels of response rates were found, partly depending on the degree of personal touch involved in the introduction of the respondents to the Internet supported survey, and partly depending on the presence or absence of a clear incentive:

- Personal touch** (met researcher in person and/or received personal e-mail)
- Incentive**, typically e-mail invitation as well
- Enthusiasm only**, never met – no pers@ - no list@ – and no clear incentive

Figure 12 Three levels of response rates – for Internet supported survey approaches

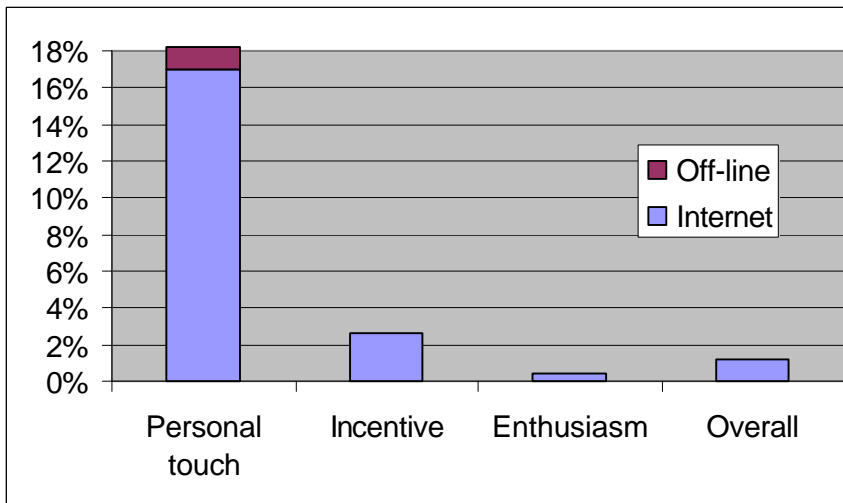


Table 15 Actual number of responses, potential number of responses and response rates, by main response driver in the Internet supported survey

Response driver	n	Chances	Rate	n	Chances	Rate
Personal touch	26	143	18,2%	24	141	17,0%
Incentive	33	1236	2,7%	33	1236	2,7%
Enthusiasm	21	5001	0,4%	21	5001	0,4%
Total	80	6380	1,3%	78	6378	1,2%

Note: Including off-line pilot (two respondents)

Excluding off-line pilot (two)

To rely purely on enthusiasm for response obviously gives a poor response rate. But the response rate is only half the story. The other half is the absolute number of responses. Pure enthusiasm resulted in more than a quarter of all responses, i.e. 26%.

Figure 13 Responses by response driver (n=80)

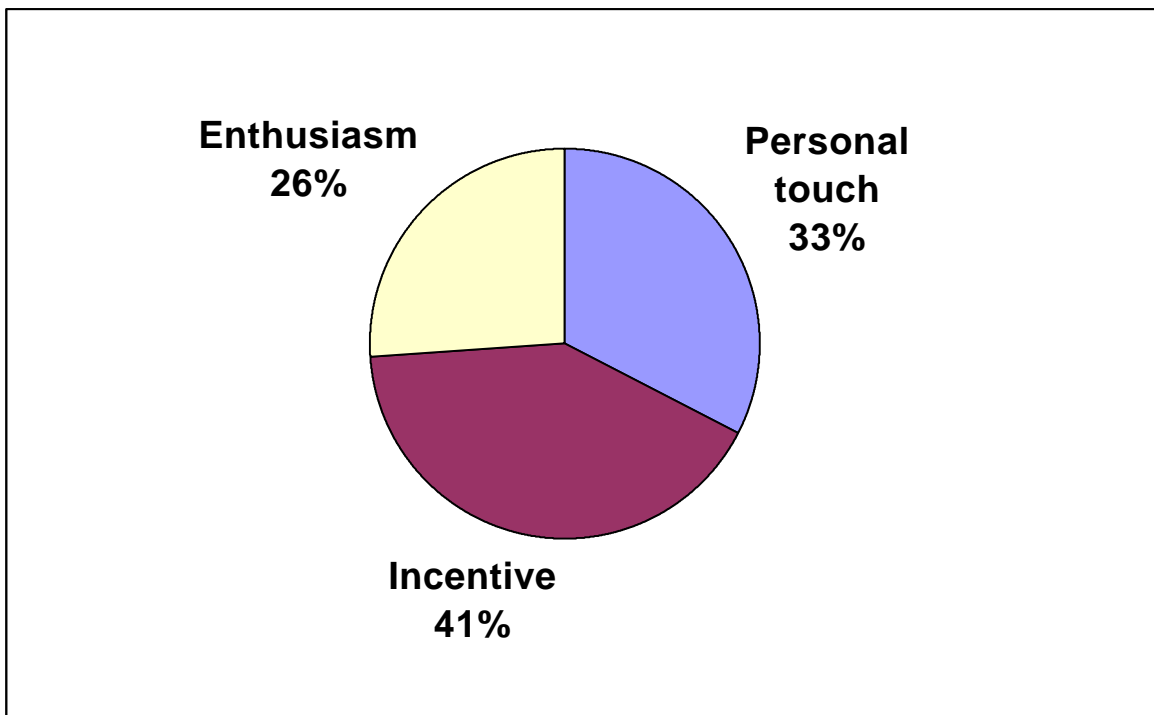


Table 16 Nine ways of finding about the survey – and the final Internet response rates (n=80)

	Met	Pers@	List@	Incentive	Form	n	Chances	Rate
1	yes	no	no	no	no	2	2	100%
2	yes	yes	no	no	yes	4	5	80%
3	yes	no	no	no	yes	7	32	22%
4	no	yes	no	no	yes	2	16	13%
5	yes	no	yes	yes	no	11	88	13%
6	no	no	yes	yes	no	31	1136	2,7%
7	no	no	no	yes	no	2	100	2,0%
8	no	no	no	no	yes	16	2999	0,5%
9	no	no	no	no	no	5	2002	0,2%
						80	6380	1,3%

Note: In this overview, combination 6 includes five respondent who had reacted positively to e-mail list announcements, but who were directed to the Web-form when it had been established. These five respondents are coded as a separate combination in the data matrix, though, i.e. as no-no-yes-no-yes.

By combining list@ and incentive, the number of determinants (independent variables) can be reduced to just four, and the number of combinations represented is reduced from nine to eight. The access incentive report did serve its other purpose well, namely wide circulation, maximum reading, thanks to unrestricted access to pdf-file of the incentive study from the same access site and largely same access point only a few lines apart. All those readers who did not know about WAP to fill in the questionnaire or who simply did not have the time, i.e. the vast majority of visitors to the access site, could still read the full study, which was no longer effective as an incentive from the time the Web form was established.

Table 17 Eight ways of finding about the Internet survey – and the final response rates (n=80)

	Met	Pers@	Incentive	Form	n	Chances	Rate		
A	1	yes	no	no	no	2	2	100%	Off-line
A	2	yes	yes	no	yes	4	5	80%	
A	3	yes	no	no	yes	7	32	22%	
A	4	no	yes	no	yes	2	16	13%	
A	5	yes	no	yes	no	11	88	13%	
B	6	no	no	yes	no	33	1236	2,7%	
C	7	no	no	no	yes	16	2999	0,5%	
C	8	no	no	no	no	5	2002	0,2%	
						80	6380	1,3%	

As indicated in the above tables a total of 8 or 9 different ways of introducing respondents to the Internet supported WAP survey was used, each applying either e-mail or the Web to get the questionnaire to the respondents (and back), and each with a certain final response rate after reminders. The 8 ways have been classified into the earlier introduced three main categories, and are reviewed in declining order of the achieved response rate below.

A. Internet supported survey methods – with a personal touch

It was possible to *add a personal touch* in the introduction of the potential respondents in the Internet supported WAP-survey in five different ways, or there was a varying degree of *personal touch* or perceived proximity *inherent* in the different ways of introducing the respondents to the Internet supported survey:

1. Personal handing over of hard-copy questionnaire: The off-line pilot test.
2. Direct personal e-mail to someone you *have met*.
3. Introducing the survey in a *face-to-face* interview about a related topic or at a conference / exhibition directly related to the topic of the survey.
4. Direct personal e-mail to someone you have *not met*.
5. Sending an invitation via e-mail lists (i.e. not personal e-mail): Relatively high response rate from those list members you have met at earlier occasions such as at conferences.

(1) In the off-line pilot test two persons agreed to take the survey, which they did. One of these suggested an additional question, which was then added.

(2) In five instances a personal e-mail was sent to people which the researcher had previously met. Four of these responded.

(3) In a dozen instances the WAP survey was introduced during a personal interview about a related topic. This resulted in three responses, i.e. a *response rate of 25%*. The attempts to make these busy persons take the WAP survey were not wholehearted, since the main purpose of the personal interviews was to get material for a series of full case studies into WAP for hotels, not to solicit responses for the WAP survey.

At a mobile commerce conference and exhibition in Stockholm, considerable efforts were put into talking delegates and exhibitors into taking the WAP survey. About 20 attempts were made. People were given the writer's business card, with the address of the website of the WAP survey written on the backside, and people were explained that they should just go to the site and fill-in the online form. Only 4 of 20 did so, i.e. a *response rate of 20%*.

(4) Personal, direct e-mails were sent out to 16 persons (or firms), none of whom the researcher had ever met. These organisations (or specific persons representing these) were quite obviously capable of responding to the WAP survey, either being someone specialising in WAP or mobile network operators offering WAP services. They were all from Europe, typically from countries either not already represented in the expert survey at all or weakly represented countries. This initiative resulted in just 2 responses, i.e. a *response rate of 12.5%*.

(5) E-mail invitations with an effective incentive were circulated on a number of e-mail lists. Those who agreed to participate were e-mailed an attached Word-doc with the questionnaire. The researcher had met a total of about 88 of the persons of whom 11 responded, i.e. a response rate of 12.5% after a reminder procedure. Eight of these respondents were IFITT members, met at the federation's earlier conferences, and the three last were attendees from a mobile commerce conference with 75 participants where the writer gave paper, a couple of months before the WAP

survey was run. Only about half of the 75 participants at the mobile conference were coded as *having met*, as explained in the section *Multiple regression analysis*.

B. No personal touch, but with an effective incentive

Without anything which even remotely resembles a personal touch, response rates in Internet supported surveys must be expected to drop to quite modest levels, even with an effective incentive. However, 41% of all responses fell in this category. There were a total of 1236 chances of response, and 33 actual responses, i.e. an overall response rate of just under 3%. Potential respondents comprised

- 6a. The 75% of the IFITT list members *not met*, i.e. 150. Nine responded. 6% response rate.
- 6b. All of the about 300 members on the Anywhereyougo list. 11 responded. 3.7%.
- 6c. About 100 WAP board viewers. Two responded. 2% response rate.
- 6d. All 650 INFOTEC-travel list members, except one. 11 responded. 1.7% response rate.
- 6e. The half of the mobile commerce conference participants not really met. None responded

(6b) On the Anywhereyougo e-mail discussion-list for WAP developers an invitation similar to the one mentioned under IFITT was circulated. People had to write back with an “OK I will take the survey”, after which they got the questionnaire by e-mail attachment, and upon returning the filled-in questionnaire they got the address of the “WAP study”, for free. In the first instance 9 out of about 300 people on the WAP developer list actually took the survey, i.e. an initial response rate of 3%. Another 3 more responses (1% more) were received following a reminder procedure, i.e. an overall *response rate of 4%* from the WAP developer e-mailing list at Anywhereyougo.

There are many non-Europeans on the Anywhereyougo list, which must have made the incentive offered relatively less interesting than for those on the IFITT list. People on the Anywhereyougo include many computer programmers, who are used to communicate lightning fast over e-mail about quite specific WAP programming issues, but probably are less used to working with questionnaires than for example the people on the IFITT list, who are more academically oriented.

(6c) Just two responses resulted from a posting on the WAP-board, although perhaps at least 100 may have seen the invitation. People had to give their OK to take the survey, and actually take it, before they got access to the incentive study. The response rate was no more than 2%.

(6d) Out of some 650 people on the INFOTEC-travel list, 11 took the WAP survey by e-mail, i.e. a *response rate of 1.7%*. The reason for the low response rate was indicated by one of the potential respondents, who had agreed to take the survey, but gave up citing WAP being *vapour-ware* in the United States, i.e. not even soft-ware and of little practical importance. This was by the end of year 2000.

There were only half as many active WAP-users in the USA as in W. Europe by the end of year 2000: 3.7 million WAP users in the USA by the end of year 2000, vs. 7.5 million in Western Europe. The percentage of WAP users among mobile phone users in the USA actually fully matched that of W. Europe (i.e. just over 3%), so when there were twice as many WAP users in W. Europe as in the USA by the end of year 2000, that was down to a greater number of mobile phones in use in W. Europe than in the USA, not a greater WAP-usage percentage among the mobile phone users (Marcussen 2001b).

Many of the people on the INFOTEC-travel list are US Americans, for whom the offered incentive - a European focused report – was of relatively little interest: “...upon returning the questionnaire you will be given the URL of the general study into *Mobile phones, WAP and the Internet*, which focuses on Europe, but goes a bit further also, due to the character of the 'm' industry. “

C. Enthusiasm only - No personal touch, no clear incentive

Self-selection, i.e. where visitors to ‘your’ website simply are invited to take the survey, is the least effective of the three main categories of methods, with respect to response rates. The incentive to take the survey was largely absent for the self-selection category, since the “WAP study” was available online free of charge without any need for password, on the same site which included the link to the Web form (i.e. the WAP questionnaire). Summaries of the results of the “WAP study” were rather widely published on the Internet, in fact 30 different places on the Internet, in many instances with active hyper-links directly to the site of the “WAP study”, which in turn also included a link to the “WAP survey”, i.e. the Web form. The key website, www.rcb.dk/uk/staff/chm/wap.htm thus received about 2000 unique visits during the first month, and about 3000 in total for the last three months the survey was running.

(7) 17 people out of 3000 unique visits during the last three months of the survey period simply took the WAP survey by filling-in the Web form. No real incentive was provided. *The response rate was thus just 0.6%*. - There was a ‘please keep me informed box’ by the end of the questionnaire, though, but it was possible also for those not responding to submit an e-mail with a ‘please keep me informed’ request.

(8) Finally, during the first month of the survey period, people were encouraged to agree to take the survey by sending a short OK to an e-mail box, after which they would receive the questionnaire as a word-doc attached to an e-mail. Two persons out of 2000 unique visits during the first month completed the WAP questionnaire in this way. Also, during the first month, people could print the questionnaire off the web, fill it in by hand and return it by fax. Two persons did this. So, all in all a *response rate of $4/2000=0.2\%$* for this combination of ways to get to know about and to take the survey. Online response rates cannot get much poorer than this next to nil: The incentive was absent, and the answering procedure cumbersome.

“Response rates” among those who had committed themselves to take the survey

Interestingly, as many as **47** out of 62 persons who actually promised (by e-mail) to take the WAP survey actually did so (76%), in one of four ways:

- (1) E-mailing the word-doc back (**33** respondents);
- (2) Printing the word-doc, fill-in by hand and then faxing back their answers (**eight**);
- (3) Going to the website with the online form after having agreed by e-mail to ‘take the survey’ (**five**).
- (4) Printing the e-mail word-doc, filling in the questionnaire and returning it by snail-mail (**one**).

Table 18 Assessment of actual response by those who had promised – by e-mail – to respond

Promised by e-mail to respond	62
e-mail response	33
Fax response	8
Snail mail response	1
Online form	5
Any response after OK by e-mail	47
Responses in % of “promises”	76%

Notes: The 33, 8 and 1 corresponds to one column in Table 9. The five last respondents had given OK first (by e-mail), but they actually responded by filling-in the online form (after a reminder which informed them that the survey could now be taken by filling-in a Web form).

Smith (1997) mentions a UK E-mail survey from 1996 with pre-notification, where a response rate of 45% of those who consented to participate was achieved. The mentioned 76% response rate is thus very satisfactory. Only face-to-face commitment from someone you have known personally for years or from someone you have spent time with at a several days long conference can beat this response rate. As incentive for committing themselves to respond, people were promised free access to a study (summary and full-text) about “Mobile Phones, WAP and the Internet” (Marcussen 2001a), cf. later.

However impressing the 76% is, we cannot conclude from the material at hand, that a two-step procedure asking for commitment before access to the questionnaire is given, is necessarily better in terms of final response rate than a one-step procedure where respondents are led directly to the questionnaire without any commitment first. The results of the current study do indicate though, the most convenient way of taking an online survey should always be offered to the potential respondents in any case, i.e. no matter if a two-step or a one-step procedure for involving potential respondents is chosen. In the current WAP expert study the 76% mentioned above was achieved in spite of the fact that the most convenient answering mode was not offered to the respondents from the outset, although it was offered in the reminder procedure. The two-step and the single-step procedure for involving potential respondents are discussed in the next section.

Does a two-step procedure involving commitment from potential respondents actually result in higher response rates than a one-step procedure?

In a one-step procedure potential respondents are simply sent the questionnaire by e-mail attachment or given the address of the web-page with the online questionnaire, without asking for any commitment to respond first. In a two-step procedure only those potential respondents who have explicitly promised to take the survey, will be sent or given the URL of the questionnaire. So which is better, a one-step procedure or a two-step procedure, with respect to boosting online response rates?

On one hand, the rates shown in Table 18 are so high that there is no reason to believe that the two-step approach has diminished the response rate. On the other hand, in spite of the impressive response rates among those who had actually responded, the current study cannot be used to answer the above question. So, other studies will have to investigate the question further, but let us just

discuss why and under what circumstances a two-step procedure may be superior to a one-step procedure.

Advantages of a two-step procedure

1. Non intrusive – or less intrusive than the single-step procedure.
2. Possibly lending a greater touch of seriousness and formality to the survey. – Thus more appropriate for sensitive information.
3. In case the questionnaire is long - the deterrence effect of this may be less (in a two-step procedure). Only creeping (step-wise) commitment of the required time to take the survey: Once people have promised to respond, ~75% will.
4. In case of attached questionnaires, a two-step procedure is best. It is not good practice to circulate e-mails with attachments to large e-mailing lists, especially not large attachments. The WAP expert survey indicated that e-mail+attachment approach was ineffective for generating response in a single-step procedure.
5. Reminders can be targeted to those who have promised to respond (but not already done so) leaving all others on @list undisturbed.

Advantages of a one-step procedure

1. For embedded e-mail surveys – which give much higher response rates than e-mail+attachment surveys – a one-step procedure is straightforward: Just respond or delete.
2. Less time-consuming for the research to administer than the two-step procedure.
3. It is more fair, if the respondents can see straight away how large or small the task of filling-in the questionnaire is before they commit their time.
4. Some respondents may be willing to respond ‘now’ only (i.e. may lose interest if they have to wait for the questionnaire).
5. Most likely higher final response rate – if the questionnaire is short. With given response format (either embedded or attachment), in spite of the overwhelmingly high response rate of those who promised to respond in the two-step procedure, the one step procedure will most likely result in a higher final response rate than the two-step procedure, as far as short questionnaires are concerned. – For long questionnaire the opposite may be the case. More research needed to illuminate this.

Very high response rates can be achieved by getting prior commitment to respond. This is the case both in online and offline surveys. In the current Internet supported expert survey it was found that more than three out of four (76%), who had promised – by e-mail - to take the survey, actually did so. This is very encouraging. Further research into under what conditions a two-step approach tends to give higher response rates in Internet supported surveys than a one-step approach.

Additional issues in connection with online surveys

In this section a number of additional issues in connection with the undertaken online survey are reviewed. They are more or less related to the main issue of response rates:

1. Single page vs. multi-page Web forms (online questionnaires)
2. The use or non-use of mandatory fields in Web forms
3. Completeness and quality of responses - avoiding missing values
4. Time required to fill-in the questionnaire (in word-doc vs. Web form)
5. Closed vs. open-ended questions
6. Advantages/disadvantages of e-mail and *Word-doc* vs. *Web form*
7. Incentive to fill-in questionnaire
8. Number of responses
9. Geographic applicability of the results
10. Representativeness for what .. in expert surveys
11. The Internet as a survey instrument for collection of primary data vs. the Internet as a source of secondary data
12. Running Internet supported surveys is a relatively new discipline.

1. Single page vs. multi-page online questionnaires

Deliberately, a *single page* Web form was used for the questionnaire. *Single page* means that the respondents should only hit the *submit* bottom once. The alternative approach is called *multi-page* (online) questionnaires or surveys (iResearch, 2001). The two key design approaches are also known as *scrollable Web survey* and *interactive survey* (Bosnjak, 2001). The reason for choosing the *single page* approach was that the researcher did not want to risk losing any respondents who might give up before reaching the end of the questionnaire.

Advantages of single page Web form questionnaires:

- Respondents only need to hit the submit button once: Less risk of losing respondents before the entire online form is submitted.
- Server performance less critical
- It is clear from the outset how long the questionnaire is: Little risk that the respondent will give up just before the entire questionnaire is completed.

Advantages of multi-page Web form questionnaires:

- Logic can be built into the online form, e.g. for jumping to next relevant question, or for preventing entirely illogical answering combinations.
- The time-out problem is avoided (the online connection is kept going)

2. The use or non-use of mandatory fields in Web forms

It was decided only to make one single field mandatory, in order not to make it too difficult for respondents to submit the form successfully. The researcher would rather receive questionnaires with some missing values (answers) than lose any responses. It was thought that some potential respondents might give up making a successful submission of the online form if they repeatedly were automatically informed that they forgot to fill-in question X, and then question Y etc. The one and only field in the Web version of the questionnaire, which was mandatory for the respondents to fill in, was 'name'. Although answers were of course aggregated, and not traceable to source, respondents thus had to be willing to identify themselves. It was thought that this would help to prevent unserious responses, and to try to ensure respondent authenticity. Because of this 'non-mandatory' approach, in many instances those who had responded were contacted by e-mail and asked to fill-in questions which had been missed in the first place. Also, in some instances respondents were asked to clarify one or more of their answers.

3. Completeness and quality of responses - avoiding missing values

After clarification of some answers, and getting missing ones, almost two thirds of the first 146 questions were answered by ALL respondents. In the data matrix there are as many as 180 variables, corresponding to some 175 questions, and about 5 other registered aspects. The first 146 questions, [i.e. (14 times 3) + (22 times 4) + 16], were either rating scales (from 0 to 10), or yes/no questions. Out of a maximum of 146 answers, from each of 80 respondents, there were only 89 missing values, which is just 0.8% (of $146 \cdot 80 = 11680$)! And none of these 146 questions were marked as *required fields*.

Table 19 Analysis of missing values for the first 146 closed-end questions (n=80)

Missing Values per question	No. of questions	Missing Values in total	Data cells	Missing values (%)
0	95	0	7600	0%
1	25	25	2000	1%
2	16	32	1280	3%
3	8	24	640	4%
4	2	8	160	5%
(n=80)	146	89	11680	0,8%

The greatest number of missing values for any of single questions was four. And there were just two questions, among the 146 first ones, which four respondents (of 80) did not fill in, and these were:

Q122: Whether or not buying/selling shares is currently possible via WAP to suit needs.

Q146: To what extent XML is fruitful in connection with the development of WAP-sites for hotels.

In the first instance, some of those who do not even consider buying/selling shares abstained from responding. In the second instance, the explanation of the non-responses is different: Some respondents did not have a clue about what XML is, and therefore abstained. (EXtensible Mark-up

Language is a way of bridging html and wml.) Whether this is also the case for some of those who actually responded cannot be inferred.

Only three persons had filled in the questionnaire so poorly that their reply could not be included in the analysis, i.e. either because the same response had been given to a whole series of questions or because too many questions had not been answered.

4. Time required to fill-in the questionnaire

The minimum taken to fill in the WAP-questionnaire as Word-document was about 30 minutes (from sending out Word-doc as attachment to an e-mail till this was returned), including writing several lines for the open-ended question. For the majority it probably took about one hour. To this came a minimum of a few minutes from the message “OK, I will take the WAP-survey” was received till the questionnaire was e-mail out to the respondent, and after the respondent had returned it, it took a minimum of a couple of minutes to send out the URL of the WAP-study, as an acknowledgement and reward.

To fill in the questionnaire *online* (by checking the boxes in the Web form) is no doubt faster. The time taken to fill in the online form was not measured for technical reasons, though, although in principle it can easily be done. As a matter of curiosity, one respondent was asked about how long time it took to fill-in the online form, and responded that he thought it took *about 10 minutes*, but was not sure, and this did not include the open-ended question which was skipped, but answering that would have taken another 5 minutes. To fill-in a questionnaire in a Word-doc may thus be up to twice as time consuming as filling-in an online form. This is obviously a strong argument for using the latter, rather than the former.

However, although being a little more time-consuming, and probably should be labelled an antiquated and increasingly non-recommendable approach to running Internet-supported surveys, there are several advantages of the “e-mail and Word-doc approach” to letting respondents fill-in the questionnaire, cf. below.

5. Closed vs. open-ended questions

The questionnaire only contained *one single strictly open-ended question*, namely one asking respondents to write a couple of sentences *explaining how they think hotels (in chains, directories, destinations) can make innovative use of WAP at the moment and during the next 12 months*. As many as 69% (55 of the 80 experts) answered this question, writing an average of 42 words corresponding to three lines each. Obviously, answering this question requires some knowledge both about WAP and about hotel distribution. There was a small tendency, that those who had expertise in IT for travel/tourism services were more able (and willing) to express with their own words how hoteliers could utilize WAP than those who had expertise in WAP and mobile telephony. This is hardly surprising. Each and every one of those (six – of 80) respondents, who claimed to be experts in all three fields of relevance to the study, actually were able to (and took the time to) answer the single open-ended question. These six respondents were not exaggerating when they claimed to experts across the board. It is clear that at least some of those who abstained from answering this question did so simply to save time, not because they were not capable of providing an answer. If nothing else, the inherent logic of the answering pattern of every completed

questionnaire included in the data matrix indicates that every respondent can rightfully be called experts.

Three out of four of those who consider themselves to be experts in the same field (IT for travel/tourism, i.e. not necessarily WAP) answered the one and only open question, and this goes for both those who filled-in the questionnaire in a word-doc, and those who filled-in the Web form.

6. The *e-mail and Word-doc* approach vs. Web form

Among those IT/travel experts, who filled-in the single open-ended question *in the Web form* wrote an average of *60 words*. Those who filled-in the open-ended question in the Word-doc only wrote *35 words* in average. It has been checked if this difference could be explained by differences in WAP expertise, i.e. the second field of relevance for the ability to formulate an answer to the particular open-ended question, but this was not the case: There was exactly the percentage of WAP experts in both groups. The difference in length of words written to an open ended question thus seems to apply under an everything else being equal situation (*ceteris paribus*).

Thus, the two approaches, e-mail+Word-doc and Web form, seems to give equal chances of getting responses to open-ended questions. More interestingly, and rather surprisingly (to the researcher at least), the Web form approach – in the current survey – resulted in almost twice as long answers as the e-mail+Word-doc approach. The reason for the longer answers to open-ended question in Web form (compared to Word-doc) must be that the faster filling-in of closed-end answers in Web-form leaves more time to answer the open-ended questions.

Advantages of *e-mail and Word-doc attachment* approach to Internet supported surveys

- No telephone costs while filling-in the questionnaire (the argument does not apply for flat-rate or free connections)
- No risks of loosing the on-line connection before the questionnaire is completed.
- No need for Internet access where the questionnaire is actually filled-in. Respondents who find it difficult to find the time to fill-in the questionnaire at work can thus bring it with them home and fill it in there, possibly more undisturbed.
- No need for any special software tools for developing and handling the questionnaire (unlike Web form).

Advantages of *Web form* approach to Internet supported surveys

- Time-effective for respondents, especially for closed-end questions.
- There seems to be no less tendency for respondents to answer open-ended questions in Web forms than in Word-documents, *ceteris paribus*.
- Contrary to expectations, there seems to be tendency for respondents to give considerably longer answers to open-ended questions if they fill-in a Web form in stead of a Word-doc, *ceteris paribus*.
- The entering of data from Web forms into the data-matrix can be automated.
- Possibility of making one, more or all fields mandatory.
- Possibility of automatically ‘jumping’ to next relevant question (if multi-page online questionnaires are used).
- No virus fears and risks involved (unlike in the e-mail+attachment approach): From time to time some firms forbid their employees to open attachments at all. This is no problem with Web-forms.

- The filling-in and returning procedure is much simpler than in the e-mail+Word-doc approach. Thus possibly higher response rates for Web-forms than for e-mail+Word-doc.

As time passes the arguments for the e-mail approach is getting weaker:

- The difference between e-mail penetration and Web penetration is narrowing.
- More and more people get increasingly stable Internet connections this tends to make the “e-mail and Word-doc approach” more and more inappropriate.
- More and more people move to flat rate or free Web access.
- If you – as a researcher or research institute do not offer respondents the opportunity to take your survey by filling-in a Web-form, but for example only as e-mail+Word-doc, you are increasingly in danger of being accused of living in the technological past.

To fill-in an online Web form is quite time-effective for the respondent, and a Web form version of the online questionnaire should always be offered. If the researcher opts for a single approach only, it should definitely be the Web form.

However, to let respondents fill-in a questionnaire attached to an e-mail also works quite well in practice. It is definitely possible to run an entirely e-mail based survey, and even to get high response rates with prior commitment by e-mail from potential respondents. The questionnaire as a word-doc attached to an e-mail can be offered as an additional option, but this is an increasingly antiquated approach to Internet supported surveys. So, if offered as an option, the e-mail approach should be a low-key offer, more or less like a *PS: If you prefer to fill-in the questionnaire as a word-doc, you can drop an e-mail to this address ...*

7. Incentive to fill-in questionnaire

The main incentive for respondents to take the WAP survey was free access to a report about a topic related to the theme of the expert survey itself, cf. Marcussen (2001a). Bauman et.al. (2000) state that *sharing of information – from a study – with every respondent can be an incentive for some elite audiences*, which was precisely what was done in the WAP expert survey. To use access to a pdf-document on the web as incentive was very easy to administer, and the specific report was probably a relevant incentive to most respondents. For some respondents the main driver to take the survey may have been simply willingness to do the researcher a favour, if there was a personal touch of any kind involved in the introduction to the survey. Those who found the website themselves, via search engines or review articles linking to the site had already read the summary of the mentioned study as well as had the possibility of accessing the full study in pdf (over 100 slides). Readers were then encouraged to “take the survey”. Some actually did, a few of whom explicitly wrote that they had taken the survey in order to return a favour, since frequently studies like Marcussen (2001a) come at \$500, \$1000 or more.

Access to the web-site with the “Mobile Phone, WAP ..” study, Marcussen (2001a), was not particularly restricted. Since the study was already in the public sphere after a number of weeks, and accessible without a password, free of charge, there was no reason to play a hide-and-seek game with the potential respondents. In the reminder procedure they were simply given the web-site address containing both the “WAP study” and the “WAP questionnaire.” Thereby the incentive element in the reminder procedure was relatively weak. On the other hand it has thought that most of those who had not responded after a few weeks would probably not respond anyway, irrespective of whether or not they got free access to a certain report.

8. Number of responses vs. other considerations: Quality of responses - in an expert survey - and freshness of results

The researcher was trying really hard to find 100 experts who would take the WAP survey, but even after four months only 80 responses had been received. Since it was the views of expert, for example capable of foreseeing the situation for the technology in question three years ahead, obviously the quality of responses was more important than the quantity. Every indicator of expertise and sincerity of the respondents support this assumption: The insight in the two fields (one hand IT for travel/tourism, and WAP / mobile telephony on the other) of particular relevance to the researched topic, WAP for business travellers, can hardly be found much better in this world, and certainly not in Europe.

The final averages and tendencies crystallised and stabilised rather quickly. For example from 60 respondent or so, and until the response number 80 had been entered, the changes in the overall results were absolutely minimal. Both the various averages and the ranking of attributes according to importance and performance etc. stayed practically the same. It can be taken for granted that another 20 respondents would hardly have made any difference in the overall results at all. Furthermore monthly number of incoming responses had dropped to a very low level when the data collection was stopped (Figure 8). There is also a trade-off between the desire to get additional responses and to get the final results analysed while there are as fresh as possible.

Question: In absolute terms, would there have been more or better responses, if the incentive report had been kept password protected? Possibly more, but hardly better responses. The incentive report would certainly have got a lot less reading, though. In an expert survey responses from non-experts are to be avoided. It would be counter-productive to the validity of the overall results, if people who are not really experts in the field in question are tempted to take the survey even if they are not experts, just to get (access to) an certain incentive (such as free access to a report). It could then afterwards be a problem to decide who are the real experts and who are not experts but just someone who took the survey to the promised incentive. In an expert survey more responses are not always better.

9. Geographic applicability of the results

Two-thirds of the respondents come from Western Europe. All of the 18 *Eurostat* nations represented except the very smallest one. Many of the rest are coming from countries, which are relatively closely connected Europe, culturally and technologically. The study can thus largely be considered European. The results and expert advice reflected in the responses are certainly applicable to Europe ... and well beyond, for example in Australia/NZ, ... Eastern Europe, South Africa and the Middle East.

10. Representativeness for what .. in expert surveys

Largely all the respondents in the WAP survey were business travellers. 95% had stayed at least some nights at hotels in connection with business trips during the last 12 months. The last few did not travel on business, but were certainly experts in WAP. 66 of 80 respondents (83%) spend *more* than six nights a year away from home on business (cf. the Diners Club TrendTrack research definition of business travellers). At the same time they were experts in the relevant field(s). The

answers to some extent reflect the views and priorities of business travellers in general. It should be kept in mind that respondents are considerably more IT-minded and relatively more heavily armed with IT and telecommunication devices than the average business travellers, though, who in turn are more IT-minded than the general population. With two thirds of respondents using a company financed mobile phone, it is hardly surprising that the costs of acquiring and using the devices are of largely no concern to the majority of respondents. Expert surveys samples do not aim to be representative for the general population. In fact the opposite is sought: Greatest possible expertise, and thereby in effect the greatest possible difference between the expert panel and the general population. As far as the carried IT hardware is concerned, other surveys, both among especially IT-savvy travellers and among business travellers in general, have shown that the mobile phone is the most frequently piece of IT hardware carried by business travellers, followed by the laptop. The PDA (handheld computer) ranks considerably lower, even for IT savvy and other business travellers, and even in the USA (HITEC, 2001), where PDAs are more commonly used than for example in Europe (Marcussen 2001b). This ranking of devices was also found in the current WAP expert survey.

11. The Internet as a survey instrument – and as a source of secondary data

Online market research is actually more than online surveys. The Internet is also a valuable and huge source of secondary data. Indeed, with 1.6 billion web-pages (documents) available the World Wide Web by September 2001, up from 1 billion one year earlier, the Web is probably the worlds largest repository of secondary data. Most of the documents on the Web are available to free of charge, right from you desk. Not least in business-to-business (organisational) markets, it is very important and cost-effectiveness to exploit data which is already available from secondary sources, before considering collecting primary data via surveys, both from the Web and from other sources. The writer has in fact researched the entire world market for some products, years ago using off-line secondary data sources only and recently using the Web almost exclusively (Marcussen 2001a and 2001b). To locate the most relevant pieces of secondary data on the Web, and analyse these in appropriate ways, is by no means a trivial pursuit, though. It can be an extremely challenging task, indeed it can be as challenging as running online surveys. Both of these two very different ways of utilizing the Internet in research processes can be relevant, both involving plenty of challenges involved. The normal procedure would be to identify the research results which are already available before running a survey of your own. This is true both for off-line and online market research. Also it is true both for academically oriented and applied market research.

To run an online survey is *not necessarily fast*. Although the first replies can be collected within hours after initiating the data collection, it may take months from beginning to end. It can be time-consuming to administer an Internet supported survey, and therefore *expensive* (see the title of Askew et.al., 2000). It is *not easy*: It can be hard to get a satisfactory number of responses. It is invariably difficult to achieve satisfactory response rates, which have been called *chronically low* (Bosnjak 2001). Representativeness, if that is what the researcher wishes to achieve, is another challenge. Or, alternatively, if getting the highest possible level expertise among your respondents is what you are looking for, then the difficulty is make experts (and experts only) take the survey. As far as the latter is concerned, the Internet may be one of the few ways of reaching the right people. There could be other ways of reaching a large group of experts, though. For example many responses from experts can be gained at just one single conference (cf. e.g. HITEC 2001), but

different kinds of bias could then be an even greater issue than if using the Internet as a way of soliciting and getting responses, and you may not be the lucky one who will be allowed to take 30 minutes of 100 people's time at a conference, where time is invariably a very limited and very precious resource. This would be especially true for the *captive auditorium audience* approach, less to in the *catch-bypassing-exhibition-attendee* approach.

12. Conducting online surveys - a relatively new discipline

The discipline of conducting Internet supported surveys is a relatively new one, almost by definition born around the middle of the 1990s, from which time first e-mail and then World Wide Web usage started to gain momentum, i.e. significant penetration. Relatively few market research firms are offering this service to their customers, and not too many scientific articles and papers about the subject have appeared: Recent examples include Zadeh et.al. (2000), and earlier examples include Sackmary (1998) and Strauss (1996), all of which include many further references relevant to the subject of online market surveys. Also, there are now or tracks at conferences, e.g. "Internet Surveys: Improving response Rates", cf. Askew et.al. (2000), Bauman et.al. (2000), Clark and Harrison (2000), and Dommeyer and (2000), and even conferences focusing entirely on online market research ("Innovations in Online Market Research", IRRConferences.nl, Amsterdam, 11-12 September 2001).

Summary of methodological issues relating to online survey response rates

The WAP survey was run almost entirely via the Internet. A handful of different methods were used to make potential respondent aware of the survey, to get the questionnaire to respondents, who in turn used a number of different online and off-line returning methods.

Half of the respondents found out about the WAP survey via 4 lists on the net, one fourth via the Web, and the last fourth in other ways, including 3 conferences and direct, personal e-mail invitation. The WAP survey was mainly administered via a Web form and via e-mail plus attachment, in both directions. More than half of the respondents answered during the first of four months during which the online survey was conducted.

The following lessons can be drawn from the multivariate analysis of the determinants of response rates in Internet supported surveys:

1. *a personal touch – having met* - having shown up even in the forums of the potential respondents greatly facilitates the response rate,
2. *e-mail invitation to respond* (e-mail via e-mail lists or a directly to selected individuals or firms) is also very effective, when combined with the
3. provision of an effective *incentive* to respond, and finally
4. a convenient way of taking the Internet supported survey facilitates the response rate.

First and foremost, response rates were found to be determined by whether or not any personal touch were involved in the introduction of respondents to the Internet supported survey. Secondly, in particular in situations where there is no personal touch at all involved in the Internet supported survey, the presence of an effective incentive is an important driver of response rates. Thirdly it

plays a role how convenient (or cumbersome) the responding procedure is for the respondents. The Web-form procedure is less time-consuming and therefore more convenient for the respondents than the e-mail+Word-doc attachment approach. A regression analysis indicated that the Web-form approach gives a higher response rate than the e-mail-Word-doc approach. Additionally, it was found that among those who responded, answers to open-ended questions were almost twice as long for Web-form respondents than for e-mail+Word-doc respondents (with relevant expertise present for both web-form and e-mail-word-doc respondents). The tendency to get any answer at all to an open-ended question was the same for both answering modes, though.

Quite different levels of response rates were observed in the Internet supported WAP expert survey, depending on the above:

- Met in person - a personal touch: 10% response.
- Never met – but e-mail invitation in combination with an effective incentive: 2.4% response.
- Never met – and no clear incentive: 0.4% response (self-selection on web)

The importance of an e-mail invitation in combination with an effective incentive is greater than indicated above, since the 2.4% was achieved in spite of a more cumbersome answering procedure than in the situation where a response rate of just 0.4% was achieved.

In instances where a personal touch in some way was involved in the introduction of the respondents to the survey, a response rate of about 10% was achieved. The range was from a high of 40% to a low of 4% depending on the degree of *personal touch* involved in the introduction. For the lowest of the response rates in this category, the *personal touch* was rather marginal.

In the middle category there was an effective incentive – but nothing which could resemble a personal touch. A response rates of around 2.4% was achieved, in spite of the fact that the most convenient answering format (WWW form) was not being offered from the outset. Most of the respondents in this group used the e-mail+Word-doc approach. The range of response rates was from 4% down to 1.7%. For the lowest response rate in this group the explanation is largely geographic, with the list being US dominated but the incentive and the topic of the survey of relatively limited interest to the majority of persons on the list.

The no-no approach (no personal touch, no incentive) gave response rates of less than 1%. In this category there was neither any personal touch involved, neither any effective incentive for taking the survey. Website-visitors would already have seen the results of the study used as incentive. Those who more or less stumble into your website by chance tend to leave quickly again, and rarely willing to spend the necessary time to take a long survey, with hardly any incentive. The only incentive to take the survey was – if anything – just a moral one: Now you have seen the survey for free, please return the favour. And some actually did, even citing this reason.

The response rate among those who had promised to take the survey was sky-high, over 75%. There is no reason to believe that such a two-step procedure should result in lower response rates than one-step procedures, certainly for long questionnaires. However, more research is needed to investigate under what circumstances a two-step procedure for taking a survey is more or less effective than one-step procedures. Few mandatory fields should boost response rates for Web forms. With few or no required fields there is more work to do for the researcher after the first submission from the respondents, since the majority of respondents tend to miss a least a couple of

questions. After prompting respondents manually for missing answers, the data matrix was more than 99% filled-in for the 80 respondents. There were 175 questions in total. Two thirds of the first 146 questions was filled-in by all 80 respondents. Answers for the single open-ended question in the survey tended to be longer for those filling-in a Web-form than for those filling-in a Word-doc. To fill-in a Web-form is less time-consuming than to fill-in a questionnaire in a ordinary Word-doc. The reason why respondents tended to write more words for the open-ended question in the Web-form than in the Word-doc could be, than people filling-in a Web-form tend to have more time and patience left to fill-in open-ended questions. The Web-form approach is the best current and also the future way of administering Internet supported surveys. To attach a word-doc to an e-mail is now to be considered old-fashioned. Furthermore, studies have shown that questionnaires embedded in e-mails gives much higher response rates than attached questionnaires. In expert surveys, access to a report on the Web about a topic related to the theme of the online survey can be very appropriate as incentive. In an expert survey the quality of responses is very important, more so than the absolute number of responses. Representative of the general population is not sought in expert survey. On the contrary, since of course the maximum level of expertise is sought in expert surveys. Respondents in the current survey were frequent business travellers, which made them ideally suited to answer questions about WAP for business travellers, since all of the respondents were experts in IT/travel or mobile telephony / WAP, or both areas, and some even in general electronic commerce as well. The expert views reflected in the WAP survey results are highly applicable to Western Europe, as well as many other parts of the world, for example Australia / NZ, which are also relatively well represented among the respondents. Apart from being an interesting tool as a tool for administering surveys (primary data collection), the World Wide Web is probably the worlds largest repository of (free) secondary data. It is more or less the duty of any researcher, in academia as well as in industry to find out what is "already there", before starting own tailor designed surveys, this goes for both off-line and online surveys. The area of online surveys is still relatively a embryonic field of academic research and industry has yet to exploit the opportunities - posed by the ever increasing penetration of World Wide Web usage in the general population. Academia should help industry avoiding some of the pitfalls, and for example do more research into the issues of how to boost response rates in online research, which tend to be lower than in off-line research and many other related fields such as and related aspects such as the issue of representativeness.

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Appendix A - Postings inviting potential respondents to “take the WAP survey” – via the Internet

The first message and the reminder, which were posted at the WAP developer site can be seen below. Similar messages were circulated on the IFITT list, for example.

The first of two posting at: [http://mail.anywhereyougo.com/
http://mail.anywhereyougo.com/pipermail/wap-dev/2000-November.txt.gz](http://mail.anywhereyougo.com/http://mail.anywhereyougo.com/pipermail/wap-dev/2000-November.txt.gz)

From marcussen@rcb.dk Thu, 2 Nov 2000 10:01:09 +0100
Date: Thu, 2 Nov 2000 10:01:09 +0100
From: marcussen@rcb.dk marcussen@rcb.dk
Subject: [WAP-dev] WAP SURVEY

I would like to invite you to participate in a WAP SURVEY (among professionals). Would those of you who will agree to take the WAP SURVEY please drop me an e-mail, directly to:

marcussen@rcb.dk, simply leaving

- (1) WAP SURVEY in the subject field.
- (2) At text just write OK
- (3) and then your signature, please.

You will then receive the WAP-questionnaire as an attachment to an e-mail. The questions are mostly in the form of rating scales (requiring you to fill-in a number). It may take you close to one hour to fill in, I have to say. Upon returning the questionnaire you will be given the URL of a general and rather comprehensive study into "Mobile Phones, WAP and the Internet", which is somewhat focused upon Europe, but it also goes further than that due to the global nature of the 'm' industry.

I have already got a fair number of responses from IT/travel experts (with some knowledge about WAP as well), but I am keen to supplement those with responses from WAP experts (with some - personal - travel / hotel experience).

Best regards,

Carl H. Marcussen, Senior Researcher, PhD,
Research Centre of Bornholm, Denmark,
marcussen@rcb.dk

“REMINDER” -- Second posting at

<http://mail.anywhereyougo.com/>

<http://mail.anywhereyougo.com/pipermail/wap-dev/2000-November.txt.gz>

From marcussen@rcb.dk Tue, 14 Nov 2000 13:24:40 +0100

Date: Tue, 14 Nov 2000 13:24:40 +0100

From: marcussen@rcb.dk marcussen@rcb.dk

Subject: [WAP-dev] WAP SURVEY

The WAP SURVEY which I told you about on 2 Nov., can now be taken by filling-in a Web Form, simply by following the appropriate link by the end of this site:

<http://www.rcb.dk/uk/staff/chm/wap.htm>

The above site, which is now in the public domain, also contains a six page summary of a general study into "Mobile Phones, WAP and the Internet - ... 2000-2003" AND access to the full study in pdf-format (108 slides).

Best regards, Carl H. Marcussen, PhD,
Research Centre of Bornholm, Denmark.

Appendix B – Unhappy WAP users

As many as one out of four, among those who had actually sent and received e-mail via WAP, did not think that this WAP function currently satisfied their needs. Specifically, 8 of 32 current WAP e-mail users were not happy with this function of their WAP-phone.

The same pattern of many unhappy users exist with respect to the function “checking the ordinary e-mail box while on the go via WAP”: 51% have done so, but fewer, namely only 48% of all respondents, believe this function is currently available to a degree which suits their needs. It turns out that 8 of the 30 who have checked their ordinary e-mail box via WAP while being on the go are not happy with this function.

There is some overlap between those which are unhappy. Four respondents are unhappy with both functions. Four are only unhappy with the checking the ordinary e-mail box via WAP function, and another four are unhappy with the sending/receiving e-mail via WAP function. So, up to 30% of current mobile e-mail users are unhappy with at least one of the e-mail functions of their WAP phone (i.e. many as 12 of 30-32). There seems to be plenty of scope, challenges and opportunities to work on improvements in this e-mail via WAP field, which can safely be called a potential killer-application for mobile devices. – The question is, though, to what extent users will wish to use the mobile phone or the portable PC or the PDA for e-mail communication while being on the go.

A bit of further investigation actually shows that across all 22 travel-related WAP services, as many as 3 out of every 10 of the current users are not happy with the current WAP sites. The current users consist of happy users (1), unhappy users (2), and a few happy users by mistake (7). So, unhappy users in percent of all current WAP users are combination 3 divided by combination 1+3+7.

In average, almost 50% want to see further development of given WAP services. 17% are happy WAP users, and another 12% potentially happy users, i.e. respondents who believe that given services are currently available to suit their needs, but they haven't actually used them yet. - 7% are unhappy users, but these should be seen in relation to current users only, whereby in reality 3 in 10 of current users are unhappy with the different WAP services which they have tried out.

There are two other fields – both location related – where there are more people (among respondents) are currently using (or at least trying to use) certain WAP-services than there are people which think these services are currently available to a degree which is enough to suit their needs:

- 1) Getting driving directions.
- 2) Getting restaurant information.

As many as 6 out of those 14, who have tried to get driving directions by WAP did not feel that this service was currently at a level which satisfied their needs. In percentage terms, 43% are not satisfied with this service. – Even more, 7 out of 15, a whopping 47%, of those who had accessed restaurant information on WAP were not satisfied with this service for the time being. - Obviously,

in future there will be great opportunities for improvement in these fields, as and when location based services become available.⁵

Appendix C - Brief review of WAP applications in high demand found in other WAP surveys from the second half of year 2000

Below it is attempted to present the WAP applications highlighted in recent surveys. It is thought that the applications which are being mentioned in multiple surveys are actually the most important ones. This scanning recent surveys for important WAP applications should put the findings of this current study into perspective.

NOP Research Group (2000a)⁶ undertook conducted 1008 telephone interviews with mobile users across the UK in July 2000. The Internet/WAP applications of greatest interest to respondents were:

- E-mail
- travel information
- accessing information from directories (e.g. telephone numbers)
- financial services
- games and entertainment listings (for low-budget teens).

Also in high demand, both for WAP and non-WAP phones, cf. NOP Research Group (2000b)⁷,

- SMS and
- ring tones

Nokia (cf. Lindqvist 2000a)⁸ have asked about 50 mobile network operators about which WAP services which are currently most popular. These are:

- e-mail and different messaging services
- Phone book
- General news
- Financial services

⁵ Orange points way for mobiles, By Andrew Ward in London, Published: December 8 2000 08:31GMT | Last Updated: December 8 2000 08:50GMT. "Some mobile phones [WAP enabled] will be turned into navigation devices from next week, capable of directing users to their nearest cash machine, hospital or cinema." "The service, set to be introduced by Orange, Britain's third-largest network operator, will be the first of its kind in the country to offer mobile phone users products tailored to their location." – Others are following different approaches (Grande, C., "Survey – creative business: Location! Location!, ft.com, 12 Dec. 2000).

⁶ NOP Research Group (2000a). Internet Surveys – WAP: Consumer momentum, but ignorance of services available. 13 September, <http://www.nop.co.uk>.

⁷ NOP Research Group (2000b). Internet Surveys - 4.7 Million Mobile Phones To Be Given As Christmas Presents. 11 December, <http://www.nop.co.uk>.

⁸ Lindqvist, C. (2000). Nokia believes in a 'killer cocktail' (in Swedish language). 22 Nov., www.finanstidningen.se - The Nokia person quoted in the article is Niklas Savander, VP of Mobile Internet Applications, Nokia Networks.

- Games
- Navigation services (how to find ...)
- Weather info.
- City guides

- Positioning (i.e. location based services)
- M-commerce

Time and place are stressed as being important contingency factors.

In a presentation by Bergqvist, Senior VP of 3G Business, Nokia Networks, a top 10 of applications for four different segments of users of different non-voice wireless applications and services was shown.⁹ The four segments are: Professionals, Technophiles (mostly men), Female; Youth. In all four segments messaging (e.g. e-mail) comes as number one, and phone book as number two (or three). For professionals the full top ten is as follows:

1. Messaging e.g. e-mail
2. Phone book
3. Corporate info.
4. Banking
5. Route finder
6. Calendar
7. Weather
8. Traffic info.
9. News
10. Contacts

Some of these services are WAP-based, others not necessarily. E.g. phone book may both be numbers stored in the handset itself as well as WAP-based white and yellow pages.

One Swedish mobile network operator, Europolitan, summarizes the result of a customer survey as follows (Lindqvist 2000b)¹⁰: “The Swedes want serious services like e-mail and messaging services. This is perhaps because we are not used to [online] games.”

From the supplier-side it can be noted that “Europe’s banks are investing heavily in mobile banking”. And: “.. Almost half (48%) of Western Europe’s WAP-enabled mobile banking accounts originate in Scandinavia, 22% in the UK, and 13% in Germany.” (IDC, according to NUA, 11 Dec. 2000).

The travel industry is apparently more reluctant in making investments in m-commerce, according to Arthur D. Little, the management consulting firm, who have interviewed 65 travel and tourism firms in Germany, which is Europe’s largest travel market (FVW 24 Nov. 2000): Only 11% of the

⁹ Nokia (2000). Making the 3G market. By Dr. J.T. Bergqvist at the Nokia Capital Markets Day, 5 Dec., www.nokia.com.

¹⁰ Lindqvist, C. (2000b). Few get access to mobile Internet [via GPRS] (in Swedish language). 1 Dec., www.finanstidningen.se

travel firms describe themselves as being pioneers investing in the new mobile technique (m-commerce, WAP). Travel has taken a waiting position, whereas other industries are more proactive:

- Financial services.
- Media
- Telecom.

However, precisely in Germany one firm is certainly investing in m-commerce for precisely travel: Siemens has founded a subsidiary which should have 150 employees by 2003: Siemens Mobile Travel Solutions GmbH.¹¹

In Australia, Cable & Wireless Optus reported the following ranking in December 2000, after their first year of WAP service operations:¹²

1. Email
2. Stock quotes
3. Movie listings
4. Weather

Horoscopes and TV listings were also popular. The Nokia 7110 was the most popular WAP handset, followed by the Siemens C35i and a Motorola model. “Location-based services are also popular with over 30 per cent of our WAP users using them since we launched .. [just one month ago .. in the beginning of November 2000].”¹³ – The headings in Optus’ portal are: Email, news, financial information, sports, entertainment, shopping, weather. – It appears that the services which have turned out to be most popular, also were those highlighted already when the WAP service was launched in the beginning of December, 1999:

“Cable & Wireless Optus customers will now be able to access e-mails and find out about the latest news, sports results, share prices and weather through their mobile phone.”¹⁴

Location based services, which are being launched by Orange in the UK comprise the following:

- Directory: a location-relevant business directory (nearest pub, restaurant, cinema etc.)
- Cash Machine Finder: find the closest cash point
- **Hotel Finder: search for hotels by brand or type**
- Emergency Services: search for the closest hospital, police station, garage, etc.
- Driving Directions: get directions to your search result or other location¹⁵

In China Siemens and China.com cooperate to launch WAP-services: “wap.china.com includes information (news, stock quotes, weather, sports), emergency (car rescue, emergency call), interactive community (email, chatroom, poll and auction) for China WAP users, and leisure

¹¹ Siemens gründet Tochter für mobile Internet-Reiseportale, 20 Nov. 2000, www.handelsblatt.com.

¹² http://www.cwo.com.au/codocs/pr231_wap_survey.pdf

¹³ <http://www.cwo.com.au/newsroom/1,1450,231,00.html>, Wappy Birthday at Optus, 01st December, 2000.

¹⁴ <http://www.it.fairfax.com.au/breaking/19991201/A9758-1999Dec1.html>

¹⁵ “Orange first to launch location based services in the UK” <http://www.wapdrive.com/DOCS/>, 12 Dec. 2000.

(horoscope, city guide -- movie, restaurant and bar info, travel package and search) .. (PR Newswire)¹⁶

Ericsson indicates that in the current early days of mobile internet services, a portal with personalized services contains these three categories, with several subcategories for each:

Table 20 Portal with personalized services

Mobile Commerce	Mobile Infotainment	Mobile messaging
Banking	Information (news, sport, etc)	e-mail
Trading	Entertainment (music, games)	Voice-mail
Ticketing	Navigation services	SMS
Shopping		Video/image-mail (postcards ...)
		Instant message
Positioning		

Source: Eriksson, H., VP Research, Ericsson. WSI workshop "Visions of the wireless world", 12 Dec. 2000, Brussels.

The WAP Forum lists as many as nine categories of WAP services, each with several sub-types, without indicating any priority of these, though.¹⁷ In the *travel services category*, the WAP Forum mentions these:

- Reservations,
- ticket purchases,
- flight rescheduling,

the two first of which are also mentioned under the M-commerce category. Their so-called *location-smart category* comprise three types of services, all of which are of relevance for travel:

- Directions,
- traffic reports,
- dining/event suggestions.

In a survey undertaken by the ARC Group among 300 of 1250 the participants in the WAP Congress 2000, which took place in Cannes in the beginning of May 2000, these applications came up as those which most respondents thought would generate the most revenues by the end of 2000:

- e-mail
- news (personalised)
- financial information¹⁸

In a survey with 1000 respondents undertaken by the Tamkang University as early as April 2000 in Taiwan, the following applications came up as the main ones that the respondents would use:¹⁹

¹⁶ "China.com, Siemens To Deliver WAP Content In China" Posted by ThinkMobile.com - ThinkMobile on 10/07/00
<http://www.wirelessauthority.com.au/article.jsp?sid=72983>

¹⁷ <http://www.wapforum.org/what/WAPForumBrochureOCT00.pdf>

¹⁸ <http://www.wap-resources.net/wapsurvey.shtml>. The precise wording used in the mentioned source is this: Heading: "e-mail and Information services will lead the way in 2000". Text: "When asked which 2 data services they think will generate the most revenues from WAP by the end of 2000, over 50% of respondents chose e-mail and Information services. When asked which specific Information services, 50% also felt that personalised news and financial information would provide the greatest revenues."

- viewing financial information and conducting financial transactions
- making movie ticket, restaurant and travel reservations
- traffic and weather information.
- general reference services
- news sites

Apparently e-mail or messaging was not included in this early survey.

In a UK survey among people interested in getting a phone with Internet access, NOP Research Group found that these services were among the most popular²⁰:

- e-mail
- travel info.
- info. from directories, e.g. telephone numbers
- financial services (for the more affluent)
- games and entertainment listings (for low-budget teens)

The Boston Consulting Group (BCG) has made an international m-commerce survey, which can also be regarded as a listing of the most popular applications²¹:

- transactional services (Americans)
- entertainment (Japanese, i-mode)
- online banking (Germans)
- communication, e-mail (Australians)
- news, weather, sports (general)
- untargeted push advertising not acceptable (general)
- enthusiastic enough to change pre-set portals (Swedes)
- very sceptical (French)

I-mode application can be classified into two groups: practical, and fashion/self-identity²²:

Practical

Banking

Travel (train and plane schedules, hotel room availability and booking, travel booking)

Ticketing (concerts, movies, other events)

E-mail

Also:

navigation service for pedestrians

weather reports

Fashion/self-identity (~Entertainment)

Call tones

¹⁹ www.allnetdevices.com/industry/market/2000/04/11/taiwan_survey.html.

²⁰ www.nop.co.uk/survey/internet/internet_item21.htm (Press release, 13 Sept. 2000). The survey was undertaken in July 2000 by telephone with 1008 mobile users across the UK.

²¹ www.

²² www.isoc.org/inet2000/cdproceedings/3a/3a_1.htm#s3

Music downloads
Screen saver
Animated characters
Greeting cards
Horoscope
--
Wireless virtual chat

“More than 50 percent of access numbers for I-mode come from entertainment sites, including extremely popular character downloads. Bandai (BNDY: news, msgs), one of the first to offer this service, makes over half a million dollars a month from downloads of their characters.”²³

²³ http://cbs.marketwatch.com/archive/20001107/news/current/asianetdaily.htx?source=htx/http2_mw