

## Farmers on Androids

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### Abstract

*In order to promote the use of smartphones by farmers and to uncover possible barriers for their use, an experiment was launched in the autumn 2010. 22 farmers were given an advanced smartphone – 15 based on Android and 7 on Windows Mobile 6.5. One and three months after the reception of the smartphones, the farmers completed surveys. The results showed that the smartphones were able to withstand the harsh farming environment, and that most farmers chose to use the smartphone instead of their ordinary mobile. Access to weather information, market information, e-mails, camera and calendar functionality were the highest rated. The entering of text and readability were given as the major reasons amongst those that gave up using the smartphone.*

Keywords: smartphones, experiment, survey



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## Introduction

The modern farmer can be compared to a business man, with the difference that he does not have access to a computer most of the day. It does not have to be like that. Nowadays, smartphones are almost small computers - meaning that the farmer, so to speak, can carry his office in his pocket. However, very few of them are actually exploiting this possibility.

To promote the use of smartphones amongst farmers, and to uncover possible barriers for their use, an experiment was launched in the autumn of 2010 in which 22 farmers were given an advanced smartphone.

The objective of the experiment was to investigate to what extent farmers

- have the patience, interest and skills to utilise a smartphone,
- appreciate the different possibilities offered

and of course – how does a smartphone go along with clumsy fingers, bright sunlight, dirt, dust and moisture.

## Materials and methods

The farmers were invited to participate through a posting on the personal part of the farmer directed portal Landmand.dk (Hansen et al., 2006) (see fig.1) and by direct mails to approx. 15 farmers. The posting included pictures of smartphones and some text informing that test persons would be provided with a smartphone and be given instructions in how to use it. Amazingly, it took almost two weeks before 29 farmers had signed up. Out of these, seven already used smartphones (4 HTC, 2 Samsung and 1 Nokia) and were therefore rejected. Amongst the 22 selected farmers, 17 used different kinds of Nokia models; 4 Sony Ericsson and one used a Samsung.



Figure 1. Invitation to participate in the experiment as shown on the personal pages on the portal Landmand.dk.

### Smartphones and apps

The smartphone market was surveyed. We ended up selecting HTC models – Legend (11), Wildfire (4), Mini (4), and HD2 (3) - as this company is strong on smartphones and delivers both Android and windows based models. Nokia and Sony Ericsson – brands typically used by farmers – were ruled out as these companies are lagging a bit behind on smartphones. iPhone was ruled out because there are only two models to choose between.

Table 1. Number of smartphones and most important specifications for the phones used in the experiment.

Model	Number	Operating system	Screen size	Price, €
HTC Legend	11	Android 2.1	3,2"	375
HTC Wildfire	4	Android 2.1	3,2"	280
HTC HD2	3	Windows Mobile 6.5	4,3"	540
HTC Mini	4	Windows Mobile 6.5	3,2"	385

Prior to handing out the phones, they were configured to suit the needs of the farmer receiving the phone as far as this was possible. This included installing apps covering weather forecast, news, market information and map services, besides the common services integrated with the phone such as e-mail, calendar and internet with relevant bookmarks. None of the apps were specific to agriculture, as there is not yet developed any apps specifically targeting the Danish farmers' needs.

The Androids were installed with more than 20 apps, in contrast to only 3 apps on Windows Mobile, as there are only very few apps available for the Windows Mobile 6.5 platform. On the positive side, the Knowledge Centre for Agriculture have developed programs for data registration in plant production and dairy herd management, and these programs function only on the Windows Mobile 6.5 platform. These programs were installed on Mobile 6.5 models.

To enhance the user experience, all Windows Mobile phones were delivered with the SPB Mobile Shell 3.5 (SPB Software, 2011) installed. This shell made it possible to customize the phones beyond the barriers imposed by Windows Mobile 6.5, see figure 2.



Figure 2. Opening panel on Android models (left) and Mobile 6.5 models with SPB Mobile Shell (right). In the middle an overview of all seven panels on Android models.

### Support

The smartphones were delivered to the farmer around 1<sup>th</sup> of November 2010 by an employee from The Knowledge Centre. Each visit lasted typically 60 to 90 minutes. The farmer was instructed in the use of the smartphone, and in each case, the phone got connected to his Wi-Fi. In a few cases, access to the farmer's e-mail account was established.

After the first survey, farmers were invited to join in on communities established for Android users and Mobile 6.5 users, respectively. A Yammer (Yammer, 2011) community was used for Android users, and a Microsoft SharePoint site for Mobile 6.5 users.

A number of instructional videos were produced – 12 for Android and 5 for Mobile 6.5. These videos were accessible from the portal landmand.dk. Farmers were invited by e-mail and in the communities they were advised to use those videos.

### Surveys

Participating farmers were asked to fill out two online surveys. The first survey took place in the end of November, 4-5 weeks after receiving the smartphone. The survey was sent to 21 participating farmers and 17 filled it out. The second survey was sent in the beginning of February 2011. It was sent to 22 farmers and 21 replied.

Both surveys had an option for indicating that the smartphone was not used, and in this case, the respondent was not asked questions concerning the use of the smartphone.

The questions were, to a large extend, identical in the two surveys, except a few new questions added in the last survey.

### Results

All the farmers, except one, were using the smartphone one month after the start of the experiment, see figure 3. Some might have used their old phone along with the new one, as the question in the first survey only had the option *Yes* or *No*. Three months from start, five had given up using the smartphone. Some indications of reasons for this are given in figure 9.

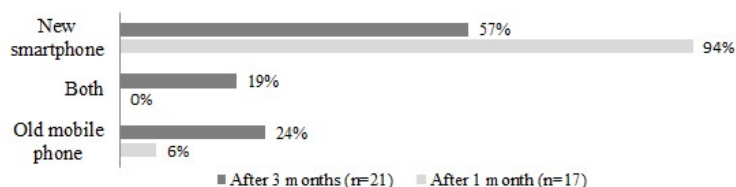


Figure 3. Distribution of farmers using the new smartphone; their old mobile or both after one and three months after receiving the smartphone.

Will it last? The experiment gave a clear answer as seen in figure 4. It shall be noted, that the farmers were told to handle the smartphone just as they used to handle their own phone. None of them were given protective cases, and together with the smart-phone, they received a statement declaring that they would not be held responsible, if the smartphone got damaged.

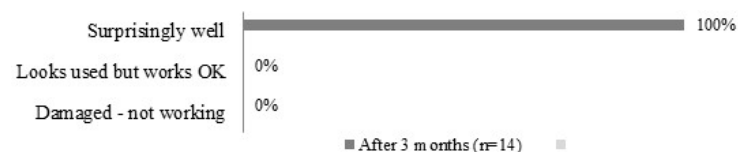


Figure 4. The farmers' perception of the smartphone's sturdiness answering the question *Will it last?*

Figure 5 shows, that it was not love at first sight and that satisfaction moved in both positive and negative directions over time. It should be noted that the number of smartphones not used, increased from one to five after three months.

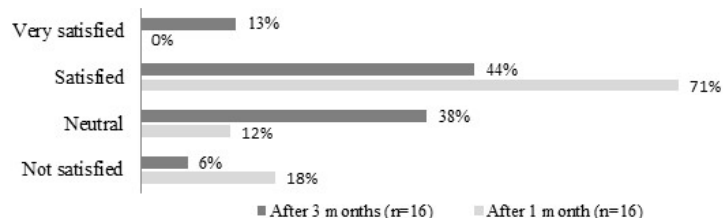


Figure 5. Overall satisfaction with the smartphone.

In Denmark, it used to be common to pay for the use of your phone per minute of talking, per sent SMS and per MB data transferred. Using such a plan with a smartphone can turn out to be expensive, as data usage will increase. Therefore, the farmers were told to check their payment plan, and an app showing their daily data usage was installed on Android models. As can be seen from figure 6, after three months, 44 % still did not know, how much they are paying. It should be noted that all farmers used Wi-Fi in their house.

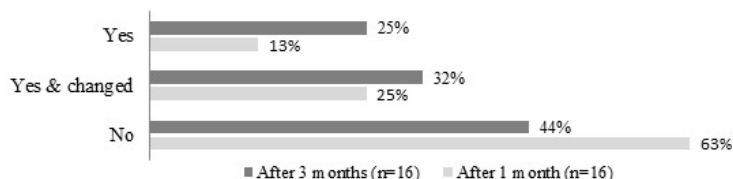


Figure 6. Responses to the question *Have you found out how much you pay for data transfer?*

As expected, getting a weather forecast is the most popular option, which all respondents state that they have used, see figure 7. Both Android and Mobile 6.5 models have weather forecast functionality on their opening panel, so it is very easy to use this. To get a weather radar map, Android users must use an app, and Mobile 6.5 must use a bookmark to an internet page. A closer look reveals that the 75 % holds for both Android (n=12) and Mobile 6.5 (n=4) users.

A further comparison between systems shows that Android users were more active when it came to reading e-mails (75 %), sending e-mails (50 %) and installing new apps (58 %).

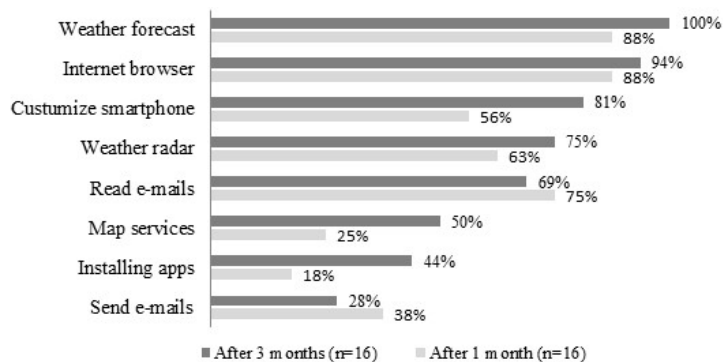


Figure 7. Use of options offered by the smartphone.

Figure 8 shows how 16 respondents (columns) rates some functions and issues, after three months of using the smartphone. A full circle expresses a high rating, and the rightmost column shows the average rating. Similar questions were posed in the first survey (after one month). Also at that time, *Weather radar* and *Enter text* was top and bottom, but with 6.8 and 3.6 points respectively meaning that rating did increase over time.



Figure 8. Likes or dislikes of some functions and issues from 16 respondents after three months of use. Respondents should rate on a scale from 1 to 10, with 10 expressing must positive. An empty space indicates no relevance.

Figure 3 shows that five farmers had completely given up on using the smartphone, and that four used both the smartphone and their old phone. As shown in figure 9 – and in fine accordance with figure 8 – difficulties with entering text are a major reason for not using the smartphone. Also noteworthy, is the problems with readability – a typical issue when using a phone outside in sunny weather.

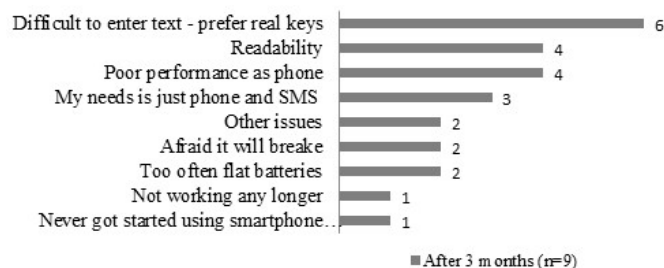


Figure 9. Reasons stated for not (n=5) or only partly (n=4) using the smartphone.

## Discussion

Sands & Thing (2010) report, that SquareTrade analysed failure rates of over 50,000 smartphones covered by SquareTrade Care Plans and found that the 12 month malfunction of smartphones was 3,9 % compared to 6,9 % on basic feature phones. Concerning reported accident rates after 12 months, the analysis showed around 10 % for smartphones in general and 12-13 % for high performance models. These findings support the results from this small experiment.

Smartphones are similar to computers: Their functionality depends on the software/apps installed. It is important to realise this when evaluating the results reported here. The smartphones given to the participating farmers were configured and customised to suit their needs as far as possible. Had the farmers received an off-the-shelf-box and some manuals, the results would probably not have been nearly as positive concerning the use of the smartphones.

Both Android (n=15) and Mobile 6.5 (n=7) models were used in this experiment. The reason being that the Knowledge Centre for Agriculture have developed programs for data registration in plant production and dairy herd management, which only run on Mobile 6.5. Five farmers gave up on using the smartphone: Three of these were using Mobile 6.5 models and two were using Android models. This indicates a problem: IT developers of professional (farming) software are typically working in a Microsoft world inclusive mobile devices. This leaves – at least in Denmark for the time being – farmers with a difficult choice: Buy an out-dated Mobile 6.5 model with a low degree of usability if you want farm specific programs or go for an Android/iPhone model, if you want all the exciting apps everybody else is using.

## Conclusions

Based on the results from this experiment, it can be concluded that HTC smartphones with 3.2" to 4.3" screen sizes are solid enough to survive use in a farming environment. This is an important observation, which should be followed up with initiatives to develop apps and mobile sites specifically targeting the needs of the farmer.

Even without farming specific apps and mobile sites, a smartphone can be a valuable tool for farmers depending on his personal interest and willingness to invest time in exploiting the possibilities. In this experiment, a majority (57 %) shifted to only using the smartphone, and this percentage can be expected to increase as more farming specific apps becomes available.

## Acknowledgements

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