Paper presented at

AFITA / WCCA 2012 September 3 – 6, 2012
Venue: National Training Institute of Farmers' Organizations, Taipei, Taiwan

Using QR codes for context specific support around the farm

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ABSTRACT

In Denmark, running a modern farm demands that you are able to handle a wide variety of technical equipment; manage a number of farm labours and contract works and ensure that all activities are performed according to legal rules and legislation. It is a demanding job – especially as farm labour often includes persons from Eastern Europe with less experience with Danish farming standards.

To replace the use of printed Standard Operational Procedures (SOPs) and/or precise and time consuming instructions from the farmer/manager, a project is investigating the utilisation of QR codes and smartphones as means to access context specific instructions around the farm.

A package called QIC (Quick Information in Context) has being developed. QIC includes a simple web based system to generate QR codes, a QR label printer and a pocket video cam and instructions how to use the different elements including a common YouTube account for uploading video. QIC has been implemented on three farms; there the farmers themselves have created instructional materials (text pages and videos). Our experiences working with QIC are mixed: Showing a farmer how to use QR codes convinces him instantly about its usefulness in practice. Writing about the potential of using QR codes gives a low response.

Keywords: QR codes, smartphones.

1 INTRODUCTION

QR codes (Quick Response codes) are square 2D barcodes that are seen everywhere nowadays. They are on print advertisements, such as magazines, business cards and posters; they are on real estate sales signs in front of a home and they have also started appearing on goods such as milk and wine. Their basic aim is to allow people to scan them using an app on their smartphone or tablet, which then takes them to a webpage giving further information about a brand or product. The benefits are many, the most obvious being giving the user an easy in-context access to more information without having to key in long URLs.

QR codes are a simple and stable technology, which already in June 2001 had reached the "Slope of Enlightenment" on the Gartner Hype Curve [1]. According to ComScore [2], over 14.2 million smartphone users scanned a QR/Bar code, reaching 14.5% of the smartphone audience in EU5 (France, Germany, Italy, Spain and UK) during the three month average ending March 2012. More than half of the smartphone audience that scanned a QR/bar code did so from a printed magazine or newspaper (50.9%), making it the most popular source. Over 38.0% of the smartphone audience scanned a QR/bar code that was printed on product packaging, making it the second most popular source in EU5.

In Denmark, usage of smartphones amongst farmers is increasing at a rapid pace. At the end of 2011, a survey [3] with responses from more than 4,000 farmers showed that 1 out of 5 farmers at that time used a smartphone, and that more than half of those, who expected to buy a new mobile in Q1 2012 indicated that they expected to buy a smartphone.

Danish farmers are well aware of QR codes and how to use them. A survey in June 2012 amongst farmers using a smartphone (n=682; 49% response rate) showed that 79% knows how to use QR codes; 15% are a bit unsure and 6% do not have any knowledge about them. Amongst farmers knowing how to use the codes, 85% have tried scanning a code.

There are some odd examples of using QR codes for specific farming purposes. At a T-Mobile brainstorming session with the UK's National Farmers' Union (NFU), the participants came up with the idea of spraying QR codes on cows going to auction, so interested buyers just have to scan the code to get information about the animal's provenance and vaccination history [4]. This story, which got quite a lot of press coverage, has inspired others to decorate cows with QR codes. BBC News [5] reports about the cow Lady Shamrock, which by its owner has been sprayed with a QR code, so visitors to the farm can scan and get information about this cow.

Besides these odd examples, no examples of specific on-farm usage of QR codes seem to have broken the surface. This is a bit surprising, as there are a number of potential uses. Chambers [6] – a social media interested farmer and blogger – lists these four farm applications of QR:

1. Tracking Parts
   On machinery parts, each one is stamped to ensure that the farmer can use correct terminology when phoning in for parts at the local dealer or it can help a hired hand to communicate correctly with the farmer in case of a break down.

2. Chemical Application Rates / Tank Mixing
   Instead of reading the small print on the mini books attached to chemical containers to get application rates and tank mix instructions, it would be much better to put a couple of QR codes on the top of the box linking to relevant instructions.

3. Equipment Operation Tips
   Besides manufacturer operation tips, the farmer could produce his own instructions targeting farm labour that changes every season.

4. Servicing Tips
   Again; this could be a combined effort by both the manufacturer and the farmer. The large majority of this material could be in an archive by the manufacturer and QR codes could be placed around the implement on the corners of the large servicing stickers they already have on the implement. In addition to these manufacturers' service tips, the farmer could add in additional notes to remember for labour to watch while servicing based on past break downs or weak points they notice on that particular machine.

A more systematic approach to 3) and 4) is using *Standard Operating Procedures* (SOPs). They are descriptions of the way particular tasks should be carried out on the farm. They help ensure that everything that needs to be done gets done – for example, correct hygiene procedures during milking to minimise mastitis. Using SOPs is also the way to get consistency when different people are doing the same job.

At the Knowledge Centre of Agriculture (VFL), such SOPs [7] have been developed and implemented in a paper based format as binders placed around in the production environment on the farm. To further develop this concept, a project is now investigating the potential in eventually replacing the binders with QR codes if use of the codes for purpose 3) and 4) as suggested by Chambers proves successful.

2 QIC PACKAGE

Keep It Simple is of utmost importance when developing ICT tools for farmers. This has guided the development of a package called QIC (Quick Information in Context). QIC includes

access to a simple web based system to generate QR codes, see fig. 1, a QR label printer and a pocket video cam and instructions how to use the different elements including a common YouTube account for uploading video.

Figure 1 QR code generator for creation of different types of QR codes including label

There is a huge number of QR code generators, but to ensure easy usage and Danish instructions, we created one specific for this project. As it is foreseen that the farmer might produce several labels while at it, there is an option of putting a text on each label. This is also useful if there will be used several labels pointing to instructions in different languages e.g. Danish, English & Russian.

The printer is a Brother QL-700 label printer. This inexpensive printer works without ink or toner and has a *Plug & Label* feature that lets you create and print labels without installing software. 62 mm wide endless label rolls are used as this size makes labels resilient against dust and dirt.

The pocket video cam is a robust Creative Vado HD, which is robust and has option for direct upload to YouTube.

To shield the farmers for the trouble with creating their own YouTube account, they are offered to use a common account using the *Unlisted* privacy meaning that only people who know the link/QR code to the video can view it.

3 EXAMPLES OF FARMERS' USAGE OF QR CODES

Three farms have been involved in a user driven development including discussions of potential uses and testing of the different elements of the QIC package. Initially, these farmers had never tried scanning QR codes, but after a short demonstration, they were quickly convinced about their usefulness.

Besides these farms, other farmers stumbling across the QR code generation tool are offered to have QR labels produced and sent to them as a temporary free service.

3.1 Video based instructions

This farmer uses an automatic feeding system for his slaughter pigs. This system has a number of adjustment possibilities and includes a disc mill. Previously, the farmer had to return back to the farm or use long time instructing over the mobile phone, if the system stopped working. Now he has produced two YouTube videos, in which he shows how to clean the disc mill

and how to check the different readings on the control dashboard. Both labels are fixed onto the dashboard.

3.2 Text based instructions

Irrigation failure

Gislum Højgaard is a medium sized organic dairy farm producing most fodder on the farm. Irrigation is necessary even though the machinery might not be used each year. Therefore, even the farmer himself has trouble remembering what to do if the pumps or irrigation machines are making trouble. He used to have instructions in the office. Now these text based instructions are web based and accessed via QR codes placed at the pump and on the irrigation machines.

3.3 Manufacturer supplied instructions in different languages

Washing robot

A large pig producing farm has both Danish and international labour. A fully automatic washing robot is used to clean the animal houses. The manufacturer of the robot has Danish and English two pages quick start manual on their website. QR codes to these manuals are placed on the washing robot, so even unskilled workers are able to do basic operations with the robot.

4 DISCUSSION

Our experiences working with QR codes are mixed: Showing a farmer how to use QR codes convinces him instantly about its usefulness in practice. Writing about the potential of using QR codes gives a low response: More than 500 have visited the page with the QR code generator and the offer to have QR code labels sent by mail – only three have made use of this offer. Our belief is that the lack of interest can be explained by the lack of imagination about how to use the codes. This view is supported by the fact that examples of codes used in agriculture for internal knowledge sharing are not apparent yet.

This is going to change as there is a number of obvious advantages using QR codes on the farm:

- Context specific information is often needed and there will seldom be traditional information channels available
- With larger farms and more employees – maybe of different nationalities – it is too time consuming with individual instructions
- Use of the smartphone as delivery platform gives multimedia possibilities compared with paper based systems
- Production and maintenance of information can be done at low cost in a flexible manner.

At current, a complete set of binder based Standard Operating Procedures developed by VFL for dairy farms costs 1,300 €. It is our belief that this material can be made both more useful and at a lower cost by transferring it to a QR code based system.

The perspective is to integrate production and storing of the necessary information into the personal portal landmand.dk [8], which more than 10,000 Danish farmers use for accessing farm specific data, information and tools.

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Den Europæiske Union ved Den Europæiske Fond for Udvikling af Landdistrikter og Ministeriet for Fødevarer, Landbrug og Fiskeri har deltaget i finansieringen af projektet.