Fresh and local: the rural produce market as a site for co-design, ubiquitous technological intervention and digital-economic development

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ABSTRACT

Ethnographic studies have played a key part in informing the design and development of a multitude of ubiquitous systems, from control room systems to pervasive games. While other papers have often focused on systems developed for urban contexts, this paper presents the initial findings of a study that focuses on a rural produce market in West Wales as a site for ubiquitous multimedia system-based intervention, digital economic considerations and co-design. The findings relate to the initial ethnographic fieldwork, digital-economic considerations for the site, the evolution of a participatory design strategy for developing a *Market Portal* and - importantly – the way that these are informing the design of the ubiquitous technologies relating to the *Market Portal*.

Categories and Subject Descriptors

H.5.m. Information interfaces and presentation (e.g., HCI)

General Terms

Design, Economics, Human Factors interfaces and presentation (e.g., HCI)

Keywords

Ethnography, Rural, Economic, Participatory Design, Ubiquitous, Mobile, Research in the 'wild', Enterprise

1. INTRODUCTION

The setting of this work is within a rural farmers' market in West Wales (both English and Welsh are spoken in the market). Once a week the market traders come together to sell a variety of produce. The market space is owned by a local community project that wants to open a shop on site eventually and use mobile technologies in it to display the provenance of the items they sell. The stallholders currently pay the project in order to set up their individual stalls on the market site. The stallholders use very little technology in regard to the promotion and sale of their products and yet would like to increase "footfall" in the market, indeed, a lack of online presence within Wales has been identified by Google [1] with only 40 % of SMEs having some form of online presence. Rising fuel prices impacting upon delivery costs, the cost (both economic and in terms of staff time) of physical and virtual marketing and the loss of face-to-face contact with their customers are all real concerns of the traders. This combined with the issues relating to the seasonal influx of both produce and customers, shows the complexity of issues the stallholders have to deal with. Many of the stallholders operate under the further pressures of working at the edge of broadband and 2G/3G provision. The initial ethnographic findings of this study have so far informed the design [2] and led to our further engagement with stallholders. Their participation within the design process has allowed us to progress to an initial design concept, the *Market Portal,* that is responding to the needs that the engagement with this group has raised.

At the time of this paper's publication this research is ongoing.

2. THE MARKET AS A SITE FOR DESIGN

The rural produce market is both a socially and economically complex institution, with a plethora of different rules, accountabilities and economic events occurring in one place. The market is space that is: a workplace; an open public arena; a site of leisure; relationships; gossip; food and fun. It isn't purely a site of economic or institutionally orchestrated activity. Black [3] writes, "If we looked at just the economics of markets there would not be a lot of reason for this form of distribution to continue. Economically speaking, markets are amongst the least efficient

methods of food distribution and retail…" Yet within the local community the market still proves to be an important place of both social and economic activity. Activity that needs to be fully understood in order for any IT-based designs to take account of the existing user practices that will impact upon any system that becomes manifest as a result of the research.

2.1 Real world enterprise systems

A part of this project is examining the way that economic understandings may be drawn upon as part of the design process, but it can prove difficult to fully model the more qualitative elements of such economic activity taking a quantitative approach to economics, as Button [4] notes, "Model building in economics shuts out the confusing contingencies of real world irascible transactions." Of course there are fields such as Economic Anthropology that may be drawn upon to offer research approaches that could combine ethnographic understandings in order to suggest the reasoning behind such models, but the existing literature within this field still doesn't offer an answer in regard to the applied use of findings in respect to systems design. However we thought it still important to take an approach that can offer an insight into the market and the actors involved within the process of bringing things to market, the way they co-operate in order to do this, the technologies that they use and their motivations for being part of the market. The motivations of the stallholder are an important area to understand as it often underlies the reasons why the stallholders turn up at the market and the reasoning behind the way they work to produce what they sell. Many of the stallholders will readily talk about themselves as wanting to be, for example environmentally friendly, wanting to promote local food or play a part in the local community, and this is echoed in how they describe their produce, for example: home-reared, organic or local.

It is important to emphasise this as many stallholders have a provenance-conscious approach in regard to the way they market their products and present themselves and the reasons for what they are doing. This approach allows them to add value to their product, by differentiating themselves from the standard supermarket products that offer little information in regard to provenance. Kirwan's [5] analysis of consumer-producer relationships within the farmer's market finds that, "Quality is equated with the transparency of provision, which is seen as allowing consumers to make a more informed choice about the produce they are buying. This may be on the basis of its production locality, production methods, trade practices, or place of sale. Labelling is likely to refer to the production process, and variety and regional/local differences are celebrated. Price and consistency of supply are important, but not dominant."

Within this project we have opted to take an interdisciplinary approach as highlighted by others working in a similar vein [6], combining IT, Economics, Rural Studies and Ethnography, and in doing so we appreciate that the literature in other disciplines can aid and support our discussions in relation to the development of systems.

2.2 Site-based interviews

In order to accomplish our study we carried out a series of 15 site-based interviews combined with participant observation. We found that in regard to supply there were a range of different supply chains: some were relatively large, but mostly small, focusing on local product such as: eggs, meat, cheese, milk, seasonal fruit and vegetables and wood. Supplies from outside Wales were mainly packaging, some fruit and vegetables and

spices. The coordination of supply was technologically lightweight, predominantly done through face-to-face interaction and phone calls. The Internet was primarily used for ordering packaging, occasionally people used email (although this was not the norm) and there was one documented use of Excel for inventory and pricing. The research showed a minimal use of the web for trading and there were 4 trader websites, none of which offered online sales, although 2 provided pricing. Only 1 trader used social media (Facebook).

2.3 Emergent themes

Themes started to emerge from the research. There was a focus on sustainable business: these businesses wanted to stay small-scale ("family businesses"), they saw themselves as local suppliers rather than local employers. The supply chains were small scale and were largely shaped by seasonal rhythms. The use of coordination tools was 'lightweight" as previously mentioned. There was a real sensitivity to local competition; the stallholders were often not selling things that were everyday items; their produce was more about differentiation and specialisation. In regard to the quality of the product the produce was high quality, traceable and distinct. They were directly accountable for what they were selling.

Figure 1, *Mapping the Market* displays the outcome from a series of workshops based around the understanding of the tools for both the co-ordination of people and relating to their procurement needs in order to supply their product. These initial studies also found that economic activity (*in a monetised form*) was not the primary goal of the stallholders. People's motivations for having a market stall also focused upon social/leisure and promotional activity. This initial ethno-economic understanding could prove interesting in terms of system design when we start to look at the qualitative aspects relating to the development and existence of both supply and value chains as non-linear entities.

Figure 1. Mapping the Market – Understanding Coordination Tools and Supply, outlining the social and technical tools for co-ordination.

2.4 Expert interviews with rural business advisors

In order to understand issues that may relate to the adoption of such systems we have also been engaging in Expert interviews with rural business advisors working with both private and government organisations, in order to understand some of the issues faced by farmers and food producers. Some of the advisers have more than 20 years experience within the area, and are currently working with farming and rural food producing

businesses of different sizes (including large and small-scale and different agricultural branches and types of food products). These advisers found that in their experience, technology was mainly adopted by individuals under 40, primarily for individual use (not as a group) or in order to enhance production. However, the benefits from the technology may not be obvious or easily recognizable, particularly in the short-term. This in turn influenced the rural businesses' motivation to adopt and use technological solutions, particularly technical solutions that did not fit with and could be seen to change their 'traditional' practices in production. These studies have given us data that we can use to understand issues that will relate to the adoption and use of technologies within our setting, such as developing applications that will compliment everyday practices, existing ways of working (e.g. interpersonal/face-to-face deals) and be a flexible enough system that it could be appropriated by different, but related rural enterprise.

3. Community engagement strategies

Previous experiences whilst working in the 'wild' have taught us that it is not realistic to plan engagement with communities without first spending a considerable amount of time in order to understand the social 'lie of the land' and become 'part of the scenery'. In this study we have been able to embed researchers working at the site of the market, developing a relationship with and gaining the trust of the stallholders. This has aided the gradual evolution of strategies that have meant that we have been able to successfully carry out interviews and get the stallholders' input, which has allowed us to become aware of emerging issues and concerns that could impact upon the development of any systems. This engagement has so far taken 8 months and has developed from an embedded researcher explaining the project to paper-based sketches, wireframes on an iPad, to high quality Photoshop illustrations containing real world content. Throughout this engagement we have been making the design process, and the stallholders' role in this clear, inviting them to suggest the most appropriate ways to engage. Initally we had our own market stall, with paper designs and technology demonstrations, this method of engaging was suggested by the stallholders. However we have found that taking up a central position at the core of the market seemingly encouraged stallholders from all sides of the market to speak with us, this also allowed us to be seen by everyone and talk to customers as they passed by.

3.1 The Market Portal

One design concept that we have been developing with the stallholders has been that of the *Market Portal,* a solution that could offer the possibility of marketing/promotion, sales and developing new enterprise. Interviews with the stallholders found that very few had an online presence, and that those that did had no e-commerce/ordering functionality, although customer pre-ordering and collection is an activity that the stallholders and customers took part in. We are currently in the process of working with the stallholders to co-realise [7] system specifications, by carrying out this process the *genuine* concerns of the stallholders are surfaced; and in addressing these we will ensure that a system is developed that will be appropriate to their needs and therefore achieve sustained use. A real concern of the market traders that has been raised is the question of, "who markets the market?" Is it the stallholder, the site owner, do the stallholders market themselves, or the market? How do they do it, what are the tools they use, can we help them, and will the system be easy to use? Concerns exist around the use of online payments

(if needed), the cost of such a system and their use and cost to the business in terms of staff time. As part of this process the market traders have started to produce a newsletter and have been examining Facebook and Twitter as an initial way to market the market. We are supporting them in this endeavor and aim to use this initial technological intervention as something by which we can perhaps probe their initial online endeavors.

The market portal is simultaneously:

- A thing in its own right, i.e. a possible technological intervention;
- A contribution to the dialogue with the community which demonstrates that we are listening and hopefully fosters acceptability; and
- A tool or probe, which can be used to learn more about perceived value, usability (in this setting) and fitting in.

From the technology perspective the choice of WordPress multi-site as an implementation platform reflects the suggested emphases on the technical aspects of working, compatibility and scale. We also envisage possible technical developments to support a flexible federation-based approach (e.g. between markets (trader profiles can be used and appear in other markets).

From the usability perspective we anticipate several interesting challenges, including making site administration, authoring and configuration usable for primarily non-technical users.

The initial community engagement suggests some areas in which financial benefit might conceivably be found, mostly through increased and/or more consistent sale of produce, at the market (e.g. where improved marketing might lead to increased footfall, or pre-ordering might lead to more repeat trade) and/or through other channels (e.g. online sales, direct or mediated), but perhaps also by reducing some costs (e.g. collectively sourced packaging, coordinated/shared delivery). Indeed, another core problem will be that of scalability: developing a system that many small enterprises can use which is low cost and low effort to set up and implement, could be key to the success or failure of the system's take-up.

3.2 'Show and Tell' – eliciting feedback

We used a 'show and tell' method to engage the stallholders with the initial concept of a market portal. The evolution of this can be seen below in Figure 2. This was primarily done in order that the stallholders could grasp the concept and importantly to see what the stallholders thought of the idea. Once the stallholders saw the value of the idea, we started to refine the design ideas with their input, through iterations and using real world content, in order that they might visualise and identify with the developing system.
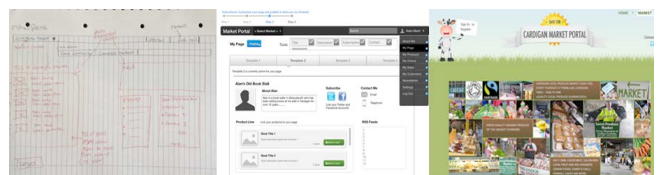

Figure 2. Design through iterations – sketching, interactive prototyping, and lo-fi high-quality Photoshop concepts.

We went from quick wireframe sketches, to interactive iPad demonstrations, quickly developing high quality Photoshop designs. We regularly met with the stallholders, often on a weekly

basis in order to keep them up to date and get their feedback. Their thoughts and opinions were fed into the next design iteration until we reached our best design to accommodate everyone's needs and prioritise factors within the design. Until recently there had been a focus upon the requirements of the stallholders but our research has led us to initiate further strands of research that are specifically targeting both customers and the wider community.

An earlier project (Bridging the Rural Divide (RCUK) [grant number - EP/I001816/1]) had shown us the importance of using mock-ups with real-world content and this proved useful in order to quickly show what we were thinking of doing and as a platform to raise issues and concerns.

3.3 Technological interventions

In order to develop a *Market Portal* as outlined earlier, we have been carrying out a series of technical exploratory investigations into the use and adaption of existing technologies, such as WordPress. We have chosen to develop an existing platform, as this makes financial sense and affords us the opportunity to engineer additional features in order that we can rapidly develop them, such as e-payment and sales systems, and then work with the stakeholders in order to get feedback. Additionally, the portal serves as an immediate technological intervention that has allowed us to gain an insight into the working practices of stallholders and may act as a foundation for future developments of a more technologically emergent nature. As part of the technical development we have been developing a series of prototypes using templates relating to the product taxonomies that we have extrapolated from real-world products that will eventually feature in the Market Portal. Importantly, these also play a key role in aiding our engagement with the stallholders.

As we have started to develop the system an apparent concern of many stallholders has been how easy the system will be to use. Many stallholders have asked, "Will it be easy to use?" "Will we get help?" Training and support are a genuine concern of the stallholders and in order to appropriately provide training and support we will need to develop a strategy that means we will be able to do this. Creating systems that are easy to learn and use will be a challenge that we will face throughout the development of the system. Currently, none of the stallholders uses e-payment systems to sell their own products, indeed some of the stallholders when talked to thought that this would be expensive and could be difficult to use.

Initially some stallholders also raised the use of QR codes to promote their products and to add to labels in order that they might inform people about the ways and reasons they produced their product, a 'virtual stallholder' if you will, yet within many rural areas there is little to no 3G coverage and there are concerns about the loss of customer contact if they were to use IT-based solutions to do this – How does one create a technical solution that 'replaces' the stallholder and yet gives the same level of contact? There were also initial discussions about how this might then link to a stock-based system and perhaps relate to delivery. One of the economic factors that directly impacts upon the rural stallholder is the price of fuel and because of this we have also started to examine the possibility of pickup, payment and optimized distribution systems that are based on the existing practices of the stallholders.

This has led us to examine the issues relating to the development of the mobile elements of the system and what may be required in order to do this, particularly in rural areas where there is sparse

3G coverage and caching may have to be employed, and in relation to the users' practices where a mobile device would become the primary way to interface with the Market Portal.

4. CONCLUSIONS

This research has opened up many different opportunities for us to understand the technical/social issues and requirements of a wide range of users, from producer/stallholders to restauranteurs and the general public. In doing so this research has been able to inform the design of our e-ubiquitous market system and strategies for participation both at a design and user level. Within this paper we have outlined some of the issues and concerns that have been raised in the project so far in order that we may share them with other researchers and practitioners working with real-world rural communities using participatory approaches [8]. The multidisciplinary nature of the research has the potential to both expand and develop the ways in which we work and design systems for a whole range of users. It is envisaged that the developing *Market Portal* will allow both rural and urban traders with an interest in food and local procurement to source and sell produce, and to create multiple instances of market portals that could create produce clusters across Wales.

5. ACKNOWLEDGMENTS

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