What is Missing for the Full Deployment of Mobile Search Services?
Results from a Survey with Experts

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Abstract— **Web search providers have developed a highly successful business model, which has rendered them amongst some of the most profitable companies operating on the internet. Many observers regard mobile search as the next new big market. In contrast to search on PCs, however, the provision of search on mobiles is still in its infancy. In order to shed light on the real prospects of mobile search we performed a two-round Delphi exercise with experts, in which we included two innovative elements. First, the Delphi exercise included seven forward-looking scenarios for discussion. Then, the second round of the Delphi was carried out during a workshop with 19 of the original 61 participants involved. In this paper we present the findings from the discussions of this final round.**

Our study confirms the high expectations put into the mobile search market. We found that this optimism is rooted in the view that critical technological components are already available. Our paper argues that the technology push is not yet matched by a corresponding market pull. Web search engines, mobile phone manufacturers, and telecom operators are already starting to take action to place themselves in a favourable position. They are exploring trial applications, but business models are still unclear and companies are experimenting with very different approaches.

Our Delphi study identifies interfaces as critical for increased mobile search usage. Moreover, experts think that perceived usefulness is valuable but trust is essential and that privacy should be seen as an opportunity rather than a constraint.

The paper concludes with some suggestions for fostering innovation, growth and competitiveness in the mobile search domain by increasing the interoperability of services, assuring the openness and mash-ups of content and services, and developing personal identity data management systems to improve user acceptance and enhance trust.

Index Terms— **mobile, search, business models, expert opinion**

I. INTRODUCTION

MOBILE search is a growing area, due to the increasing availability of content intended to satisfy the information needs of people on the move and the availability and increasing affordability of both mobile broadband connections and smartphones [1-2]. Mobile search can be defined as a mobile application "through which the user may submit a query (usually by entering a set of keywords) and get a list of results matching the search criteria" [3]. However, information retrieval on hand-held devices depends on the conditions in which search is performed, which are dynamic and likely to be influenced by the external context and the activity the user is carrying out. Contextual relevance is a distinctive aspect of mobile search but it also poses an important challenge for the development of this sector [4-5]. For such reason, mobile search is expected to overcome conventional web search, going beyond an adaptation of existing internet search solutions to the mobile interface [2, 6]. In addition, mobile devices are not only expected to become the primary connection tool to the Internet for most people in the world well before 2020 [7], but they are also seen as the future bridge connecting the real and virtual worlds, e.g. as in mobile augmented reality and the internet of things. Mobile search is therefore likely to evolve so as to respond to information seeking patterns that demand a strong link between informational and physical worlds. In addition, it is considered to be a very promising area both in terms of empowerment of citizens, and of new opportunities for mobile Internet service business, holding great promise for European competitiveness and growth [8-10].

Innovations are the key constituents to fulfil these expectations and they depend, as in any other emergent domain, on a conjunction of technological, economic, social and regulatory aspects. In the case of mobile search all of them are particularly relevant and encompass both hurdles and uncertainties. Firstly, technological innovation is spread over products and their components, services and their enablers, as well as on infrastructure aspects. It comes along that the mobile search ecosystem stakeholders are diverse and heterogeneous, including device manufacturers, mobile network operators (MNO), infrastructure providers, mobile OS providers, web search players, and mobile-specific search players. The variety of players, technologies and approaches complicates interoperability and increases transaction costs. Secondly, it is not clear where economic value can be

obtained from investment in the mobile search sector. Thirdly, it seems that mobile search is not yet being disruptively adopted by mobile users. Last, but not least, the sector is highly dependent on regulatory environment factors, ranging from international data roaming costs to spectrum allocation issues and privacy regulations.

Several market research reports dedicated solely to mobile search were published a few years ago – see for example [11-13]. Surprisingly, just when mobile search is moving to become a mainstream application, there appears to be no comprehensive recent studies about where the mobile search market is going. One reason for this may be the dynamics of this segment of the market with events happening so rapidly that it would be very hard to capture major trends in the time span of a detailed study. This observation is supported by the fact that there are many web sites, blogs, forums, groups, etc where different information about major developments in the mobile search market is regularly published and discussed. Another reason is that there is a general lack of comprehensive publicly available data sets upon which verifiable predictions of the evolution trends in the sector could be made. These data may be available to the MNOs, device suppliers and some applications providers, but they typically do not disclose them.

The lack of quantifiable evidence makes it hard to understand where drivers and barriers lay and subsequently to identify and support positive transformations while avoiding undesirable development paths, e.g. a new kind of digital divide or abuses from significant market power. For such a reason, within the context of the Prospects of Mobile Search Project at IPTS it was decided to consult a group of mobile search experts and foster a debate with respect to the key dimensions of mobile search (technological evolution, emergence of innovative business models and user acceptance) so as to harness their opinion concerning the main issues that affect its future development. This paper presents the collective opinions of this group of experts and the way they see the future of mobile search.

II. METHODOLOGY

The prospects of emerging technologies can be captured by foresight tools, such as Delphi, surveys and scenario building exercises [14-15]. Each tool has advantages and disadvantages. Delphi techniques usually employ an iterative survey of expert opinions, normally aimed to facilitate the reach of some degree of consensus [16]. Scenario based evaluation on the other hand allows to elicit opinions based on specific contexts of use, accounting for user's motivations and activities and allowing for an exploration of the role technology, business models and user perceptions could play in that context [17].

To this regard, the aim of the activity was not to reach a consensus on alternative and mutually exclusive predictive views or policy options. Rather the objective was to foster a multi-stakeholder prospect of mobile search, pulling together different opinions to help build a shared understanding of the complex relations that are shaping the evolution of this area. Therefore, scenarios were used to facilitate understanding on the prospects of mobile search by providing a common ground for answering the questions and fostering a debate with academics and practitioners with different expertise. For this reason a final round of discussion of findings face to face was considered.

A. Delphi Method

The first round of the Delphi Exercise consisted in an online survey. In March 2009, we sent a questionnaire to 240 experts. 61 answers were collected, 27 from experts currently at industry and 34 from academia. The sample covered expertise in all necessary domains for the study. In particular, 41 respondents declared expertise in business/market development, 37 in user experience, 28 in technology, 12 in legal and 9 in regulatory issues.

The second round consisted in a face-to-face workshop, which took place in Seville (Spain) 14-15 April 2009. Nineteen (19) of the respondents of the first round survey were invited to take part. The results of the survey (first round) were presented to the expert panel and ad-hoc responses to the presented results were recorded. Then a structured discussion was performed chaired by one author. Whenever necessary, supportive material was presented and critically analysed. Finally, both consensual results and diverging views were recorded.

B. Scenarios

The "conventional" Delphi method was complemented by a scenario building exercise. The authors provided the experts with seven distinct scenarios. The motivation was twofold: first, to set a common ground for participants to engage into a forward-looking debate. Second, to poll experts' opinion on upcoming mobile search drivers and barriers with regard to technological, business and user acceptance issues. Experts were asked to elaborate on critical dimensions that are considered fundamental enablers of the wider deployment of mobile search, by having them exchange information, identify points of agreement, disagreement and uncertainty; create new shared understandings; and envision policy instruments.

The seven scenarios proposed to experts were built following a human-computer interaction approach [18-21], i.e. focusing on the description of concrete usage situations, where users interact with technology to achieve specific aims in a given context. The scenarios, which were not alternative one to the others, were developed so as to stage different:
- Levels of intensity of use of personal data
- Types of search paradigms ranging from "traditional" textual queries to "reality mining" where information is searched from physical objects.
- Contexts of use and activity types.
- Enabling technologies showing different levels of complexities of service provision.

The scenarios are mapped along the above dimensions as shown in Table 1.

STEPS IN THE EVOLUTION OF MOBILE SEARCH	TRADITIONAL SEARCH ADAPTED TO MOBILE	CONTEXT–AWARE (PULL / PUSH)	INTERNET OF THINGS	COGNITIVE TECHNOLOGIES
Data types	Web (virtual)	+ Personal profile + Location + Social + Audiovisual queries + Environment (basic)	+ Sensors in objects (advanced environment)	+ Bio–parameters + Cognitive information
Critical technologies	Usability of mobile browsing in the handset Availability and affordability of mobile broadband connectivity	+ Tools for user in control + Mobile social computing + Audiovisual search + Context–awareness (basic)	+ NFC infrastructures and sensors + Context–awareness (advanced)	+ Bio–sensors + Cognitive technologies
Additional enablers	Improvements in search technologies (semantic web, …)	+ Availability of geo–located content + Availability of context–aware content + Wearable computing and communications	+ Internet of the future	+ Research in artificial intelligence
Business model	Advertising	Undefined	Undefined	Undefined
Critical elements from user's perspective	Use of personal profile	+ Privacy + Management of mobile e–ID + Usefulness + Perceived value	++ Privacy + Trust	++ Trust
Number and name of scenarios	7. Dating agency (trusted third party)	1 Serendipity mode (discovery, push, privacy control) 6. Playground mates model (social limits, location)	2. Recipe search (accurate information role of standards and interoperability) 5. Tourist mode (infrastruct., sensors, tagged content)	3. Wellness model (diversity of interests of stakeholders, health information) 4. Truman Show (the limits of privacy and commercialization)

Table 1 : Steps in the evolution of mobile search and the narrative scenarios for the Delphi Survey

Below is a brief summary of each scenario. In the *serendipity search scenario (#1)* we proposed a highly tailored "discovery service" pushing information based on personal data processing. A mobile interface to Ambient Intelligence services was exemplified in *'searching for a recipe (#2)'*. In *'wellness mode (#3)'* a bio-sensor based functionality was proposed to enable fitness addicts to achieve best performance levels. *'The Truman show (#4)'* was a mobile "Big Brother" life show turning into a personal nightmare with broadcasting conversations. Switching the *'Tourist mode (#5)'* on the mobile device would turn-on the augmented reality features. It would enhance the user's travelling experience by providing suggestions and guidance to an unknown space. *Playground mates (#6)* is a mobile social application for parents to liaise with peers in a public park space. *Professional appointments (#7)* is a mobile e-identity manager that helps networking in different contexts.

The full description of each of the scenarios is available elsewhere [15, 22]. As a matter of example, one scenario is presented in the following box .

"As an intensive runner wishing to break her already impressive personal records, Gitta needs to control training sessions, food, hours sleeping, etc. She might follow one of the standard programs but her work as consultant for one of the "Big 3" leaves no room for ordinary routine; she needs something completely adapted to her personal lifestyle and she found it! Gitta is crazy about her new Runfit-kit. This is an add-on device embedded into a running bra and a daywear bra that monitors essential body signals (blood pressure,

pulse, breath, temperature, etc) and a software application to run on her smart mobile she can wear with an arm belt (to record distance and speed). The kit guides her on how to keep an appropriate rhythm depending on the type of training similar to a standard cardio-kit. As a bonus, after training it advises her also on nutrition (amount of food and drink to take) or habits. For instance, it keeps track of how long you stand on your feet –one of the worst positions for a running addict– or it calculates additional exercises to be carried out, such as recommending walking from or to work while optimizing the travel time. It is really great. It has also an optional security system warning in case of an excess of exercise or any health problem; which in case a dangerous pattern or accident calls automatically the emergency service indicating the patient location and transmits vital data to the hospital. "I do not really need that", she thinks".

Box 1: the Wellness mode scenario

III. ANALYSIS AND RESULTS

The analysis of the answers shows several main trends which are discussed below.

A. Technology is not the problem...

Experts estimate that the technology required to make the envisioned services available on the market is either already there (as of 2009) or will be available soon (2011 to 2015). It is consensual amongst the experts who took part in our study that technology is expected to come ahead of the market, which can be clearly seen by comparing the time of arrival of

technology developments and the applications that use them (respectively in Figure 1 and Figure 2). A time lag is expected between the actual possibility of having a scenario enabled from a technological perspective and its reach to the mass market. This time lag seems to be bigger in the most complex scenarios.

Ordering the scenarios, it could be interpreted that a shorter time to market is more likely to occur first in the take-up of conventional search adapted to the mobile environment in niche markets, followed by applications making a more intensive use of personal and social data to improve user experience in increasingly wider markets. Scenarios requiring more complex services will arrive last given the effort needed for the integration of technologies, the interoperability of content and applications, and advanced interconnected services. The experts considered the "dark" scenario (Truman show mode) not likely to occur, thus, placing it long away in the future or saying it will never happen.

Even though the Delphi exercise indicates that the critical factors for take-up of mobile search are economic rather than technological, the economic factors are difficult to assess due to unclear patterns. As a main finding the Delphi results suggest that users expect high-quality search services with an even better user experience than in PC-based ones, but without a dominant business model and showing that most of them are not willing to pay directly for such services. This fact supports the use of scenarios to complement the Delphi.

B.   … but interfaces are critical

Looking at the role that technology is judged to play in the sector, experts were asked to choose the technological components that they evaluate as critical for deployment so that the different scenarios happen. Data from Figure 3 confirm that search technology does not constitute a bottleneck to the development of the area according to the experts. However, there are supportive technologies that would positively affect the take up of a number of services and applications (e.g. biosensors would enhance a "Wellness scenario", while cognitive technologies could play an important role across different scenarios though they do not represent a bottleneck to the deployment of any of them). What emerges from the expert survey on scenarios is that mobile interfaces are expected to remain a critical issue for the full deployment of mobile search, due to the specificity of information search in mobile contexts.

C.   Perceived usefulness is valuable, but trust is essential

The Delphi exercise included a question to collect expert opinion concerning what is the most important factor to enable a satisfactory user experience as seen by experts for each of the scenarios. The overall opinion is that the challenge is to provide services whose perceived usefulness to the end-user is clear and valuable.

Trust in the service provider has also been consensually identified as one of the most important factor for the adoption of advanced mobile search scenarios. Privacy related issues

are not pervasive, but are considered service dependent (privacy may be a barrier when sensitive data are handled like in the "Wellness scenario", but it is considered less relevant in a distributed ambient intelligence scenario as in the "Search for a recipe"). Price is not a minor issue but again while it would be a barrier with respect to a leisure type of service ("Serendipity scenario") it is not considered a barrier if the service is based on user-generated content.

According to experts the market is pulling towards personalised and context-aware applications and services, which could respond to users' needs on the move.

It is consensual that one of the main bottlenecks to the widespread deployment of mobile search is made up of the lack of a well-defined value proposition for mobile content fruition. Even though it is clear that the combination of context awareness with relevant, useful and interesting context-related information will make the difference in mobile search, disruptive applications proving this concept are missing.

Additionally ease-of-use and enhanced user-control are considered to contribute to the success of context-aware mobile search, together with social applications expected to evolve into fully-fledged "recommendation engines" that reap the benefits of personal networks and trusted relations.

In this scenario, anticipatory applications, ranging from serendipity content discovery, to learning and entertainment, would be possible. Such applications would require a much higher level of user profiling and behavioural tracking than the level to which we are currently accustomed. This causes a dilemma. On the one hand, the lack of personalised data severely limits the usefulness of some applications. On the other hand, however, the fact that advanced personalised services require a lot of data about the user provokes privacy concerns. Meanwhile, privacy concerns are growing as more and more data is becoming available to both the public administrations and private players. A privacy backlash could prejudice advanced mobile search. Thus, ensuring privacy by law enforcement, by technological design and by user choice are all necessary elements to consider. One way of diminishing this risk and alleviating users' privacy concerns would be to empower users by providing digital identity management systems, able to define and control the release of personal data. Such systems should be user-friendly, all-round solutions which can operate across different platforms (mobile, PC, smartcards, etc).

D.   Privacy: it is an opportunity rather than a constraint.

Figure 4 also shows that privacy related issues make up a transversal matter affecting all scenarios where personal data are needed to provide a tailored service.

Looking at the comments experts made on the subject, there seem to be various opinions. Generally privacy is considered an important but difficult issue. Some experts think it may be overrated in search ("Serendipity scenario") and that users already allow search engines and social media to know a lot of their personal details in order to be served better (customised

search and geo-positioning). Others think that the boundaries of personal privacy will shift, but generally there is feeling that limits and boundaries have to be introduced ("Truman show" and "Tourist mode" scenarios).

In relation to personal data protection, experts pointed out that the mobile sector is characterised by a policy asymmetry between mobile carriers and application providers: whereas mobile network operators have to comply with obligations relating to data retention, application providers are not generally bound by such regulation.

E. Companies are still experimenting with business models

Experts have also been asked to associate a business model to each one of the proposed scenarios, in terms of likelihood for it to be the enabling one. The data in Figure 5 shows a clear lack of strong business model preference in the opinion of experts. Their analysis is that businesses are still in the phase of evaluating user responses to proposed services and still experimenting how exactly to monetise these services before embarking on large-scale deployment.

In response to the question about which is the most likely future business model for mobile search, the survey indicates that there is a slight preference for advertising based models, but no other business model can be clearly distinguished from the others as far as the survey scenarios are concerned. The experts remained unclear as to which of this model's many variants will prevail. They also mentioned that the adaptation of advertising formats to the mobile environment is not a trivial issue.

This is not necessarily the case for all market actors. From experts discussions, it was acknowledged that the big providers of internet search (Google, Yahoo!, Bing, etc.) and social networks (Facebook, MySpace, Twitter, etc.) are interested in shaping mobile search as much as possible as an extension of their core activities and services and technological openness in this case may clash with business interests. Another relevant driver is the availability of context-based metadata-enabled content or, more generally, content enrichment. Ideally, such metadata would be automatically machine-generated. However, as long as semantics remain a challenge, meta-data will also rely upon users' involvement. Mobile tagging is one example of content enrichment by the users.

Another potential business model would be to include mobile search technology as a function integrated within other products or services and to charge for the complete package. The services included would probably constitute a kind of add-on to traditional mobile communications services, or would be packaged with other product/services. In the case of the "Wellness scenario", for instance, where health-records related data are involved, experts would either see subscription as the most viable business model, or to have the service offered as a premium feature of either a personal training service or an insurance product.

Experts argued that if such services remain within the telecom operators' domain ("walled garden" approach), they will probably not lead to a sustainable model.

The proposed scenarios imply a much more open market where new players can deliver services that satisfy search needs in mobility (e.g. a Supermarket in the case of the "*Search for a Recipe scenario*", or a Municipality / Tourist Guide Publisher in the case of the "*Tourist Mode*" one), where cooperation amongst players is stronger than today's, and where the openness of the platforms players use and offer provides greater value to the user.

IV. FURTHER DISCUSSION AND CONCLUSIONS

Search represents a major business opportunity for growth in the mobile sector. There seem to be no significant bottlenecks from a technological point of view. The basic technological components are either available on the market or soon will be. According to experts, the massive adoption of mobile search does not depend so much on technological components (although improved search algorithms or prospective cognitive technologies can enhance adoption) but rather on their integration into relevant interoperable services.

Mobile specific search goes far beyond web search adapted to mobile platforms and interfaces. Such a specificity can flourish in an environment were hardware becomes "senseware", where information coats objects and people, where social networks enhance the available information sorting it out on users' behalf, and where mobile devices becomes the entry point to a networked environment in which "intelligence" is distributed across different elements. It is consensual that greater openness is required to favour mobile specific search. The availability of data generated with public money would foster an open environment where data and applications can be freely meshed-up to fit users' needs.

Users do not seem to like the present mobile search offer. They still prefer to search from their PCs, whenever it is possible, or mimic this search from a mobile device. The lack of truly mobile specific search services hinders massive take up. Users' demand for opt-in, personalised, location aware, social-aware search services is not yet satisfied. Services are not yet fully interoperable; they do not link multiple dynamic databases and do not morph according to the context. Furthermore, current interfaces do not allow dynamic usage situations. Voice-, touch- and movement-based interfaces should seamlessly support the users in accessing information in situations that change not only depending on the location, but also in interactions with other devices, other users, other available services, and users needs, activities and preferences. The challenge remains in bridging data and information needs and offering useful services.

Personalisation of services requires different degrees of personal data collection. This is another very important challenge as most users acknowledge the value of personalized mobile search. Generally, users are unwilling to disclose personal information to non-trusted parties. Thus, trust becomes critical because users fear possible misuses, misrepresentation and commercialisation of their digital

identity [23]. By not owning and controlling their data, users are bound to choose on the basis of the trust they attribute to those who collect and process their data. Although in our scenarios data protection did not emerge as a critical barrier, experts highlighted that privacy is at the basis of the adoption of advanced digital services, particularly of the mobile type. It is however consensual that privacy should not be addressed as a barrier to the deployment of advanced e-services, such as mobile search, but rather as an opportunity itself. Personal identity data management systems can be a key enabling factor for the massive take-up of emerging solutions, although they are not considered a critical component of mobile search technology or part of the mobile search user experience.

Our study suggests that mobile search deployment is slowed down by the uncertainty related to its value chain. Enterprises are still experimenting with business models and though advertising seems to be generally the preferred one, companies know that the way forward requires a transformation of the advertising content into added value content that matches users' need. Current trends indicate the blurring of boundaries between different service providers. Customers require integrated services which in turn demand for partnership, ever more often between the private and public sectors. Finally, the market side is facing the challenge of redefining the role of mobile network operators which at present represent more of an obstacle to the dynamic evolution of the sector.

Mobile search is much more than web search adapted to handheld devices. Its prospects, however, are unclear due to undefined business models and conflicting interests amongst major stakeholders. In this emerging market, big actors are rapidly positioning themselves. The question arises whether the current dynamics will lead to a competitive market with innovative solutions or not. We suggest that to promote innovation, growth and competitiveness in the sector some proactive actions should be taken. Supporting innovators and entrepreneurs, promoting standards and interoperability, and funding research projects and supporting living labs are considered by experts to be the most important policies needed for the proposed scenarios to happen (see Figure 6). These actions include also assuring the openness of mobile ecosystem and the fostering of mash-ups of content and services. In addition, measures need to be taken to ensure take-up by users. Trust-enhancing measures might include the development of personal identity data management systems to improve user acceptance of data intensive mobile search services.

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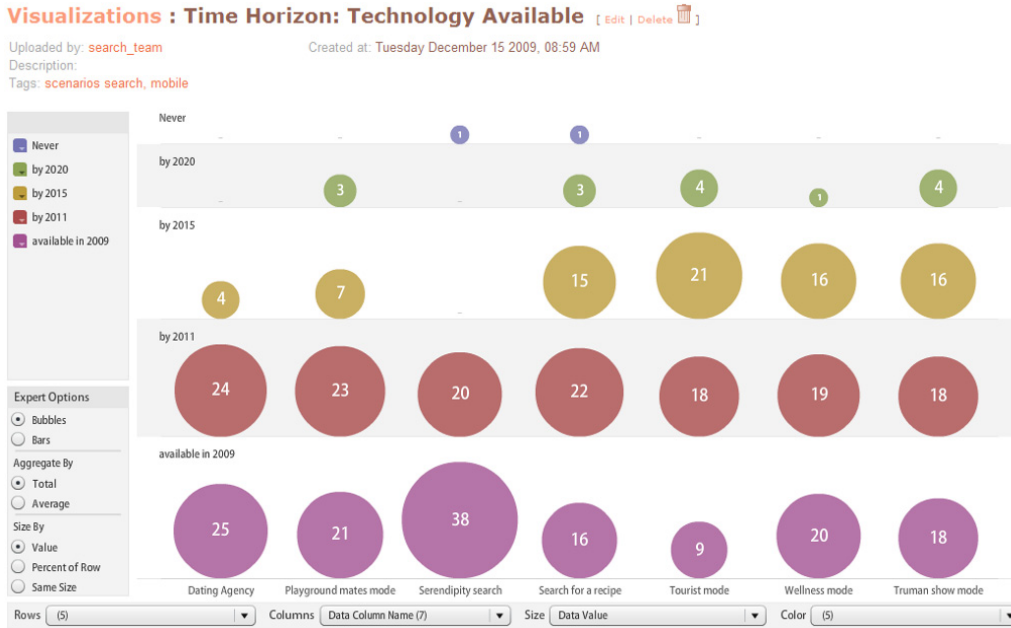Figure 1: Time horizon for different technologies.

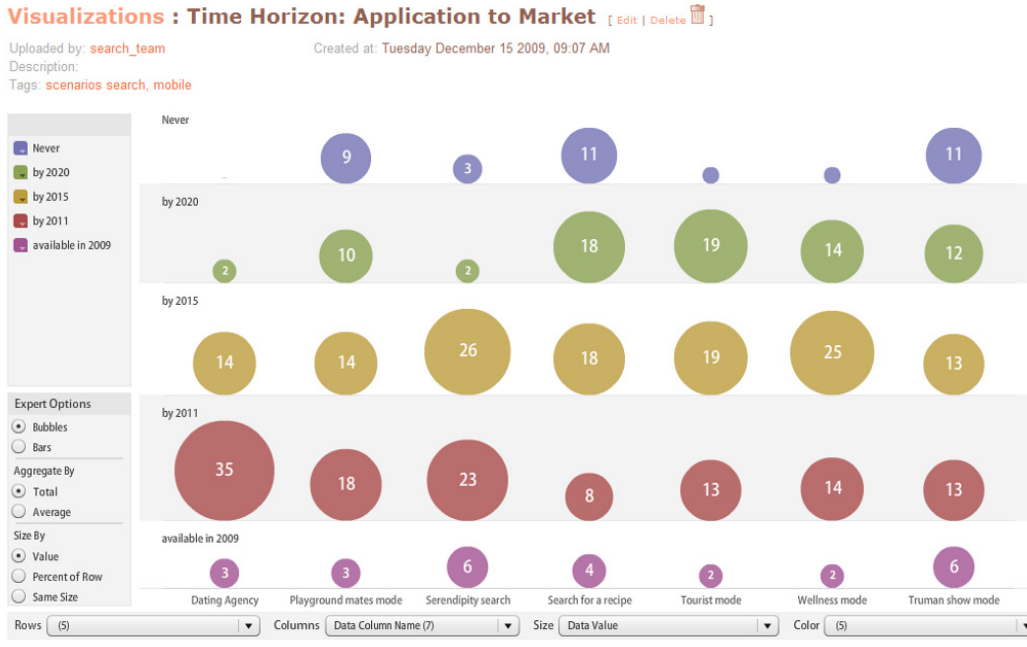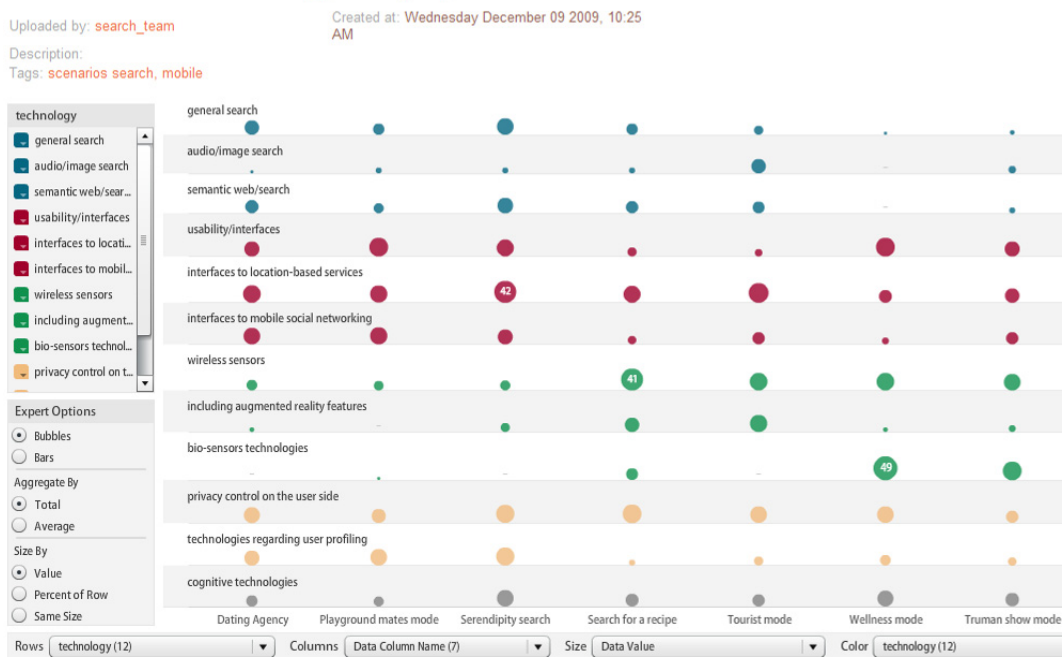Figure 2. Time horizon for applications to market.

Figure 3: The most relevant developments in technology for this scenario to happen are… (tick up to 4 options)

- "general" search technology: indexing, matching, page ranking, etc
- semantic web/search
- audio/image search
- interfaces to location-based services
- interfaces to mobile social networking
- augmented reality technologies (info embedded in physical objects)
- wireless sensors (smart environment, RFID, NFC, etc)
- cognitive technologies (behavioural patterns, artificial intelligence, etc)
- bio-sensors technologies
- usability/interfaces
- technologies regarding user profiling
- privacy control on the user side
- any other, please specify

Figure 4: The biggest challenges to enable a satisfactory user experience for this scenario to happen are… (tick up to 4 options)
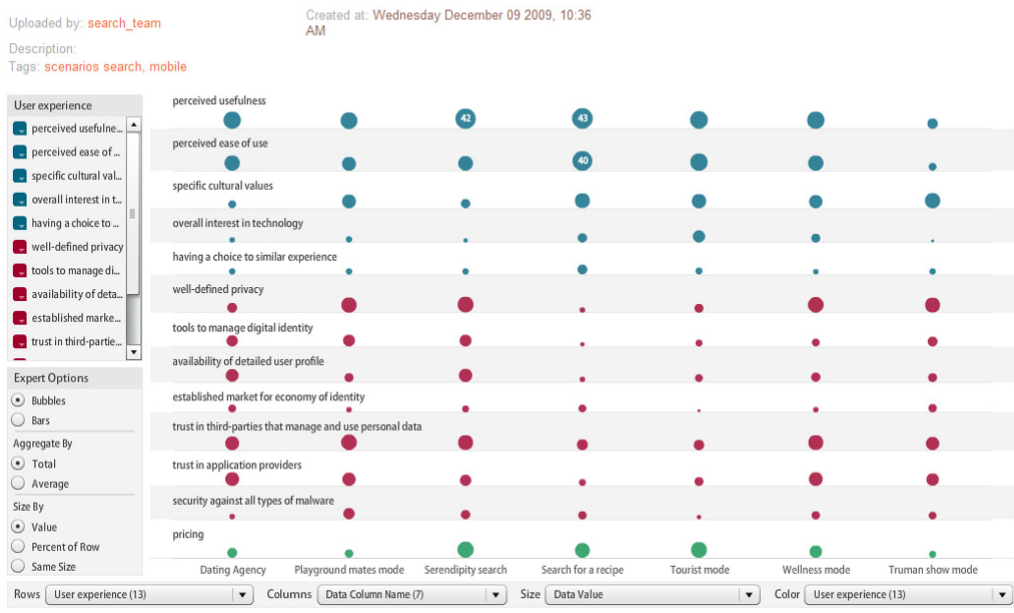

- availability of detailed user profile
- well-defined privacy (i.e., which data are private and which not)
- tools to conveniently manage eID (digital identity)
- established market for economy of identity (i.e., with which personal data is possible to commerce and which is the value of each of these data)
- security against all types of malware
- trust in application providers
- trust in third-parties that manage and use personal data
- specific cultural values and lifestyle particularities
- overall interest in technology
- perceived ease of use
- perceived usefulness / quality of the services and content offered
- existence of alternative means to access the same (or as close as possible) experience (for instance, use of a PC connected to internet)
- pricing
- any other, please specify

Figure 5: The most likely business model for this scenario to happen might be… (tick up to three options)
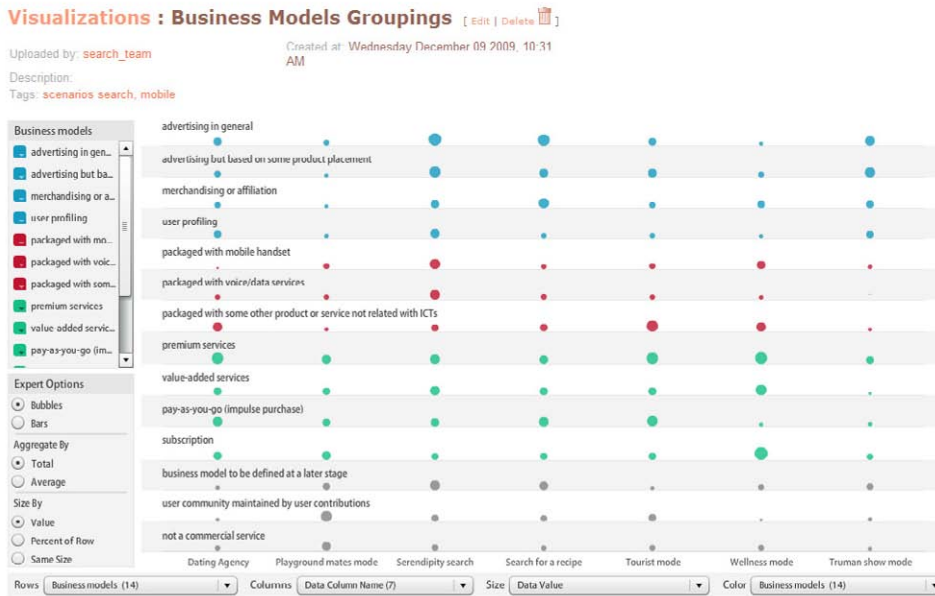
- pay-as-you-go (impulse purchase)
- premium services (basic functionality is free but not advanced options)
- value-added services (i.e., a contract for a pack of services on top of usual ones)
- subscription (monthly/annual fee, etc)
- packaged with the mobile handset
- packaged with the (voice, data) services of the mobile operator
- packaged with some other product or service not related with ICTs (a flight ticket, a hotel accommodation, a tourist pack, an insurance, …)
- advertising in general (i.e. like in today Internet search)
- advertising but based on some product placement (i.e., linked with another product: a TV show, a cinema premiere, …)
- merchandising (i.e., as a way to sell some other product or service) or affiliation (i.e., to create opportunities of business for some other site)
- user profiling (i.e., selling the user profiles for commercial purposes)
- user community maintained by user contributions (like Wikipedia)
- business model to be defined at a very late stage when a critical mass of users is achieved (like Twitter today, for example)
- not a commercial service (i.e., a public service)
- any other, please specify

Figure 6: The most successful supporting policies for this scenario to happen are… (tick up to three options)
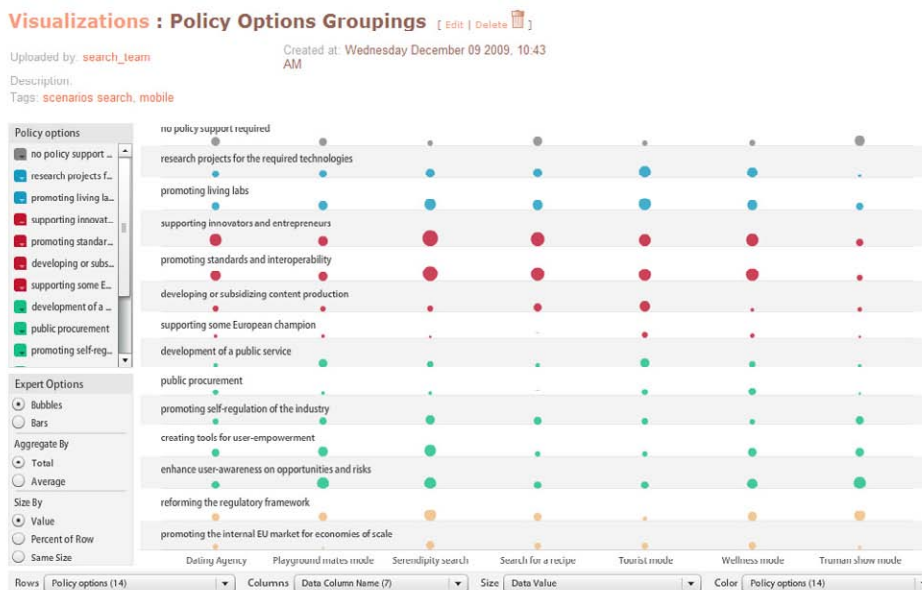
- Enhance user-awareness on opportunities and risks
- Creating tools for user-empowerment (e.g. privacy or eID management)
- Supporting innovators and entrepreneurs
- Promoting living labs
- Reforming the regulatory framework (electronic communications, e-commerce, privacy, consumer rights)
- Development of a public service for this type of mobile search
- Research projects (7th FP) for the required technologies
- Promoting self-regulation of the industry
- No policy support required
- Promoting standards and interoperability
- Developing (or subsidizing) content production
- Supporting some European champion
- Public procurement, (administrations are the first buyers and users of this mobile application
- Promoting the internal EU market for economies of scale
- Set a multi-stakeholder discussion platform
- Mandate data portability in mesh-type networks
- Help accelerate LTE roll-out
- Promoting independent third-party body (watchdog mobile data)