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FROM IDEA TO BLAH! UNDERSTANDING MOBILE SERVICES DEVELOPMENT AS INTERACTIVE INNOVATION

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ABSTRACT

Mobile communications are permeating virtually every aspect of our lives. The market is experiencing rapid improvements in technologies, while mobile operators are trying to figure out new ways their infrastructures can provide services to the customers. Furthermore, user-innovation with new ways of using these technologies generates powerful feedback loops back into the innovation processes. In this turbulent environment it is difficult to capture and conceptualize how newness comes about and what the main characteristics of innovation are. The aim of this paper is to illustrate how the concept of interactive innovation can be applied to explain the development of mobile services. This study adopts the perspective of the developer rather than the user. Moreover, through the social construction of technology lens, the concepts of sense-making and bricolage are applied to explain the innovation appropriation process during the mobile data value chain improvement process. One of the conclusions drawn is that in the rapidly changing and complex context of mobile services development, the traditional notion of 'interactive innovation' cannot fully explain this phenomenon that takes place.

Keywords: innovation, mobile services, social construction of technology, sense making, bricolage

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1 INTRODUCTION

Significant previous research efforts have explored how newness or innovation is communicated as best practices in social systems (Rogers 1983; 1995; 2003), how innovations can create competitive advantages for companies (Porter and Millar 1985) or even to transform industry structures (Porter 2001), how they can be explained through economic analysis (Avgerou and La Rovere 2003), how they emerge from the R&D process (Zaltman, Duncan et al. 1973; von Hippel 1988), how they are turned into meaningful use in social practice (Bijker, Hughes et al. 1987; Bijker and Law 1992; Mackenzie and Wajcman 1999; Tuomi 2002), how they are improvised and emergent rather than designed (Ciborra and Lanzarra 1994; Ciborra 1997), among others.

The concept of *interactive innovation* (Rothwell 1994) is an attempt to understand and explain how configurational technologies are shaped and knowledge is transferred among diverse networks in this context in a process of in- and out-bound network influences (Robertson, Swan et al. 1996; Newell, S., Swan et al. 2000; Swan, Jacky A., Newell et al. 2000; 2003).

1.1 Aims and Objectives

The aim of this paper is to apply the interactive innovation concept for characterising the development of mobile services.

We will identify the mobile services development process; identify possible influencing networks in the shaping process; conduct an empirical research to evaluate the relevancy of interactive innovation framework to the subject theme; analyse if the interactive innovation framework proposed in previous studies is suitable in the case study setting; and explain these findings in terms of the social construction of technology.

One of the conclusions drawn is that the traditional notion of '*interactive innovation*' cannot fully explain this phenomenon that takes place in a rapidly changing and complex context like the mobile services development environment.

2 STUDYING INNOVATION

This section will draw out the main characteristics of research with innovation diffusion theory, and explore the areas of interactive innovation, organisational implementation of technology, networks of innovation, and the domestication of technology.

The diffusion of innovations is defined for Rogers (1995) "*as the process by which an innovation is communicated through certain channels over time among members of a social system*". This research had a great influence in the way people analysed technology innovation, although it did not really address a specific focus on information technology (McMaster, Vidgen et al. 1997). Rogers (1983) highlights the way innovations are communicated within organizations through the diffusion of best practice templates. Adoption of innovations "off-the-shelf", considering recognized concepts to solve specific problems as always being the best policy, are considered a reality oversimplification (Robertson, Swan et al. 1996; Swan, J. A., Newell et al. 1999). Thus, most discussions about innovation in the past stressed a strong focus on the diffusion processes, considering users as relatively passive actors in relation to the adoption of technologies (Newell, S., Swan et al. 2000).

In this kind of situation, it is hard to separate and analyse social and technical domains apart, what would deny an integral part of our participation in the processes and our place in this social technical environment (Feenberg 1999). It is required to look beyond technical determinism, trying to understand what happen in this kind of relationship and what can be done to keep things from falling apart (Beniger 1986; Smith and Marx 1994). According to the social construction of technology perspective (Mackenzie and Wajcman 1985; Bijker, Hughes et al. 1987; Bijker and Law 1992; 1999; Avgerou 2002; Avgerou, Ciborra et al. 2004) and a number of related frameworks (Woolgar 1991; Collins 1992), technologies through configurational perspective can be considered as having 'interpretative flexibility'. It means that these kinds of systems can better be explained as being socially shaped, "*and that innovations emerge and become articulated when they are taken into meaningful use in social practice*" (Tuomi 2002). Therefore, this complex design processes does not just happen through inbound action of groups and internal actors, but also as an outside boundary spanning process (Swan, Jacky A., Newell et al. 2000). It becomes "*increasingly recognized in the 1990's, technology innovation and organizational change are often improvised and emergent rather than designed*" (Ciborra and Lanzarra 1994; Orlikowski 1996; Avgerou 2002; Cornford 2003).

Basically, there are three different innovation viewpoints (Slappendel 1996; Baskerville and Pries-Heje 2001), each attempting to frame the processes: the individualist, the structuralist and the interactive perspective. The individualistic approach explains the personal role of people in the innovation processes (Rogers 1995; Newell, Sue, Swan et al. 1998; Rogers 2003). The structuralist perspective identifies points in organization structure that can shape the innovation. Finally, there is the interactive approach considering the organization structure and individual attitudes as joint triggers and supportive conditions in the innovation processes (Newell, Sue, Swan et al. 1998).

Many researchers consider diffusion as a process that happens through formal and informal communications among members of social groups with a tendency to increased tension between organizational structures and networking activities (Robertson, Scarbrough et al. 2003). In this process, it is essential to recognise informal networks as the channels that allow information and knowledge to cross organizations' boundaries, which are the basis of the interactive model (Rogers 1983; 1995; Robertson, Swan et al. 1996; Kettinger and Lee 2002; 2003), and to link the micro-level interactions to macro-level patterns using the interpersonal networks to bridge this micro and macro environments, as proposed for Granovetter (1973; 1983). To discuss the proposed innovation model, firstly, we need to better understand the network concepts. Indeed, it will allow the evaluation of existing networks, to therefore comprehend the influence of inter- and intra-organizational networks in the context of use (Conway, Jones et al. 2001).

According to Alter and Hage (1992), networks are social structures that allow the exchange interactions between and within organizations. Therefore, networking is social informational exchange between people, allowing the knowledge to flow from one group to another in a process known as "boundary spanning" (Pennings and Harianto 1992). Most of the research in this field focuses on formal relationships between companies (Pennings and Harianto 1992), groups or individuals as the innovation driven forces, neglecting the less formal networking processes, called "weak ties" (Granovetter 1973; 1983), which are sometimes important sources of innovation

and diffusion processes (Rogers 1983; 1995; 2003). Weak ties disclose organizations and people from each other, connecting people that are usually associated only marginally. As argued by Grannovetter (1973; 1983), "*whatever is to be diffused can reach a larger number of people, and traverse greater social distance, when passed through weak ties rather than strong*". In this involvement with other organizations such as universities, professional associations, other companies and suppliers, new ideas are more likely to be shown and to be developed (Swan, Jacky A. and Newell 1995). It helps to build trust and confidence relationships, evolving to a more formal collaborative network considered the key point to the innovation processes (Robertson, Swan et al. 1996; Conway, Jones et al. 2001).

As a final consideration of networks, it is important also to discuss 'communities of practice' and their role in the innovation processes. According to (Lave and Wenger 1991), 'communities of practice' is defined as "*an activity system about which participants share understandings concerning what they are doing and what means in their lives and for their community.*" Whilst communities of practice can help the spread of innovations within their boundaries, in the case of radical innovations the boundary spanning among communities is required (Newell, Sue, Robertson et al. 2002; Swan, Jacky A., Scarbrough et al. 2003). Kodama (2001) argues that is possible to manage this kind of community to find a better integration during the innovation process, which facilitates reaching resources from outside the organization. So, a better understanding about networks themselves, as well as their components and key characteristics, could contribute to the data gathering process and the understanding of its innovation dynamics (Conway and Steward 1998; Conway, Jones et al. 2001).

Since the 1970s it has been noted that the progressive and linear models of innovations are not sufficient to explain innovation development, application and diffusion (Tuomi 2002). The '*interactive innovation*' concept analyses innovation as a multi-factor process in which both the inbound and outbound networks are essential to shaping the innovations in the context of use (Rothwell 1994; Tidd, Bessant et al. 1997). Swanson (1997) proposed the idea of *organizing vision*, which was an attempt to understand how the collectively make sense of the context and innovation. This concept considers not just the organizations perspective about innovations, but also the combined view of many other network members that are actively trying to interpret and make sense about it as well. This totality of networks create the 'organizing vision' as a result of several institutional shaping forces at different levels, including the feedback loops among all involved parts (fig.1).

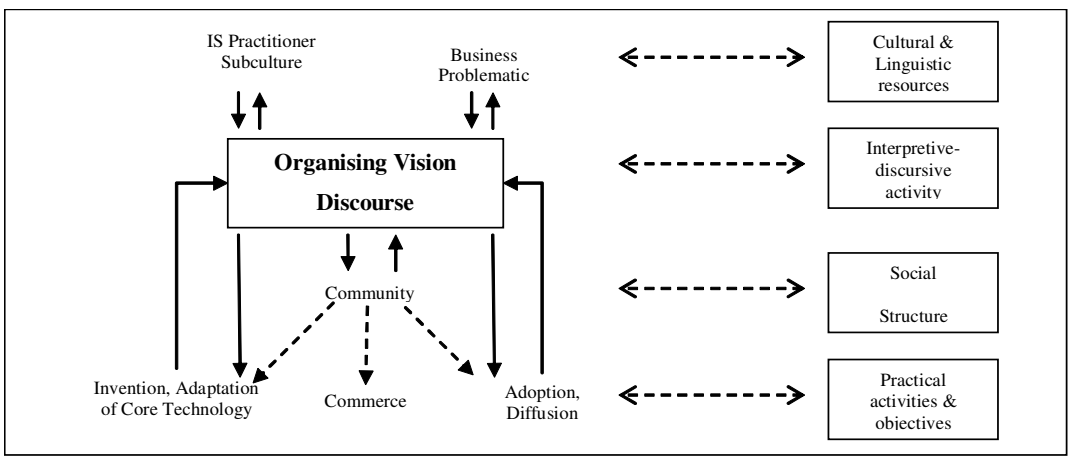

Figure 1 - Institutional of Organizing Vision – Adopted from Swanson and Ramiller (1997)

In the *interactive process*, innovation and diffusion can be described in terms of three episodes: *agenda formation* (acquisition and ideas shared among organization's members), *selection* (further analysis and match making of innovations and organization's ideas), and *implementation* (after the selection of technologies they are introduced into the organization as new products, tasks or services). Rather then represent discrete stages; here they happen in a more iterative, recursive and episodic fashion, being inherently politically shaped and called 'episodes' instead of 'stages' (Robertson, Swan et al. 1996; Newell, S., Swan et al. 2000). As argued by Swan et al. (2003): "*Previous researches tended to separate these different aspects of innovation and to focus on discrete episodes*". Robertson et al. (Robertson, Swan et al. 1996; Swan, Jacky A., Newell et al. 2000) proposed a framework to represent the decision episode that has three central elements: the user, the innovation "pool" and the networks through which ideas are diffused (Fig. 2).

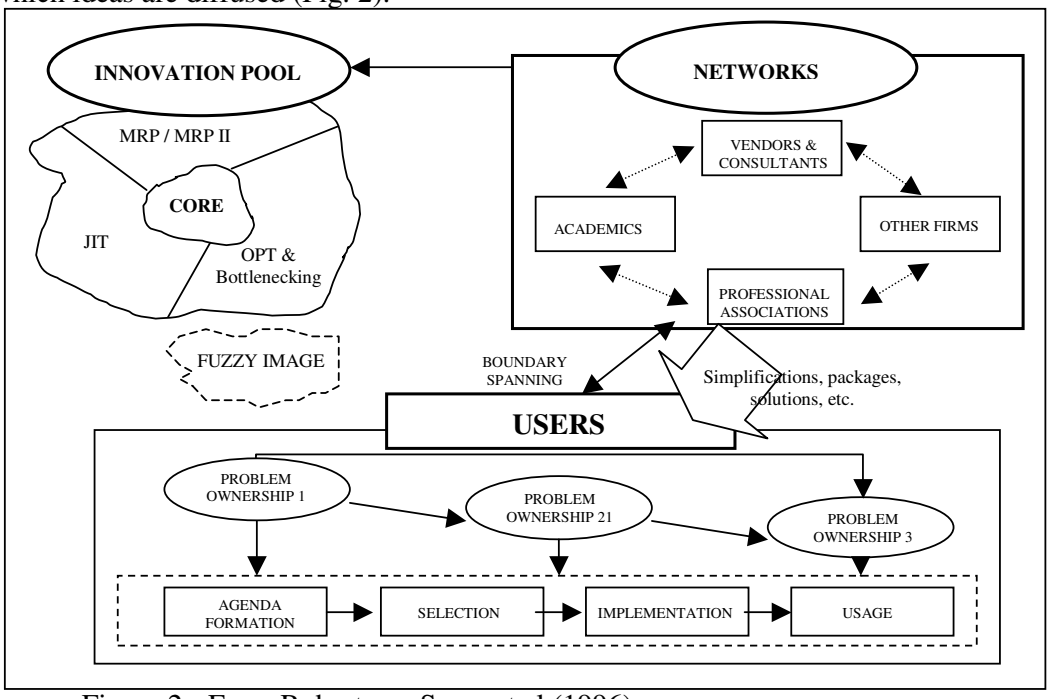

Figure 2 - From Robertson, Swan et al (1996)

Most researches in this field have analysed interaction innovations from the users' point of view. The focus in these researches were to identify how new technologies were packaged and '*blackboxed'* (Scarbrough 1995) into organizations by the supply side in a way to objectify the knowledge, to therefore analyse how the users unpacked and shaped these new configurationally technologies internally. The analyses therefore primarily focused on the identification of how different networking activities helped to shape and diffuse innovations into organizations (Swan, Jacky A. and Newell 1995; Robertson, Swan et al. 1996; Newell, Sue, Swan et al. 1998; Swan, Jacky A., Newell et al. 2000). It is here important in to differentiate between different kinds of knowledge communications and therefore to differentiate "blackboxing" strategies used for suppliers (Scarbrough 1995).

The process of appropriation and reinvention of innovations, and further improvement during the implementation processes, reinforces the idea that knowledge is enhanced during the social networking shaping process. A complementary concept "*innofusion*", can characterize suppliers adopting and incorporating users' innovation feedback loops' improvements in new technology releases (Robertson, Swan et al. 1996). Conway highlights the importance of boundary setting investigations as one of the main sources of understanding innovation processes (Conway, Jones et al. 2001). It is important in the diffusion episode not to forget that inter-organizational and professional networks do no only serve to transfer knowledge but also to co-modify and validate it. These associations have many common characteristics with 'communities of practice' (Wenger 1998), including a common understanding of their social identity (Swan, Jacky A., Scarbrough et al. 2003).

It is essential also to consider the essential role played by users and customers in the innovation processes. This happens since they have a strong influence in the social side of innovations, modifying and improving the products helping to shape technology in all its phases (Baskerville and Pries-Heje 1998; Tuomi 2002; Oudshoorn and Pinch 2003). This can happen actively and in a dominant mode through many different means, including in most of them positive or negative feedback (Conway 1993). Two different perspectives characterize these relationships (von Hippel 1988): The manufacturer-active paradigm –MAP (the user is solely the respondent in the process); and the customer-active paradigm – CAP (the customer is responsible for developing the idea for a new product). In this context, as argued by Christensen (1997), users can either help to positively shape the innovations or, in companies with a very strong customer focus, to block more disruptive ideas that can come from other actors involved in the process. Consumer behaviour theories are about human responses to the commercial and consuming world (East 1997). It can be helpful to understand how the consumer behaviour patterns can act as a of powerful feedback network into the 'interactive innovation' shaping process.

In the mobile context, one of the most interesting ideas in how users adopt new ICTs (Information and Communication Technologies) was developed for Silverstone et al. (Silverstone and Hirsch 1992; Silverstone, Hirsch et al. 1992; Silverstone and Haddon 1996; Haddon 2001). The approach is the so-called '*domestication perspective*'. The first point outlined for Haddon (Haddon 2001; Ling 2004) is on the consumption of technologies (material and nonmaterial artefacts), not just in the purchase scheme. It is argued that to be possible to understand the role of this acquisition, it is required to overview and to understand the related negotiations and interactions that take place in home and social groups in this ongoing relationship with technology. The second point that needs to be understood is the fact that this process does not happened as a one-off stage. It is an ongoing process of discussions / negotiations / arguments regarding its roles. The last point outlined "*is that domestication is not only a mental process carried out by an individual but also a social interaction between individuals*" (Ling 2004). This approach, as described by Silverstone (1992; 1996), characterize diverse steps that need to be taken in the adoption cycle, including *imagination*, *appropriation*, *objectification*, *incorporation*, and *conversion*. As argued by Ling (2004) these stages describe "*the movement from having an idea that an object or service would be useful addition to our life to the purchase of the object and its imbedding in our life*".

Many new technological innovations in this field share the same characteristics of physical networks: new adopters create extra advantages to the already existent users of the network (Katz and Shapiro 1985; Kauffman, McAndrews et al. 2000) The concept of 'positive' network consumption externalities proposes that the value of a network for the subscriber increases with number of adopters (Oren and Smith 1981). It requires an understanding of communities as driving forces in the adoption consumers' behaviour (Young 2002; Rheingold 2003), promoting new forces in the service adoption patterns, explaining the mobile service positive consumption externality (Katz and Shapiro 1985). Furthermore, it could be explained also as a consumer behaviour principle called "social proof". What determine the behaviour is finding what other people think is correct, seeing the appropriateness of something when the others are using it (Cialdini 2001).

3 RESEARCHING INTERACTIVE MOBILE INNOVATIONS

The case is a Brazilian company called BLAH! (http://www.blah.com/) that provides wireless data value added services with focus on community, entertainment and information to young adults. When the research was carried out Mid 2003, the company provided data services in 8 countries, for 12 carriers and different networks/operators, with a total of around 3 million mobile phone users. The company comprises eight main areas, of which the five most relevant for the research were studied: Creative, IT, Corporate/Technology, Marketing, Sales, and Operations & Implementation. Excluded from the field research were: Finance & Accounting, Human Resources, and The Legal Department. The field research consisted of a three-week session of interviews during June 2003 conducted at the Headquarters of the BLAH! in Rio de Janeiro, Brazil. This study focused on identifying the interactive innovation processes within mobile telecom services development, and the role of internal and external networks in the innovation shaping process. The research process was carried out according applying an interpretive approach (Orlikowski and Baroudi 1991; Walsham 1995; Cornford and Smithson 1996; Hatch and Yanow 2003) comprising semi-structured interviews with 26 executive and operational professionals of the company.

Firstly, the research focus was to map the main services development processes, to therefore understand the role of in- and out-bound networks in the innovation shaping processes. Qualitative data about the company's formal processes was also collected. The third source of data came from newspapers, magazines and market reports and research. All secondary data sources served as the basis to sketch in the context in which the company operates and also to support the understanding of some information gathered from the interviews. The intention of the semi-structured processes was so as not to become '*blind*' to other interesting data that could appear during the collecting period.

During the investigations two frameworks proposed by Swan & Newell (Swan, Jacky A. and Newell 1995; Newell, Sue, Swan et al. 1998) and (Robertson, Swan et al. 1996) (fig. 1) were used as an outline to the research process. The first framework summarizes three main research areas, from which two were used in the research since the third one (national variables) was not suitable for our proposal:

Individual variables that could be characterized as networking activities like involvement with professional associations both formally (seminars, conferences, etc.)

and informally (company visits, social events, informal meetings, etc.); internal professional contacts with other areas.

Organizational variables including structural variables like the relationship with the carriers, and processes like technologies, strategies, as related in other interactive innovation research.

From the second framework, the research focused on identifying influential networks in the innovation processes. A developer's, rather than a user's, perspective was considered since this research emphasises interactivity from the perspective of the service provider. The intention here was to analyse the questions through a qualitative approach identifying the macro-level aspects related to the innovation processes. In this context the main focus was in the *agenda formation* and *selection* processes, despite the fact that implementation and usage will appear indirectly in the feedback loops. More than merely trying to understand the networks within and outside the company, the research started mapping services development processes in the whole company allowing to identify the network influences diffuse along the chain. These procedures helped to develop a broader perspective about the context and its processes, and also to identify the network's possible influence as it appear throughout the whole organization and innovation chain.

Two-hour individual interviews were carried out with the heads of each department, plus one- to two-hour interviews with operational staff from each area respectively. The interviews with operational staff took place on an individual or small group basis depending on each case. The creative personnel were interviewed on an individual basis only, since they are the main innovation key point within company's structure. Each group talk was composed of a maximum of 3 members. There was also an extra one-hour interview with the General Manager of the company who delineated the general vision about company processes and strategic intentions. The entire process totalled 19 interview sessions and more than 30 hours of recordings, which were transcribed later. As a second step in the data collection process, each department allowed access to their internal files about project development. The data from these files helped to shed light on the sometimes difficult to understand information from the company processes.

4 MOBILE SERVICE DEVELOPMENT AS INTERACTIVE INNOVATION

The mobile market no longer comprises just the delivery of voice services to the handset. Mobile Network Operators (MNOs) "are being obliged to increase their value proposition by offering either directly or though their established partners (Content and Service Providers) an entire service package to their individual and business customers" (Mylonopoulos, Sideris et al. 2002). Although the mobile community still considers handsets, with their nice features, as the primary technology enabler, there is also the need for software development on top of these technologies and content to enhance the users' experience (Modisette 2002). Indeed, BLAH! fits exactly in this last group producing value added data services that despite the fact of the marketing surface, still is software. As reported by one of the executive of the company, "all market players are making deals and partnerships to launch products. In this context, the problem is not to develop a service, but to decide which one to develop." The mobile value chain was directly affected improving the number and types of players, occupying a space that was traditionally the domain of mobile operators (Turner 2001; Natsuno 2003; Jaokar and Fish 2004), and changing the various roles that market players could assume in the

mobile market (Mylonopoulos, Sideris et al. 2002). BLAH! was created for TIM – Telecom Italia Mobile, with the intention to provide services to the new youth niche market (Brown and Dhaliwal 2002; Brown, Dhaliwal et al. 2003; Mansur and Vicária 2003) and the need to deliver improved customer service responsiveness and experience.

An important characteristic of the company model is that the whole structure is based on the creation of a wide, strong and inter-carrier community of users, where the portfolio of wireless services is offered in a common infrastructure a part of which service will be offered. On the contrary, the traditional business model in the market is inherently different since they consider what is called 'variety providers', in which there is one ASP (application services provider) from each carrier and interdependency between carriers. In the BLAH! model, end-users are not the primary customers of the company, network operator is. Therefore, according to the Head of IT, they develop services in accordance with operators' perspective and feedback (their direct customers), but taking care and analysing requirements from end-users (their indirect customers) as well.

In the structure that was created to manage and gather all the required information to develop the application services, six key areas were identified that are directly involved in the services development and innovation processes. They are:

Creative, responsible for services conception

IT, responsible for services development

Corporate / Technology, internal supporting corporate technologies including business intelligence and billing

Marketing, responsible for marketing planning and advertisement / promotions

Sales, relationship with carriers

Operations and Implementation, responsible for interconnecting all other areas and implementing the projects on time and on budget

The mobile market characteristics, in constant evolutionary process, and the organization structure to adapt to this fast moving and unpredictable change, create in the company a particular way of working and developing ideas. According to the CEO of the company, they need to have what they call a 'collective mind', from which the ideas flow in a creative way allowing anyone in- and out-bound of the company to have a good idea and contribute in some way to develop and shape new services, and to share the same understanding about the context. Because it is an idea acquisition process it fits exactly in the idea of agenda formation. The 'collective mind' concept considers three sources of ideas: employees, operators and end-users. Besides this structure, it also considers another important source of innovation that emerges out of market research. In this case, the ideas could come from analysis of competitors and 'killer applications' from all over the world. All these processes can happen both formally and informally. In this context, the Creative Department is responsible for concentrating all newness that comes from inside the company and for researching professional associations (forums, congresses, etc.), while Sales takes care of requests and feedback from operators, and Planning provides internal 'intelligence' reports about competitors and services outside the company. Although the company structure and the board of directors were already conscious of the 'customers' feedback source, until the time when the interviews were carried out the process still did not have a department formally responsible for the gathering process. Furthermore, in the "collective mind" concept the role of consultants in the creation of new ideas is not considered formally, the IT Department is responsible

for managing the outsourcing processes from which is gathered the expertise from this network source.

➔**Process (Organizational Variable):** To formalize the process the board of directors together with all involved departments designed a framework which delineates the formal route for gathering ideas and requirements to shape the services. Therefore, the structure comprises some basic steps that need to be followed to develop an idea (names and used expressions in the model are self explaining).

Input – ideas can come from the collective mind or from market research.

Initial screen – a quick evaluation based on the information provided in the 'Standard Initial Idea form' (an internal form of the company).

Inception – further development of the idea for a 'Go / No-Go' decision. In this step, some areas are responsible for evaluating the ideas and to identify potential providers.

Go / No-Go – official decision to place a product on the 'roadmap'.

Elaboration – architecture and systems analysis in preparation for construction. During this step is required to begin the negotiation with potential providers.

Construction – build the application and create the beta version.

Transition – user acceptance test is done by BLAH! Creative & Sales and Operator VAS Team.

Deployment – user acceptance test is done by BLAH! Creative & Sales and Operator VAS Team.

➔**External Feedback (Individual and Organizational Variable):** During service software creation there are many external variables of the product that are influential sources that can bias the product development. They are: operators, users, other companies and competitors, research centres and universities (congresses), consultancy companies, professional associations (forums) that regulate the technologies and technological patterns, technology suppliers (vendors), among others (here in the 'external feedback' section only users and operators' perspectives will be presented). These sources were identified in the interview processes and also in the company documents. The user and operator feedback are important variables to be considered in this process. It can come from three main sources: market research, through the operator's request, and through informal direct contact with users in the day-to-day life. Indeed, this process is a two-way practice, in which the company needs to be finding new solutions and technologies, and on the other hand shaping services according to customers' requests and feedback. The idea of 'social proof' was underlined also as another feedback force in the definition of service styles. As outlined by one of the Senior Managers: "...people like to use services because their friends use it. Therefore, the way to develop the services is attending to the operators' requests and supplying services according to these new fashions." The idea of services spreading like a 'virus' was outlined as an interesting output from successful "style" shaping processes. As commented by a Junior Manager of Creative Department: "This is our show. Collect all this spread information plus our experience. Talk with users. All of this is tacit knowledge, and transform all this information into a basis, into a structure is exactly the problem in our business."

➔**Internal Feedbacks (Organizational Variable):** Beyond the natural joint development of the services for the Creative and IT Departments, there are other internal influential feedback loops in the service development. Marketing and Sales Departments are responsible for identifying through their internal procedures and tools

the users' requirements that will be used to form the service. Operations and Implementation, because of their proximity to the whole process and some formal responsibilities such as the UAT (User Acceptance Test) at the end of the process, have the opportunity to identify gaps and mistakes in the services development and concepts. Corporate (Technology), on the contrary, needs to receive inputs from the Creative and IT, to design and implement the billing procedures (which is an important aspect of the product), and from Marketing, to create 'Business Intelligence' Tools.

➔**Benchmark**: The search for new technologies and solutions is part of the company culture and market requirement. It is a mixture of active and passive searching in other companies and providers, forums, fairs, etc. and also through formal and informal feedback process that happen in- and out-side the company. The Creative Department has a shared responsibility to find new solutions and providers, looking together with Marketing at competitors' solutions and together with IT at the infrastructure providers. Executives outlined the importance of their participation in fairs and congresses from which they have brought new solutions or ideas into the process on numerous occasions. In this context the value of forums for standardising technological patterns, which facilitate the services development on basis of common technology patterns, was highlighted. Their active search for technologies and solutions in other companies and suppliers was also outlined in helping the ideas and solutions gathering and agenda formation. During this process it is possible to identify clearly a key technology to enter into a new market. Thus, if the company wants to enter this new niche it will be required to invest on it, always respecting the marketing planning and the company strategies or generating new feedback from these areas. In the words of one of the company analysts: "The focus is to develop solutions or find one suitable to solve the company's problems. Thus we benchmark different solutions in fairs, congresses and forums in Europe, in The Americas and in Asia. After this, we look at what people are doing in other companies, providers, etc. and thus we structure this process in a way that we can compare with each other and find the most suitable solution in our case."

➔**Market Analysis (Organizational Variables):** The mobile market, but mainly the mobile youth services market is a very young business. The old ways used to research markets are no longer suitable in this case, nor do they express the real extension of the findings. It requires creating new metrics to monitor some of the essential results and to generate the necessary feedback. The research is usually carried out not just on company users, but also on other people or groups identified in the target market. It is also directed at market competitors and users from other companies. It is an attempt to identify requirements and new services from the market, since they are an influential social force for the company users as well. Market research was identified as an important tool in helping to define the social performance influencing the services development and to assess already existent services.

➔**Content Providers (Organizational Variables):** Since the content is one of the constituent parts of the mobile business model, the logic about providing this feature embedded into the services stresses new requirements on product development and innovation. Content creation and integration into the services is a day-to day process. It happens sometimes even more frequently, requiring shaping and uploading of the content into the services according to their periodicity. Yet, according to each target market the content varies to cope with the niche requirements having different characteristics that are reflected in the services. Therefore, the services need to change

in a dynamic fashion to attend the customers' requirements. As was outlined by the Senior Sales Manager: "The services I already have, but sometimes I don't have the content that the operators and the market want. In fact the process needs to be changed. This process needs to be a two-way process. I need to be hearing what the operators want. Therefore I can bring these requirements to the Creative, and them they can analyse how they can fit into our services."

➔**Consultancy Companies (Organizational Variables):** Most of the services are developed internally by the company. However, sometimes the company needs to hire consultant companies due a technology speciality that they do not possess. The role of these external sources of expertise in the innovation processes is something that needs to be considered since technology sometimes evolves at a pace that can be difficult to follow. These consultancies bring external expertise in specific areas usually to shape parts of a solution, but never the service as a whole.

➔**Technology Drivers (Organizational and Individual Variables):** Although Carriers have a certain degree of flexibility in services development, the infrastructure and handset suppliers are to a certain degree dictating the market conditions. Thus the solutions always need to fit into technologies produced by others in a sense of appropriation of these technologies to develop the company services. When new technologies are developed or changed, the company needs to change their services as well. They need to deploy these new technologies into the company and business model, and adapt them to their requirements and strategy. This could happen as a result of a direct action of the technology suppliers or through responsiveness from forums that dictate the technology patterns. One of the executives of the company highlighted this: "When you are attending to the demands of a person your platform will always be the mobile handset. And thus the great players in this field are those who are determining what we could technically innovate on this platforms, providing new features to be possible for us to create new services."

5 DISCUSSION

Differing from previous studies of interactive innovation processes, the results presented here focused on a developer- rather than an end-user perspective. It enabled us to validate the previous framework by checking its legitimacy in the face of this new environment, generating a positive result during the analysis process. As outlined in the research findings section was possible to identify a great number of influencing network activities in the course of product development, which generates feedback and frictions in the emerging services creation processes (Ciborra and Lanzarra 1994; Orlikowski 1996). This complex system was an outcome of the market structure and the evolving 'voice value chain' (Turner 2001; Natsuno 2003), stressing extra efforts in defining the mobile ecosystem (Modisette 2002; Nardi and Technology 2003) and to understand how network shaping activities occur in the company. This fast environmental evolving pace together with the different outlook from previous researchers allowed corroboration and a different standpoint from earlier studies in interactive innovation theory to exist. Indeed, some of the assumptions that were made in the beginning of this investigation were altered during the exploration process allowing an identification of the fact that mobile services' development happens both through developers' and users' perspectives at the same time. From one side the company develops mobile services, blackboxing its solutions into operators / users and receiving feedback from them, and on the other side they interpret the knowledge from influencing networks, shaping their

expertise in services construction process. Thus, the feedback and shaping process in the company are a little more complex and needs to be carefully considered in the analysis process. Indeed, the case setting showed yet another different perspective from the usually accepted idea of interactive innovation. Differently, mobile services development needs to absorb and make many different technologies significant, requiring the interpretation and combination of solutions under the influence of networks from both sides (users and providers) to shape the service's development in an iterative and recursive way.

Clearly there is something different here from what is usually being explained in the literature. Due the rapid technological evolution and the structure of the mobile market, the service's development process happens in a different pace and fashion. Project life cycles are very rapid, usually lasting from two days to four weeks. As a result, interactions happen with more networks at a bigger frequency and recursive manner, and through simultaneous appropriation of many different technologies than usual projects. Hence, this new effect will be called hyper interactive innovation and extra theories will be presented to try to explain some of its different characteristics.

Swanson & Ramiller (1997) open a wisdom opportunity with their idea of organizing vision. It is a concept in which many actors try to actively interpret the context through feedback loops among all parts involved in different levels; however it does not deeply explore the idea of sense making presented by Weick (1979; 1995; 2001). Furthermore, the actual research into interactive innovation only explores how different networking activities help to shape and diffuse innovations into organizations, without explaining how it works and how people interpret and appropriate technologies in use (Ciborra 2002). Daft & Weick (1984) propose a concept in which organizations are interpretation systems which try to understand and "interpret what they have done, define what they have learned, solve the problem of what they should do next. Building up interpretations about the environment," and in this way, trying to create value and to give meaning to their actions (Weick 1995; 2001).

In the services shaping creation process, the researched organization transforms inputs from various sources through the action of many acting networks (e.g. vendors, consultants, academia, other companies, professional associations, users' feedback, etc.) generating outputs, which naturally creates feedback into the process again. It is a process of constant and continuous discovering and services' shaping process, which happens while the company, and their members, are making sense whilst constructing the services according to what they perceive is ahead of them (Coopey, Keegan et al. 1997). Through these acts, individuals trace their paths in accordance to their values, which helps to shape the way the group creates their identity and consequently shape the way the organization make their missions meaningful (Weick 2001). It is a continuous process in which the organization discovers what the next step will be while interpreting new technologies from the innovation pool and networks, and through interpretations of users' feedback. Nonaka & Takeuchi (1995) argue that Weick's idea of sense making is too passive, not considering a more proactive action including notions like "creative chaos" which is an attempt to explain knowledge creation and consequently the innovation processes.

However, Nonaka & Takeuchi's idea is still not sufficient in our case, not giving insights into the service creation process, which can be better explained as unplanned courses of action that "continuously develop routines, try out, retain or discard, retrieve and combine, on a local, often tacit basis, outside or at the margins of the master plans

and designs, in an endless process of bricolage" (Ciborra and Lanzarra 1994). Different from what was presented in the previous studies in which one technology (e.g. CAPM) was blackboxed into organizations to be therefore unpacked on the users' side and shaped under the influence of all involved networks; and where there were a limited pool of innovations (e.g. MRP / MRP II, JIT, OPT & Bottlenecking) from which these networks develop their expertise from the field (Robertson, Swan et al. 1996; Swan, Jacky A., Newell et al. 2000); the case study presented here shows a shaping process in which the company interacts at the same time with both the networks and the innovation pool to build a service. Furthermore, the innovation pool in the case setting is more dynamic, evolving at a fast pace according to the evolution in the mobile technology market and having more options in comparison to previous studies. In this context the complexity under which the interactive innovation occurs and is shaped is much bigger and needs to be analysed in a slightly different way, generating a sense making and bricolage driven force in the ongoing development process.

In contrast to Rogers' (1983; 1995; 2003) focus on knowledge transfer, in our case the innovation process needs to be seen as a process of mediation, interpretation and reshaping of technology to deliver services to the customers. In this context the concept of bricolage presented by Ciborra (2002) which is defined as "tinkering through the combination of resources at hand" appears to be promising. In this context, technologies at hand might be existing technologies in the company and new technologies presented by suppliers as well. They are used to design and compose the new services, absorbing influences also from the networking processes in this interactive innovation 'construction'. In this process the bricolage can cause negative friction when technology is not sufficiently malleable to adjust to actual and other new mobile technologies (Kallinikos 2002), or positive friction when technology and context barriers help generate new ways to solve the problems. Despite the evidence of this new concept in interactive innovation, the role of different networks still needs to be considered when moulding what will be generated and constructed through the process of bricolage. The newly developed services are situated and created in action, also creating new knowledge, routines and arrangements both inside and outside the organization. As in the company setting these changing processes are cognitive and socially embedded, these bricolage processes are not usually considered when explaining innovations in the organization. In this creation process, these new technologies and services lead to emergent modes and new ways to use and mould services within the company (Ciborra and Lanzarra 1994). These modes occasionally emerge in unexpected, unintended or unplanned ways, sometimes happening according to the results of previous stages, but mainly to previous actions, exactly as a sense making process. The development methods at the company are at the same time rational but unpredictable according to the presented ideas, having a formalized way to follow the newness and shape of the services. However, the company is not in control of all involved networks and the aspects in the moulding process, which push the organization and services development toward uncertain results according the ideas of Weick (1995; 2001) and Ciborra (1994; 2002).

Consumer Behaviour and the Innovation Processes

Although the research focus was not on the consumer behaviour theories, the empirical research has slightly opened up an opportunity when considering communities and network externalities (Katz and Shapiro 1985; Kauffman, McAndrews et al. 2000) as possible driving forces in innovation processes, considering also the understanding of

'social proof' (Cialdini 2001) in the patterns of adoption that could generate powerful users' network feedback. However, all ideas presented here did not have enough support from the empirical research, requiring a deeper study of these subjects if it is intended to understand these possibilities.

6 CONCLUSION

Having discussed many issues concerning interactive innovation theory, this research can contribute to the analysis of the question through a suppliers' perspective instead of a users' perspective as previous studies. It can contribute both empirically and theoretically generating interesting feedback to the field, as follows:

Characterize the mobile services' development as interactive innovations when analysed from the suppliers' perspective.

Identify possible influential networks in the development process.

Identify how networking helps to shape innovations throughout the mobile service development process.

Identify knowledge gathering processes in the mobile services development chain.

Explain these findings in light of a social constructivism perspective.

The main empirical contribution was toward the improvement of the theory, creating a new concept called hyper interactive innovation, which is an attempt to explain disruptive innovation environments under the influence of multiple and simultaneous networks and feedback loops. The research also contributes through possible theory approaches to analyse how mobile services development happen in hyper interactive innovation context.

The main limitation of this study is due to the chosen research methodology. The case study approach, despite the fact of its validity in the problem analysis, lacks depth since it allows the theory's exploration in just one case setting at time. In this case the empirical data is limited to the views of managers within a single organization. Social constructivism presents an interesting set of theories for analysing IT technologies. A more thorough look at various other networks and companies would have added to a better understanding of the interactive innovation environment. Moreover, another important limitation to mention is the fact that a new set of theories was used to try to explain the process through new lenses which suffers from a lack of feedback.

According to what was explained in the limitations section about the research, the main focus of future research should be in the evaluation of sense making and bricolage theories in similar case settings to validate the newly adopted approach. Furthermore, it would also be interesting to develop new case studies in different settings to corroborate the new propositions presented in this investigation. An extra theory, the Actor Network Theory, maybe can be used to analyse and understand how these actors in this chaotic interactive innovation environment and its networks are formed, and in which way they inscribe their knowledge / intentions on the innovation services formation. It needs to happen in way to identify the powerful entities inscribing into processes and networks, and the environmental dynamics in the intentions alignment of different actors.

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