Subtheme 13. Management and capacity building for effective engagement in Triple Helix partnerships: challenges and possible solutions (13.1. Skills, knowledge and experience required for building effective partnerships between universities, business, government and the community)

Title **User driven social innovation: roles and knowledge of university, business, government and the community of users in the case of web-based service**

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Keywords user-driven innovation, Triple Helix, social innovation, innovation process, knowledge

1 Introduction

In this study, the user driven approach to innovation, especially that of user driven social innovation, is explored within the context of multiple stakeholders including participants from user community, university, business and government. The dynamics, roles and knowledge of multiple stakeholders are explored within a case of developing a web-based service for people with food allergies and other special dietary requirements called Erimenu.fi. With this example of combining user driven innovation process with the Triple Helix model, the findings support the theoretical assumptions that different participants all have their indispensable and complimentary roles, activity levels and contributions throughout the innovation process in supporting its success and social goals.

2 State of the art

In this study, we use a broad definition of innovation*: "Innovation is: production or adoption, assimilation and exploitation of a value-added novelty in economic and social spheres, renewal and enlargement of products, services, and markets, development of new methods of production, and establishment of new management systems. It is both a process and an outcome."* (Crossan and Apaydin 2010: 1155). This allows us to explore innovation with knowledge related analysis, and describe the innovation process and its result with knowledge related concepts: the tacit knowledge of ideas moves along the continuum toward something more explicit (Nonaka and Takeuchi 1995), which then can be shared and used toward economic gains. Especially, we concentrate on user driven approach for innovation, and explore that with a case study illustrating a case of user driven innovation process.

There are several ways of how the innovation process can be described in more detail. One way is to divide the process into three phases, namely to fuzzy front end (FFE), new product development (NPD) and commercialization (Koen et al. 2002). The front end phase is often chaotic and non-sequential when compared to the very goal oriented and structured product development (Deppe et al. 2002). The more specific phases of the beginning of the innovation process are often called as requirement or need analysis, idea capturing, concepting, or planning (Takala et al. 2006) or ideation, project definition, problem solving (Crossan and Apaydin 2010), which are all needed in some combinations before actual development can take place leading to commercialization. After the launch or commercialization of the product or service, there is also recognition of evaluation and feedback loop (Preece et al. 2002: 12) back to development or even in the earlier phases in order to achieve continuous improvement.

The different approaches to innovation address also the issue of who participates in the innovation system. Triple Helix model has been influential in acknowledging the contributions of multiple stakeholders, as it looks at the dynamics of innovation within the social context of

university-industry-government relations (Etzkowitch and Leydesdorff 1995, 2000). However, it has been criticized for concentrating too much on those crucial relations, hence neglecting the users (Bunders et al. 1999). In fact, Leydesdorff subscribes to the requests to bring "society" and "public" into the model as the 4th helix, and responds that neither "society" nor "public" can any longer be treated with singular entities but are more about the interactions, overall opening the doors for additional helices, to the N-tuple of helices (Leydesdorff 2010).

This study does not aim at contributing to the theoretical discussion on what the next helix should be nor how that dimension should be approached, but wants to demonstrate the value of complementing the model with user driven approach to innovation. The benefits and necessity of user involvement are already widely acknowledged (Karat 1997). The increasingly integrated role of users ensures that their views and expectations are taken into account, resulting in better products and services and experiences, but also resulting in more realistic expectations as well as ownership of the end-result (Preece et al. 2002). Additionally, this means that all participants have distinct and separate roles (Still 2007). The user-driven innovation approach takes user involvement a step further, as users are not considered as merely a reference group, but as a source of inspiration that can foster innovation in its own right. (Holmqvist 2004). These innovations can then be further refined into commercial products through collaboration between public sector and companies.

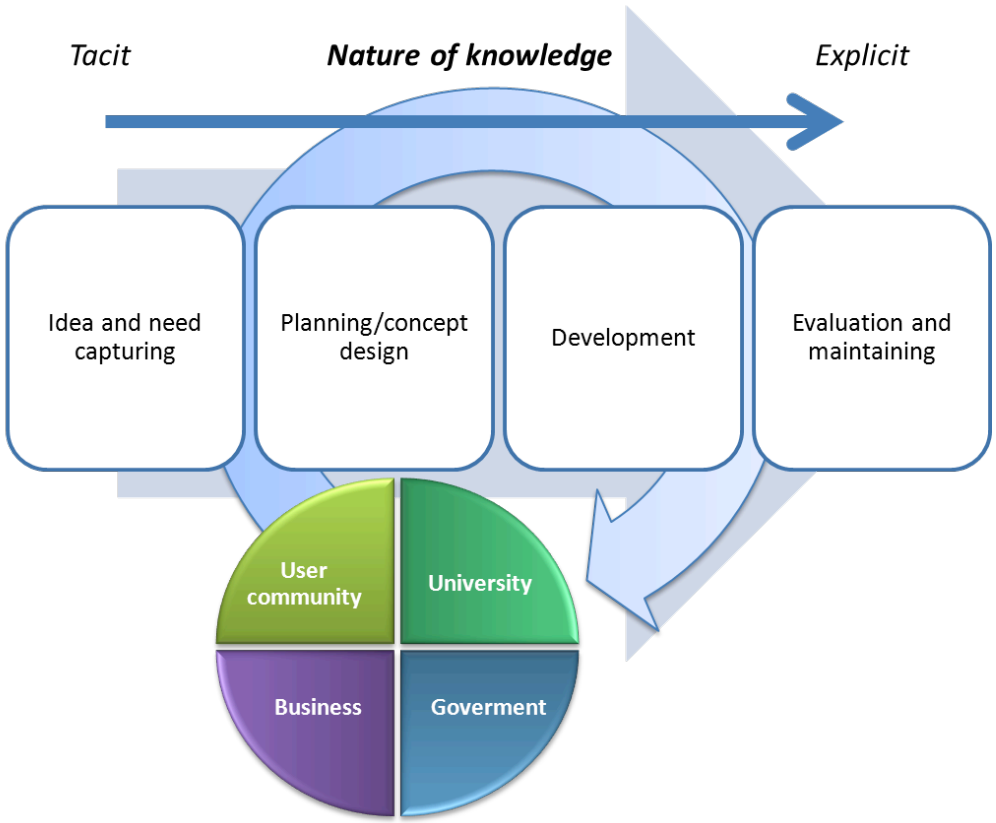

Figure 1. Theoretical framework of the study

In this study, users are driving the innovation process and creating an innovation to meet their own needs by collaborating with stakeholders from government, university and business (see figure 1.). However, they are not aiming only toward the economic value (as innovation has been defined by Hagel and Brown 2006) or for benefits for the companies (as defined by open innovation by Chesbrough 2003), but instead seeking social benefits, growth and well-being. Therefore, this innovation can be defined as a social innovation, which sees that economical success and well-being of a society is depending on the society's capability to mobilize "the ubiquitous intelligence that exists within any society" (Mulgan et al. 2007, 7).

3 Methodology: A case study of Erimenu.fi

This study will use a case-study methodology to approach the theoretical framework of the study. The case context for this study is the innovation process of "Erimenu.fi" (translation "a special menu"), a free web-based service for people with food allergies and other special dietary requirements.

Case study method was selected as it has been found to be a legitimate way of adding to the body of knowledge in the IS (information systems) field (Benbasat et al. 1987: 382) by providing detailed and analyzed information about real world environments which can be seen as examples of phenomena under research. The three reasons why case study research is a viable information systems research strategy (Benbasat 1987: 370) are seen relevant also for this study:

(1) The researcher can study information systems in a natural setting, in this case Erimenu.fi, to learn about the state of the art, and generate theories from practice
(2) It allows the researcher to answer "how" and "why" questions, that is, to understand the nature and complexity of the processes taking place—addressing the complexity of innovation processes taking place
(3) It is an appropriate way to research an area in which few previous studies have been carried out.

Erimenu.fi web service is a hub of information on food products with more detailed ingredient lists than required by the European food legislation, and recipes specifically developed to specific diets. In addition, Erimenu.fi automates the process of finding products and recipes for people that have specified their diet into the service. The service is also a simple social networking service that allows the users to construct public or semi-public profile and share information of their favorite products and recipes with other users. Therefore, the content of the service is a mixture of content generated by end users and companies. Erimenu.fi has been active since 2008, and currently (May 2011) has over 5,000 registered users and on average 7000 monthly visitors (registered and non-registered users).

4 Findings and interpretations

In the case of Erimenu.fi, the process from the first idea to the successful website has taken several years and involved multiple stakeholders: end user community, university, government and business (see figure 2.). For the purposes of this research, the participants were characterized as following to explain their primary role in Erimenu.fi:

(1) User community include a large end user community of which a smaller group of active individuals were the drivers of the innovation work as well as the health care professional and professional of catering, whose expertise was needed during the process. Also a local association, Allergy and Asthma Association of Pirkanmaa (PAA) (http://www.pirkanmaanallergia.fi/) and the non-profit organizations at national level including Allergy and Asthma Federation of Finland (http://www.allergia.fi/in-english/) and Finnish Coeliac Society (http://www.keliakialiitto.fi/liitto/in_english/) can be seen to represent the interests of users,

(2) university is represented by Tampere University of Technology (TUT), Hypermedia Laboratory (http://matriisi.ee.tut.fi/hypermedia/en/),

(3) government is represented by funding organisation Finland's Slot Machine Association (RAY) (https://www.ray.fi/en), and

(4) businesses are represented by Tuko Logistics Cooperative (TUKO) (http://www.tuko.fi/en_GB/) and Finnish Foods and Drinks Industries' Federation (ETL) (http://www.etl.fi/www/en/index.php) that are organizations supporting food producers as well as the individual food producer companies (47 in total) including e.g. Meira, Nestle Professional, Pirjon Pakari, Lagerblad Foods, Halve, Semper, Raisio, Seege, Risetti, Arla Ingman.

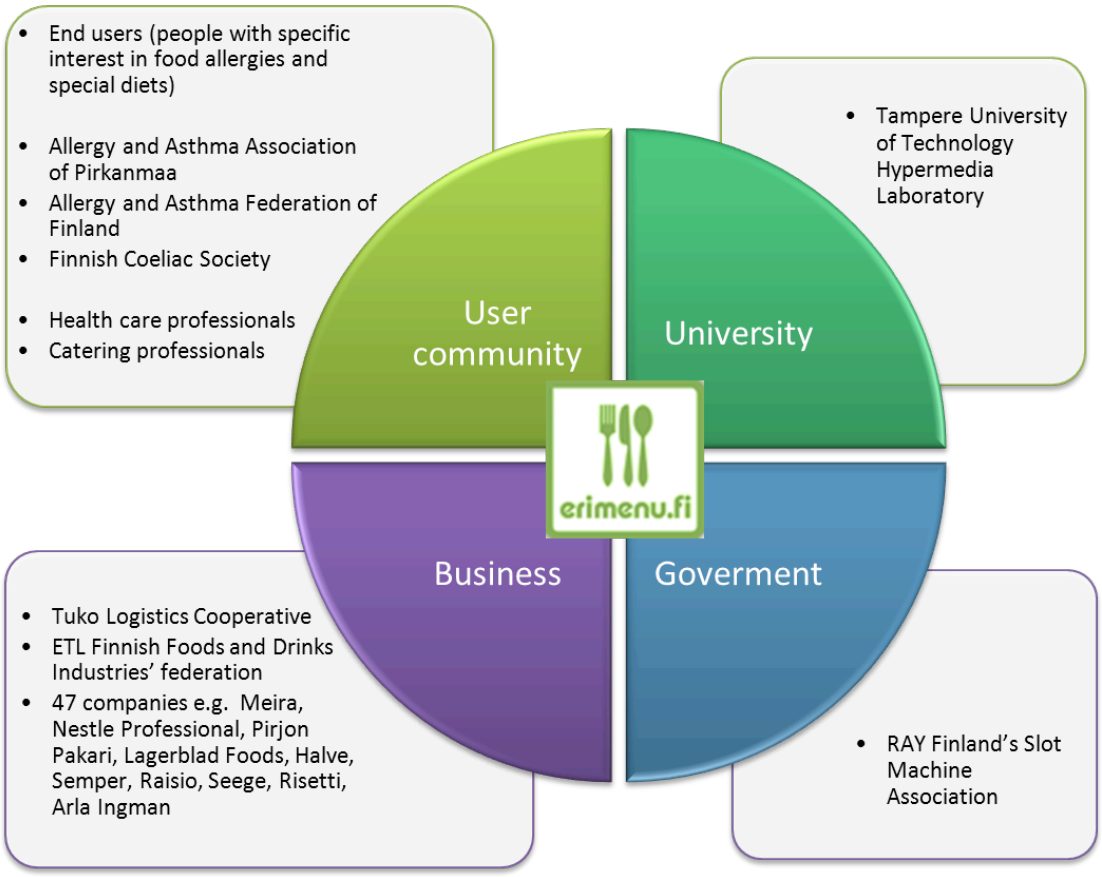

Figure 2. The participants of Erimenu.fi innovation process

4.1. Innovation process of Erimenu.fi

The whole innovation process behind Erimenu.fi started over 15 years ago with a group of mothers with allergic children meeting regularly to share information and support each other. The main challenge for families with food allergies is to find suitable food products. During that time there was a huge lack of even basic allergy-friendly products and a need for new kind of products that e.g. could be used as snacks. The group of users was actively generating ideas about new products and contacting the food producers. As a result the group became an important part of the food producers' product development and worked in a close co-operation with the companies.

The members of the user group started to work together with the local non-profit organization "Allergy and Asthma Association of Pirkanmaa" to create an active service for the community around them, supporting people with allergies and asthma in their daily life. The organization worked closely with Allergy and Asthma Federation of Finland and with Finnish Coelic Society, both non-profits for public health. However, in early 2000s, they were challenged by the sheer

number of requests as well as a need to better package and scale their service. The idea for the actual web service was born to develop a solution for improving information sharing about products suitable for different food allergies.

A couple of the members of the user group were working for a university-based ICT research group. These key individuals realized an opportunity to combine the discovered need and the technology solution they had been working on and started a discussion about collaboration between university and PAA (Allergy and Asthma Association of Pirkanmaa) for developing an online service enabling a larger scale for sharing information of existing products available for specific diets. The key individuals and employees of PAA formed a workgroup, which continued to work with the individual food producers, and expanded toward larger business community with promoting the idea for ETL (Finnish Foods and Drinks Industries' Federation), TUKO (Tuko Logistics Corporation). Based on key individuals' knowledge about the Finnish funding environment, PAA applied and in 2006 received funding from RAY (Finland's Slot Machine Association).

The first version of Erimenu.fi was developed between 2006 and 2008. At a starting stage of a development project a group of small-size food producers committed to maintain their product information in the service and also participated in the management group of the development project together with representatives from a Finnish wholesaler and the Finnish Food and Drinks Industries' Federation (ETL). Some of the food producers and groups of other stakeholders participated in several workshops held in the requirements analysis and concept design phases of the web service. The information was collected actively in focus group interviews during the whole design process on purpose to determine needs and conditions of various stakeholders to meet for a new web service. An important factor that supported the communication between end users and developers was that two of the designers working at the university were both members of the user community and owners of the final product.

The university had the main responsibility of the actual implementation of the service. The end users and the food producers also participated actively in the development phase; they tested and evaluated the service prototypes and gave important feedback. In addition the food producers fed their product information into the system before the web service was launched. Results of the services development were reported and presented yearly to RAY (the Finland's Slot Machine Association). According a report on evaluation of web service development projects funded by RAY in the first decade of this century Erimenu.fi was one of the most successful web services with innovative technological solutions, company cooperation and volume of users (Kupila 2010).

After the web service was launched n September 2008, users have had a role in creating different collections of the products and recipes in the service as well as sharing information in Facebook

and social media in general. Based on the users' feedback, a lot of new information about food products and recipes has been added into the service, and new functionalities have been implemented including private messages, usage tracking and related visualizations and reports. Numerous companies are involved in the service and pay a small fee for being able to present their products in the service.

Currently (June 10th, 2011), Erimenu.fi is serving information of 489 food products from 48 producers and 393 recipes specifically designed to people that avoid eating ingredients such as egg, soy, milk et cetera. The service has 5109 registered users and hundreds of daily users browsing the information. The users have added a product or a recipe to their own collection 4834 times. In addition, the users are able to share information about the products and recipes in Facebook and social media in general. Figure 3 shows the development of service weekly visitors from May 2008 to June 2011.

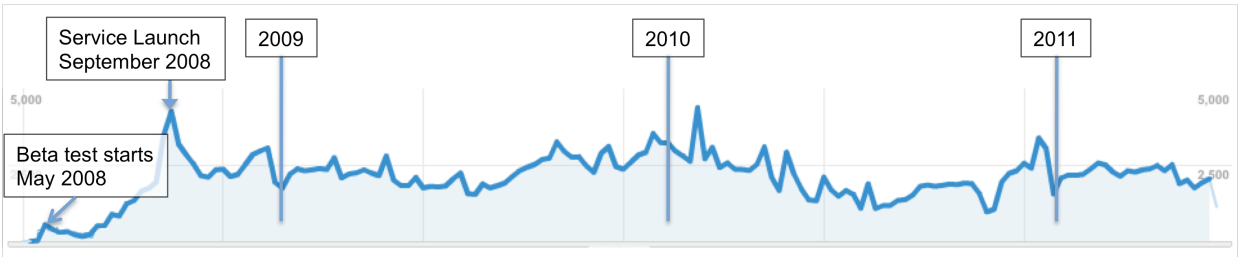

Figure 3. Weekly visitors in Erimenu.fi between May 2008 and June 2011

4.2 Motivation of participants

First, following the logic of statement "the firms' motives influence its performance" when looking at R&D alliances (Lai and Chang 2010), in this paper it is proposed that successful innovation requires motivated participants foreseeing some benefits (sometimes referred to as "perceived consequences") from their activities and the overall results of the process. In other words, it is assumed that all participants have a reason for their participation. Looking at the motivation from a wider perspective was considered important in the context of Erimenu.fi, as it being a social innovation does not directly contribute to financial value or profits of an organization.

The motivation of the participation was explored with the descriptions that participants make about the purpose, vision or mission of their organization, found from their web pages, and is also based on the interviews conducted. For this analysis, the participants of 9 entities were examined, including the non-profit organizations, university, businesses and their supporting organizations. Interestingly, many of the participating organizations were very clear and precise when describing the purpose, vision and mission in their web pages.

As can be seen from the summary (see table 1.), Erimenu.fi fits very nicely into the motivations of the participating organizations. For example, both the Allergy and Asthma Federation of Finland and the Finnish Coeliac Society talked about improving the well-being and quality of life of their constituency, and certainly Erimenu.fi can be seen to provide a novel way of supporting and improving quality of life with its timely, accessible, and reliable content. Therefore, providing services for the users through Erimenu.fi is seen beneficial by the majority of the organizations. The benefit for the two organizations representing businesses (ETL and TUKO) is less direct though still logical, as they concentrate on the supporting the participating food producers (individual companies), who, through their association with Erimenu.fi, will get access to markets, knowledge about users and user needs for their R&D activities as well as marketing and promotional activities.

4.3. Roles of participants

In order to understand how the network of different actors is able to successfully operate it is a necessity to understand who are stakeholders and what role do they have related to the web service. As mentioned above, we have identified four main groups of stakeholders: user community, university, government and business. This study is one demonstration of combining the user-driven approach—with socially aware end users, also in groups and the small organizations that have the ideas as well as the ability to cross-pollinate and react quickly—with the big organizations like governments, universities and companies, which have the resilience and scale to make things happen (cf. Mulgan et al. 2007).

Two main types of user community members have been discussed in this paper: (1) the end users who have a personal interest in participating and motivation for using the service, and (2) user-representative organizations who are third sector stakeholders established to advocate certain selected user groups. The end users have personal motivation for participating; they have a direct need for the service. However, the organizations may or may not have a personal interest as individuals to participate or play an active role, but they do it because it is of the interest of the organization they represent. End users are - depending on the definition – people who actually interact with the web service and who use the information or results of the web service. Based on that definition, the individuals in companies who create content with the service can be regarded as end users as well. However, their motivation for using the service is based on their

Table 1. A summary of participants and their motivations in the case of Erimenu.fi

Participants		Description	Motivation for participation
User community	Allergy and Astma Association of Pirkanmaa, Finland	Non-profit regional organization that aims at supporting daily life of people with allergies and/or astma, providing information, networking, and community support	Better way for supporting the community
	Allergy and Asthma Federation of Finland	Non-profit national public health organization, to improve quality of life of the allergy and asthma patients.	A novel and scalable way of supporting and improving quality of life of the allergy and asthma patients
	Finnish Coeliac Society	Non-profit organization to improve the well-being of Finnish coeliac patients in their daily life.	A novel and scalable way of supporting and improving quality of life of the celiac patients
	End users	People with specific interest in allergy and/or asthma and special diets, who may have the need for information, but who may also have personal or professional information, and want to participate in the community	Need for high quality information and better services, also need to contribute
University	Tampere University of Technology, Hypermedia Laboratory	Research, education and services of hypermedia related new insights through visualizations and development of web technologies	Research and service project that allows for developing novel hypermedia competences
Government	RAY, Finland's Slot Machine Association	Raising funds through gaming operations to promote Finnish health and welfare	A novel way of promoting health and welfare
Business	ETL, Finnish Foods and Drinks Industries' Federation	Goal is to build a competitive operating environment for food and drinks industry businesses in Finland.	A novel way for supporting its member businesses
	TUKO, Tuko Logistics Cooperative	To provide the customer companies efficient logistics and an extensive range of products at competitive terms as well as to support the customers in developing their sales and business activities	A novel way of supporting its member businesses
	Individual companies	Company success	A novel way of marketing and promoting their products, new markets and getting direct feedback from customers for product development

relationship with the company they work with; i.e. in this role they do not have motivation as an individual to participate in the innovation process. User community provided user knowledge (about user needs and context, and changes in them) as well as content during the innovation process. The end-users also provided information related to their user experiences as well as direct user feedback.

Companies play an important role in providing the community with the content, i.e. information about actual products at the market. The service could not exist without this information, as food producers are the most reliable source of detailed ingredient information. Food producers also participated in creating the processes that allowed the sharing of product information, and provided feedback about the service. However, the individual companies also received knowledge from the user community (sometimes through the university team) that could be used toward R&D activities, such as ideas, testing and evaluations, as well as toward marketing and promotional activities of the company.

The university as one group of stakeholders has its own mandate to develop and implement the web service. This mandate comes from user and funding organizations who have used university as an expert service provider for research-based work for setting up, developing and implementing a community-based ICT supported service. This role could perhaps been fulfilled also by commercial ICT company, who would have been able to develop and implement similar service. However, university as a partner could provide research-based knowledge on community building that was needed in the initial phases of the innovation process. Also the fact that the innovation can be characterized as a social innovation, therefore not directly providing financial value to its stakeholders, contributed toward the fact that a commercial ICT company was not feasible in this special context.

In addition to providing context-related information as well as content, some stakeholders can be seen to have a act in the role of decision-maker. The Allergy and Asthma Association of Pirkanmaa was responsible for commissioning the project, had power over the decision to develop the service, and acted as financial controller as did RAY (the Finland's Slot Machine Association). One group of stakeholders included legislators and other professional bodies like ETL (Finnish Foods and Drinks Industries' Federation), TUKO (Tuko Logistics Cooperative) and also Allergy and Asthma Federation of Finland, which produced guidelines affecting the development project. (Cf. Sharp, Finkelstein & Galal 1999).

A summary of the stakeholders, their roles in the innovation process and knowledge flows are presented in table 2. The arrows describe the flows of knowledge (with two-way arrows describing the interactions), and though this is recognized to be an over-simplification of the process, the presented flows are nevertheless understood to highlight the patterns of knowledge flows in the case of Erimenu.fi. It clearly shows that the participants all have a role as well as

their contributions to make during the process. The user community (whose participation has been emphasized with shading) has provided context specific information as well as knowledge of the user needs in the earlier phases of the innovation process. Through workshops their contributions have continued during the whole design and development process, which enabled the designers and developers to take into account the changing user requirements, and supported the development of mutual understanding between the stakeholders and the developers.

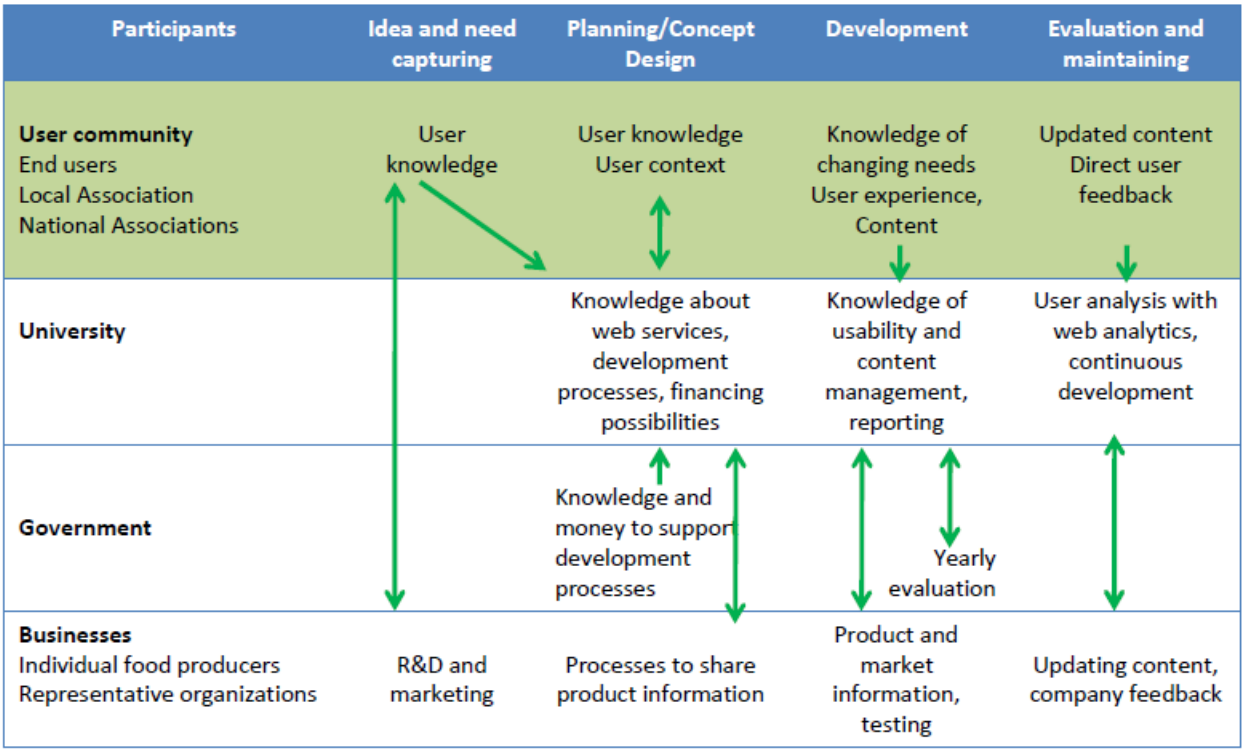

Table 2. A summary of the roles and knowledge flows of participants of the innovation process of Erimenu.fi

Therefore, the flows of knowledge are very much highlighting the role of university group of TUT Hypermedia Laboratory researchers as the driving force of the project. Indeed, two researchers that also belonged to the Allergy and Astma Association of Pirkanmaa and were active in their user community in general were seen to: (1) have an intrinsic motivation, (2) understand the context and special needs, (3) know about web services and development processes, (4) know about the content needs, and (5) knowledge about financing possibilities. In later phases, their knowledge about (6) usability, content management as well as user analysis, web analytics, and (7) service maintenance and evaluation were also utilized toward the success of the project.

5 Conclusions

This study looked at the roles and contributions from multiple participants in the innovation process toward a web-based service with a social goal called “Erimenu.fi”. Erimenu.fi is a successful web service with thousands of registered users, which has continued to serve its users for about 3 years.

The innovation process of Erimenu.fi shows the power of user-driven innovation in meeting the needs of a specific group of people and solving the need with a social innovation, highlighting the fact that impact is measured rather by growth and well-being than with financial measures. Furthermore, as can be seen from the findings, the different stakeholders each made their indispensable contributions needed toward successful service based on their motivations and roles throughout the innovation process. In the core of this new social innovation were the energetic and impatient individuals from the user community with their personal motivation to solve the health related problems of their families, friends or their own. Therefore this study is a demonstration of combining the user-driven approach of innovation, with big organizations and their resources. Having gone through a major change in their everyday thinking, these individuals showed their ability to communicate complex problems in compelling ways and raise awareness of the needs in the society through an existing voluntary organization – the local allergy and asthma association. The impact of these few, passionate people was highlighted throughout the process. Still, for the development from new idea to new products and service they needed the participation of the three helices of government, university and business.

Overall, Erimenu.fi-project presented a successful example of an innovation project, in which the participants provided a creative combination of actors, who were able to communicate together, which is essential for a new idea to progress towards an innovation. The right background conditions were present: (1) an awareness of a need to being met by the market, and some idea of how this need could be met, (2) people with motivation and commitment, (3) an ability to recognize new technological possibilities and also possibilities derived from the knowledge, (4) an ability to combine and apply ideas originated from different disciplines and sectors, (5) an ability to turn the ideas quickly into prototypes/pilots in order for argument for ideas and create interest, and (6) public body with relatively free money for providing funding.

6 Policy implications and directions for future research

Case Erimenu.fi highlights the role of user in the innovation process, simultaneously recognizing the need for participation of stakeholders representing the triple helix. For the purposes of this research conducted within this specific context, the term “user community” was elevated to the same level of university-government-industry in the theoretical framework of this study.

However, the implication of this is not intended to name the next dimension or the approaches to develop next version of triple helix.

Toward policy development, the main contribution can be seen to provide an example that emphasizes voluntary engagement of citizens (within their user communities) and sees it as a way for finding solutions and creating innovations. With new forms of engagement of citizens, private organizations, public sector (both government as well as educational institutions) and voluntary organizations together can innovate and promote well-being and economical growth.

As new data on the processes and needs of Erimenu.fi target group are now constantly being gathered by the service, insights of the user community can be measured, providing insights into inputs, outputs and impacts of the voluntary engagement. Through usage analytics, areas of improvement and arguments for additional resources enabling the development may be obtained.

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