

# Innovation diffusion through the development of a firm-created user-network

**-Insights from the journey of a medical device [Work in progress]**

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## ***Abstract:***

*This is a qualitative study of a physical firm-created user network used by the Italian firm Loccioni to develop and diffuse a high-tech medical innovation. The study benchmarks the paper by Harrison and Waluszewski (2008) and complements their findings by showing that the use of a physical firm-created user network can be favourable when developing and diffusing a product that targets potential researchers and that an important role of a user-network can be to overcome user-resistance. Furthermore, the study illustrates that users can play different roles within different business settings, they do not only contribute to the development of the technology, they also learn how to push the innovation journey forward and become opinion leader within the field.*

**Keywords:** Firm-created, user network, Innovation, Innovation diffusion, commercialisation, medical device, Health care

## INTRODUCTION

Studies of innovations processes often centre at the firm or groups within the firm (according to Franke & Shah, 2003) the importance of user involvement in this process has however been pointed out in numerous studies (e.g. Morrison, et al., 2000; von Hippel, 1986; von Hippel, 1988). Furthermore, user communities by and for users as a vehicle for innovation development and diffusion has been a subject of study for numerous scholars (e.g. von Hippel, 2007; Franke & Shah, 2003; Lakhani & von Hippel, 2003; 2008; Baldwin, et al., 2006). Some scholars have focused on user networks that consist of volunteers that are geographically dispersed such as development of open source software (Lakhani & von Hippel, 2003; Harhoff, et al., 2003), others have focused on geographically concentrated user-created communities (Franke & Shah, 2003; Luthje, et al., 2002). Furthermore, it has been pointed out that not only *user-created* networks can serve as vehicles for innovation development, *firm-created* online user-networks might also serve this purpose (Jeppesen & Molin, 2003; Jeppesen & Frederiksen, 2004). Thus, it appears that the role of the users is central for the beginning of the innovation journey. But as showed by several IMP studies (Baraldi et al., 2011; Håkansson and Waluszewski; 2002) the innovation must connect to the already established ‘structures’ within the network, namely the developing, producing and using settings (Håkansson and Waluszewski, 2002;2007). Frictions and severe issued may also occur if the innovation does not fit with the existent and already placed investments. Using the IMP based resource interaction model, Harrison and Waluszewski (2008) found that a manufacturer-created physical user network can be usable for re-launching or launching a product and that one of the conditions in which this is favourable is when the product is science based and/or target active researchers (p. 128). Harrison and Waluszewski (2008) suggest further studies into possible ways to overcome difficulties of diffusion via indirect user interaction. This study aims to continue the exploration of physical firm-created user networks begun by Harrison and Waluszewski (2008). This is done by focusing on the development and maintenance of a firm-created user network aimed at facilitating diffusion and development of a radical high-tech innovation entering the low-tech milieu of hospital pharmacists. The study seeks to expand the understanding of how lead-users can be engaged into a network when no users who operate in a “low cost innovative zone” (Luthje et. al 2002) can be found. It also aspires to develop the understanding of when user networks are suitable for diffusing innovation as well as of the role of user networks.

The study builds on a qualitative study of the Humancare unit at the company Loccioni. This business unit developed and launched a radical innovation for hospital pharmacies, namely the APOTECA robot that replaces the manual labour of mixing chemotherapy for cancer patients consequently bringing about a safer process for the operating pharmacist as well as minimizing the errors in chemotherapy compilation. The APOTECA was launched using a firm-established user network that started with the local hospital and grew from there to soon include numerous Italian hospitals. Today it contains hospitals all-around Europe and the US east coast. The user-network is managed by the firm and includes physical meetings at the Loccioni HQ. Through the network scientific papers are produced by both users and Loccioni personnel, new requirements and ideas are brought to the manufacturers attention and word is spread about the benefits with the robot.

## **LITERATURE REVIEW**

In this section follows an account of studies of innovation diffusion through user interaction, user-created user networks for innovation development as well as firm-created networks for both development and diffusion of innovation.

### **Innovation diffusion through user-interaction**

When considering diffusion of innovation user-interaction is generally deemed very important. Potential innovation adopters often find information about the innovation through their social network (Abrahamson and Rosenkopf, 1997; Byosiere and Luethge, 2010). A functioning interorganizational social communication network is thus important for innovation diffusion (Czepiel 197;, Rogers 1962) and many diffusion strategies leverage such interorganizational ties. For instance, Rogers (1962) suggests the use of interpersonal communication channels for complex innovations, and mass media (magazines etc.) for less complex innovations. Another way to promote technological innovation is through Champions (Schön 1964, Tushman and Nadler, 1986). Champions are people who put their personal reputation and position at stake when they take an external innovation to heart and promote it within their own organisation, consequently bridging the barrier of indifference and resistance that a major change normally provoke (Schön 1964). The concept of lead users was introduced by von Hippel (1986) as a group of users who experience needs that will be apparent for a larger market in upcoming months or years. These users can “serve as a need-forecasting laboratory for marketing research” von Hippel (1986, p. 791) as well as propose new product developments since they often have found ways to fulfil their needs prior to interaction with the supplier.

### **User-created user-networks for innovation development**

Another form of social network is communities by and for users. They are perhaps most famous for contributing to the development of new products (e.g. von Hippel, 2007; Franke & Shah, 2003; Lakhani & von Hippel, 2003; Baldwin, et al., 2006) but they can also be the vehicle for distributing an innovation (Von Hippel, E. 2005). Some scholars have focused on open source software that is developed through user created communities of volunteers that are geographically dispersed. One such study is the one by Lakhani & von Hippel, (2003). They find that participants in an open source software development project often provide filed support for free to others which in 98% of the cases led to them learning something when scanning the questions and answers posed by others. Harhoff, et al., (2003) makes a similar conclusion and claim that it is beneficial for users to freely reveal their own innovations to competing users and/or manufacturers. Other scholars have focused on geographically concentrated user created communities, one such example is Franke’s and Shah’s (2003) study that show how communities of sport products users collaborated around new ideas and freely shared both information and innovations within the community. Another is Luthje et al.’s (2002) exploration of the user-innovations among members of a mountain bike-community where they find that many of these users innovate for their own specific needs rather than as an attempt to meet a larger market need. In user-created networks non-users such as manufactures can be motivated to contribute if they for instance perceive that the development of the innovations within the community might benefit their sales of other products (von Hippel, 2007; Harhoff, et al., 2003).

## **Firm-created user-networks for innovation development and diffusion**

Networks of user are however not only created by and for users they can also be created by firms. Jeppesen and Molin (2003) has showed that *firm-created* online user-networks can develop innovations. They point out that user involvement has been a key strategy for gaming companies since the 1990s and that the use of online user-communities is a wide spread practice in this industry. These online-communities are managed by company employees and they interact with the users through these forums. Through these communities a process of interactive consumer learning is initiated and maintained which in turn lead to innovations connected to the company's existing product portfolio as well as ideas for future products (Jeppesen & Molin, 2003). One strategy for capturing user innovations and prolonging the popularity of a game is for the manufacturer to provide user toolkits for innovation (Jeppesen, 2005). These toolkits simplify and encourage user contributions to the existing product through for instance providing a software editor that enable users to create their own maps to an existing computer game. Jeppesen & Frederiksen (2004, pp. 22-23) have studied a manufacturer of computer-controlled music instruments that is a host of an online user community. They found that the community enabled new features to become available to all users and that the firm was able to pick up innovations from the community and sell them to other users. The reason behind this is according to them largely found in the users' attributes. The users are for instance, likely to be hobbyists, host a wish to be recognized by the host company, likely to be lead-users, users who desire product open to moderation and are likely to be competent in generic technologies. Jeppesen & Frederiksen (2004, pp. 22-23) also point out that when the community is firm-established around an already existing product the innovations tend to be incremental.

Among the IMP scholars Harrison and Waluszewski (2008, p. 128) find that a manufacturer-created physical user network could be usable for re-launching or launching a product when a product's applications are few or undefined, when the product is science based and/or target active researchers, the market is undefined or small in size, when the creation of a new customer market is desired (especially when there are few alternative solutions). They state that a user-network is not owned by the manufacturer and can thus not be regarded as a resource to own by the firm. Furthermore, they claim that the role of the user-network is threefold, creating lead users, organise direct application development and facilitating user-to-user interaction.

## **METHODOLOGY**

This is a qualitative and ongoing study that has consisted of 4 group interviews including up to 4 people, 6 one-on-one interviews, one half day site visits to the hospital where one student visit, 15 informal short talks, as well as follow up questions via e-mail. In addition APOTECA was first tested, 2 days of work onsite, participant observations during one client visit and to this, secondary sources in the shape of numerous company documents as well as the company book was used. A detailed list of respondents can be found in appendix 1.

## **A PHYSICAL FIRM-CREATED USER-NETWORK**

Loccioni is an Italian company established in 1968 by Enrico Loccioni and his wife Graziella Rebichini. Loccioni's business mainly focuses on manufacturing cutting-edge measuring and control automatic systems to improve the efficiency and the quality of complex products/processes of their customers. Loccioni's turnover in 2017 was about 80 million Euros

and it currently employs 400 people: the company is currently divided into 5 big business units. Four subsidiaries have been inaugurated in the last 5 years in USA, Germany, China and Japan. The major guidelines/strategic intent of Loccioni are: (1) to resolve problems on the customer side, costly problems (2) engaging only with big customers (3) to use *measurement* technology as a core business in addition to this a forth parameter is used to guide the selection of development project and that is that the solution should (4) be good for people and/or planet.

### **Loccioni Humancare business and the origins of APOTECA**

The story of Loccioni's most recent business unit Humancare – run by Mr. Claudio Loccioni, the President's son – and its most important product APOTECA begun in 2004 when some clients from the automotive industry were visiting the Loccioni facility. Tommaso Puerini – business developer and former KAM – was one of the people showing them around when one of the prospective clients said:

*“I see that you have competences in the robotics, I have this friend that has big problem inside the hospital and seems that the robotics application could be helpful to him. Would you like to meet him?”*

The friend of which the client spoke of was from an Italian hospital. A small Loccioni team investigated the problem. They found that the problem was one of the accurate mixing of chemotherapy drugs which is both dangerous for the personnel handling the drugs and when mixed in the wrong way it proves to be fatal for the patient. When a patient dies due to inaccurate compilation of chemotherapy the hospital can be subjected to legal actions and might be forced to pay high penalties to the patient's family. Thus, the problem was an expensive one and if affected big client organizations. The team could also see that Loccioni's expertise in measurement technology could possibly solve this problem. The problem also fulfilled the forth condition of being beneficial for people. This combined led to the Loccioni management team allowing the work of finding a solution to commence. The solution was to transform the traditional manual compounding chemo process into something automatic. Although many technical issues showed up along the process, Loccioni was able to realize a prototype. Loccioni did learn a lot from a technical perspective, it was therefore necessary to consider the business side of this experiment. Making a prototype was not considered a big issue, instead it was deemed urgent to understand the potential market of the upcoming technology. As reported by Mr. Claudio Loccioni:

*“We were used to work in a private market and we didn't know how to approach the public market.”*

Thus, they needed to understand if the commercialization of this technology would be valuable enough to justify the investment. Nearby Loccioni HQ the Marche Regional Hospital – Ospedali Riuniti di Ancona (AOR) – appeared like an interesting partner with whom they could develop the technology and most importantly it seemed like a place where they could start engaging with users. It was in 2005 when the first meetings between the Loccioni Humancare team and representatives of AOR were setup. The general director of the hospital in Ancona (Mr. Tosolini) was a key person who guided the further development of the machine and also supplied Loccioni with important market insights. Once he pointed out:

*“Ok, you don’t need a big sales team, the hospital will be your sales team. We cannot avoid to be your sales team because we have an innovation now and people will be interested in come and see our innovation and that would be your marketing basically”*

At this point Loccioni strived to get access to this new environment that was new to them and they tried to connect their own engineers with physicians and pharmacist. They put a lot of efforts into understanding the needs of the hospital, for instance they mapped the work flows, endeavoured to understand the specifications of the APOTECA systems. During the first two years, testing and validation was carried out jointly by Loccioni and AOR. At the end of that period the Apoteca machine was formally born.

The first marketing action was the official launch of the technology in Ancona. The hospital was very proud of the technology that had been born in their facility. Therefore, the hospital personnel worked together with Loccioni to set up a conference to which they invited people from other hospitals. During this conference AOR personnel talked about APOTECA and Loccioni got the chance to interact with the staff from the other hospitals. During this conference, the company was not the ones who predominantly proclaimed that *‘the technology is good’*, it was more focus on AOR, the user who pointed out that *‘this technology works’*. An agreement was then formed and signed between AOR and Loccioni which made the collaboration between the two parties official. An innovation lab was created in a public-private partnership (Lab@AOR). When the first machine was installed, it was under development and AOR did not pay for that machine. It was more convenient for Loccioni to consider AOR their lab. As pointed out by Mr. Palombi – one of the business developer of Humancare business:

*“It is our laboratory. It is the lab that helped us to develop a technology and will help us to develop new technology. Is the place where we can do research”.*

It meant that Loccioni had found a clinical spot where to continue working with the technology and they go a lot of feedback from the users at AOR.

### **The APOTECA community**

When Loccioni got their first real customer they used AOR as a reference customer and after that they started the *community* project. The community was focusing on three different but interlinked processes: (1) *technical* - to make the solution even more tuned in to the needs of the customers, (2) *networking* - to open up towards new contacts, (3) *scientific* -it had to support Loccioni in developing new studies within the field. Loccioni was rather certain that once the system had overcome some technical/social barriers it would be ready to be replicated in many more hospitals. At the beginning, the community was thus born as a technical *tool* in order to plan the advancement of the technology. Some key people supporting the idea of the community were; the pharmacy director and the managing director together with other people such as engineers and the people responsible of the purchasing department. Loccioni involved a lot of the AOR pharmacists in order make them ‘ambassadors’ for the new technology. Initially the community was built on a group of about 20 people and the challenge then was to “break the ice” and make people connect. Since the start of the community building, each Hospital with an Apoteca device is regularly invited to community events at Loccioni. Every year Loccioni conduct an upgrade of the system including new features and improvements of old ones. Each year, the Humancare team compile a list of major system changes. During the community

meeting they discuss the new specifications they need for the next yearly upgrade of the software and hardware. Nowadays, during the meetings the Loccioni team think that the real challenge is to get as much feedbacks as possible and to work together with all the stakeholders on the priorities of each requirement. Many of the suggestions and tips for the upgrade stream from those meetings, from continuously listening to the users and other stakeholders. The Loccioni team think that it is both challenging and important to share that feedback within the community. Besides the gathering of requirements for the upgrade the networking in itself is deemed important – as pointed out by Mr. Claudio Loccioni:

*“The network is everything, having group of people who comes every year and visit you and breath the atmosphere is an asset. Because then, after the years, you are connected and become friends. This is for example one aspect. The hospital can have access to our network, to our customers. We would love to work in the pharmacy hospital where everybody is connected! So instead my idea is that we could give our users the best possible experience and all the tools (eg documentation, scientific works, pictures, videos, etc.) they might need to speak about the community and the Apoteca. In my own view the community is a group of experts, and usually inside the community you can find very interesting people, the most experts. Usually the more expert people is connected with other expert people. It’s a win-win situation, everybody wants to get the most important people to be connected with”.*

When upholding this network in-between meetings, the customer care personnel are key. They are seen as ambassadors for Loccioni as they interact with clients every day when they check the status on installations etc.

The company’s location in the beautiful Italian countryside yet close to an airport is certainly a factor in attracting people to come to these events according to Alessio Viti – who is in charge of the business Humancare – (Loccioni does not pay hotel or plane tickets for the client’s due to the strict public-sector regulations). Another driver for people to attend these events is their newly technology interest and a third is the Loccioni personnel’s effort of creating a friendly environment where they make sure to make their clients feel welcome and at ease. The Loccioni personnel now feel that they have succeeded making people connect and state that. Mr. Alessio Viti claims:

*“The community spirit is big, people belonging to the community are very tight. There are strong relationships within the community and we want to take advantage of the network of the users we already have, nurture it and trying to enlarge the network”*

Having created a new connection between pharmacists and business people, Loccioni understood pretty soon that they could conduct research and publish it. Early on Demis Paolucci – scientific head of Humancare – and the AOR pharmacists worked on a scientific paper that they intended to send to a conference. Due to this the AOR pharmacist was invited as speaker at this international conference. When this story is told by the Loccioni personnel their face lit with joy when they account for how this pharmacist rose to meet the challenge. He did not speak English very well so in order to prepare he took an English course. Well at the conference he made the speech and since this technology is the first of its kind and the AOR pharmacist was the first to speak about it at a conference he established himself as world expert in the field. The pharmacists at the hospitals were interested in conducting research, for instance, they wanted to understand how effectively the system is cleaned inside and then the Loccioni team proposed that they developed a research projects together. As one of them stated:

*“They [the members in the network] want to publish, they want to make research. We tried to help them out with our papers once we got the data and share the data with them.”*

The Humancare division at Loccioni also try to connect researchers from different Hospitals who they know are interested in similar aspects of the technology and they strive to coordinate the sharing of the research conclusions with the rest of the community. The scientific activity helps the pharmacists in gaining reputation. But sometimes the limit of that is that pharmacists only publish their work in the hospital pharmacist journals, so it stays inside their own circle. As summed up by Mr. Claudio Loccioni:

*“They get reputation mostly inside their sector, at least at the national level. What we are doing with the international community, for example, it’s different. Throughout the years we were also able to publish studies that were much more important on general topics: in this way we were much more effective in engaging with actors outside the circle, like with physicians, general managers of the hospitals, etc.”*

### **The people around APOTECA**

The Apoteca device is a high technology device introduced in a low-tech environment, this is a device where a robot replaces manual procedures transforming the staff’s tasks from manually preparing chemotherapy to operating a robot. At first this can lead to resistance from the not so tech savvy personnel. Demis Paolucci however claims that after a while the work with the robot transforms the users into becoming similar to the early adopters hanging at the door to the store to get the newest iPhone, when they await the release of the new update of Apoteca. According to Mr. Claudio Loccioni, there is a habit among the users of giving the device a name and talking about it as if it was human. For instance, the Norwegian technicians described Apoteca as being decisive lady using words that animized the object and treated is as a person and in Denmark the personnel had a competition where they decided on what to name their Apoteca and ended up calling it “Sofia the diva” after the Italian actress Sofia Loren. In the case description Loccioni made about the Danish APOTECA installation the following is stated:

*“The robot is seen as a new colleague by the pharmacy staff. It may not speak a lot, but still it has got a “soul” and name”*

Region Hovedstadens Apotek, community case study

Furthermore, the introduction of APOTECA has also served the purpose of making technicians visible outside of the hospital walls. For instance, one of the technicians using the Apoteca device in Norway ended up on the cover of their national branch newspaper accompanied with a three-page interview with her on her view of the Apoteca robot.

When engaging with different people the Loccioni personnel had to demonstrate different things to different people: for instance, for the *technicians* they had to demonstrate that the system would increase the quality of work, for the *engineer* they had to show that the installation is easy to implement, to the *purchasing office* they had to prove that the hospital can gain money from this purchase, and to the *oncology* they had to ascertain that they would get an increasing service level. Customers and users that are targeted when trying to introduce this technology are often open-minded *directors of the pharmacy* they might not be the one deciding whether or not to purchase the technology but they can influence technicians and users in general. The *pharmacist* would be the person who could spread the word about the innovation

inside the organization. Over the years, Loccioni have come to realize how important is to engage with the pharmacist because they can serve as internal ‘ambassadors’ for the technology. In Italy, the *hospital managing director* decides if they should make the purchase. The pharmacist provides the managing director with as much information as possible (such as the installation plan and the ROI) but usually, the managing director him/herself makes a sort of survey in order to verify that the organization really wants and needs the new technology.

## DISCUSSION AND CONCLUSIONS

Our research interest deals with the understanding of how a new technology is diffused into a traditional/conservative context by taking the case of APOTECA in the medical area. APOTECA represents a new technology and its acceptance in the business networks has not been a smooth process. The importance of the user network is central not only for the improvement of the technology, but also for spreading the technology across other business settings where users play different roles. Technical as well as more social connections within the user network are emergent and not easy to predict.

This study has outlined a second example of a physical firm-created user-network, complementing the findings by Harrison and Waluszewski (2008). As in Harrison and Waluszewski (2008) study this user-network facilitate the creation of a new customer market where there are few alternative solutions. APOTECA does however not primarily target active researchers and is not science based per se. However, the target group are predominantly *potential* researchers, as pharmacists have the possibility to embark on an academic career. Therefore, the network might serve as a mean in order to ‘create’ new researchers and encourage a doormat scholarly interest. As illustrated by the example of the hospital Pharmacist at OR turned world expert in a new field, the firm and the community have the power to create a *Champion* (Schön, 1963) for the technology by *first* making him an evangelist for the technology and *second* establish him as expert and opinion leader rather than the traditional method of doing this the other way around.

Thus, the study suggests that another condition in which a firm-created user-network is favourable is when the product target *potential* researchers. This study also indicates that the focus on relationships and user-involvement within a user-community can help overcome the initial user resistance towards a new high-tech device entering a traditionally low-tech milieu. To the three roles of the user-network outlined by Harrison and Waluszewski (2008) this study therefore adds; *overcoming user-resistance*.

## WORKS CITED

- Abrahamson, E. & Rosenkopf, L., 1997. Social Network Effects on the Extent of Innovation Diffusion: A Computer Simulation. *Organization Science*, May - Jun, 8(3), pp. 289-309.
- Baldwin, C., Hienerth, C. & von Hippel, E., 2006. How user innovations become commercial products/ a theoretical investigation and case study. *Research Policy* ., 35(9), p. 1291–1313.
- Baraldi, E., Gregori, G. L. & Perna, A., 2011. Network evolution and the embedding of complex technical solutions: The case of the Leaf House network. *Industrial Marketing Management*, Volume 40, p. 838–852.
- Byosiere, P., Luethge, D. J., Vas, A. & Salmador, M. P., 2010. Diffusion of organisational innovation: knowledge transfer through social networks. *International Journal of Technology Management*, 49(4), pp. 401-420.
- Czepiel, J. A., 1975. Patterns of Interorganizational Communications and the Diffusion of a Major Technological Innovation in a Competitive Industrial Community. *The Academy of Management Journal*, Mar, 18(1), pp. 6-24.
- Franke, N. & Shah, S., 2003. How communities support innovative activities: an exploration of assistance and sharing among end-users. *Research Policy*, Volume 32, p. 157–178.
- Håkansson, H. & Waluszewski, A., 2002. Path dependence: restricting or facilitating technical development?. *Journal of Business Research*, July, 55(7), pp. 561-570.
- Harhoff, D., Henkel, J. & von Hippel, E., 2003. Profiting from voluntary information spillovers: how users benefit by freely revealing their innovations.. *Research Policy*, Volume 32, p. 1753–1769.
- Harrison, D. & Waluszewski, A., 2008. The development of a user network as a way to re-launch an unwanted product. *Research Policy*, Volume 37, p. 115–130.
- Jeppesen, L. B., 2005. User toolkits for innovation/ consumers support each other. *Journal of Product Innovation Management*, 22(4), p. 347– 362.
- Jeppesen, L. B. & Frederiksen, L., 2004. Why firm-established user communities work for innovation: The personal attributes of innovative users in the case of computer-controlled music instruments. *Working Paper, Copenhagen Business School*.
- Jeppesen, L. B. & Molin, M. J., 2003. Consumers as Co-developers: Learning and Innovation Outside the Firm. *Technology Analysis & Strategic Management*, 15(3), pp. 363-383.
- Lakhani, K. R. & von Hippel, E., 2003. How open source software works: “free” user-to-user assistance.. *Research Policy* , Volume 32, p. 923–943.
- Luthje, C., Herstatt, C. & von Hippel, E., 2002. The dominant role of “local” information in user innovation/ the case of mountain biking.. *MIT Sloan School Working Paper*.
- Morrison, P. D., Roberts, J. H. & von Hippel, E., 2000. Determinants of user innovation and innovation sharing in a local market. *Management Science*, 46(12), p. 1513–1527.

Rogers, E. M., 1962/1995. *Diffusion of Innovation*. Fifth edition ed. New York: Free Press, Simon and Schuster New York.

Schön, D. A., 1963. Champions for radical new inventions. *Harvard Business Review*, March-April, Volume 41, pp. 77-86..

Tushman, M. & Nadler, D., 1986. Organizing for innovation. *California Management Review*, 28(3), pp. 74-92.

von Hippel, E., 1986. Lead Users: A Source of Novel Product Concepts. *Management Science*, 32(7), pp. 791-805.

von Hippel, E., 1988. *The sources of innovation*. New York: Oxford University Press.

Von Hippel, E., 2005. *Democratising Innovation*. Cambridge(Massachusetts): The MIT Press.

von Hippel, E., 2007. Horizontal innovation networks – by and for users. *Industrial and Corporate Change* , 16(2), p. 293–315.

## Appendix 1

Respondents	Type of interaction	Number
Director Humancare (Claudio Loccioni)	Interview / group interviews / short talk	4
Manager for APOTECA Community (Alessandro Palombi)	Interview / group interviews / short talk	4
Business development, for the Nordic countries, the Baltics and Russia (George Chkhartishvili)	Interview / group interview / short talk	3
Key account manager (Alessio Viti)	Interview / group interview / short talk	3
Head of Scientific marketing (Demis Paolucci)	Group interview / short talk	2
US sales manager (Amar Festic)	Interview	1
Tommaso Puerini	Interview	1
Alessandro	Interview	1
Head of the hospital In Ancona	Interview	1
The chief pharmacist in the hospital of Ancona,	Short informal talk	1
Employees in scientific marketing,	Short informal talk	2
Community employees engaged in arranging client visits,	Short informal talk	2
Clients visiting from the hospital in Oslo	Short informal talk	3
Visiting Pharmacy students form the US	Short informal talk	2