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Master's Thesis in Business Administration and Bio- Entrepreneurship

Value Creation in Open Innovation for Drug Discovery

An illustrative case of LEO Pharma

Author:

Kaya Plewnia

Supervisor:

Prof. Jens Geersbro
Department of Marketing

Company's Supervisor:

Dr. Niclas Nilsson
Early Pipeline and Innovation Center

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Abstract

The following thesis presents a case of a Danish pharmaceutical company- LEO Pharma- and the marketing strategy in order to leverage a communication of newly introduced Open Innovation offering by the company on the market. Since working with science, knowledge trade and high tech requires the understanding of a common language, it is of high importance to communicate externally in an efficient way so to attract researchers and potential collaborations for business opportunities and moreover, to fill and progress the pharmaceutical pipeline.

That said Open Innovation requires external communication and the translation between the science and the business, the tools and resources that will facilitate the co-creation of scientific discussion with the aim of commercial collaborations. Moreover, the key aspect in evaluating, investigating and testing the idea of an open innovation platform is to realize that the offering is targeting the participants from a scientific environment, and hence the significance of appropriate communication shall be put on pedestal.

The best way to understand the communication patterns when approaching scientists is to engage with them in a direct contact since the participants play a role of opinion leaders and *ergo* the most suitable strategy may be made based on their responses. In order to achieve this, a qualitative study was carried out in which the researcher conducted interviews with scientists from different organizations. This facilitated the understanding and exploration of the factors that enable or inhibit marketing strategy when introducing a novel technology on the market.

The findings show that the participants' needs are in accordance to the customer segmentation of academia and industry, respectively. Hence, the communication strategy should include value propositions, which are directly linked to these segments. This will enhance the scientists' perception of Open Innovation Platform, since they will be targeted in a unique way leading to the facilitation of this initiative's awareness and ultimately attraction in the participation.

Since LEO Pharma, as any other company in the pharmaceutical industry, struggles with so called *lack in productivity in the lab*, it can be boldly concluded that sharing its internal capabilities between external partners will strengthen its pipeline and will be a valuable asset for having a competitive advantage, in addition open innovation is essential in XXI century as *sharing is caring*!

Acknowledgements

I would like to take this opportunity to give a special thanks to my supervisors; Prof. Jens Geersbro and Dr. Niclas Nilsson for all their guidance, support and encouragement that they provided me with throughout the thesis project at Copenhagen Business School and the internship at LEO Pharma, respectively.
I am very grateful for the opportunity working in the industry and having hands-on experience working on marketing within the pharmaceutical industry. Their supportive nature was a great constructive impact; not only on this master's thesis report, but also in the choices I have made for my future career path.
A kind recognition to all participants who contributed to my research project and helped me understanding and developing my thesis.
Furthermore, I would like to acknowledge Dr. Marta Pineiro-Nunez, Eli Lilly's Open Innovation Drug Discovery director, for her patience in explaining me the phenomenon.
Last, but not least, I am very grateful for the supportive nature I received from my family over the last six years of my educational adventure. I would not be here, if it was not for you!

Thank you!

Preface

This M.Sc. thesis is submitted as the final requirement for the Master's Program in Business Administration and Bio-Entrepreneurship at Copenhagen Business School.

The research project was carried out during a period of 16th February to 1st June 2015 at the Department of Marketing, Copenhagen Business School; Frederiksberg and is based on the internship conducted in the Early Pipeline and Innovation Center Department in LEO Pharma; Ballerup.

List of abbreviations

CRO	Contract Research Organizations
EMA	European Medicine Agency
FDA	Food and Drug Administration
INDA	Investigational New Drug Application
IP	Intellectual Property
IPR	Intellectual Property Rights
KOL	Key Opinion Leaders
MTA	Material Transfer Agreement
OIDD	Open Innovation Drug Discovery
R&D	Research and Development
TTO	Tech Transfer Office

Structure of the report

This master's thesis is divided into seven chapters as follows; introduction, purpose of thesis, theoretical framework, methodology, data gathering, analysis, conclusion and recommendations, respectively. First chapter acquaints the reader with the main ideas of the situation in the pharmaceutical industry. This is followed by the purpose of research that was conducted in the Open Innovation Department. The methodology section clarifies the reason of choice for the semi-structure open-ended interviews and a focus group in this explorative research study as a way of gathering external empirics. In addition, the participants from the organizations of interests are mentioned together with the role they have within the organization. There is also an explanation given stating the reason of other methods of qualitative research study rejection.

The limitations and ethical issues in methodology are likewise mentioned. Then, data is presented, where the summary of the interview's content is obtained and compared. In next chapter, implications from data are analyzed and discussed, and marketing strategy for LEO Pharma of Open Innovation platform is proposed. Finally conclusion is made and the future outlook is given.

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1. Introduction

The pharmaceutical sector is an industrial pioneer in creating shareholder value, not only regarding the financial aspects, but mostly because it creates medications and puts human life on the pedestal. This means that the human health and welfare will be always a chief aspect in the bio-pharmaceutical industry and the inducement to cure will be assured. Yet, even though this industry is the pioneer, it has been noted that the firms experienced the innovation capacity problems, which lead to market share losses. That said the current environment of pharmaceutical industry in general and drug discovery in particular struggles with numerous overlapping issues. Costly and long processes of R&D, drastic decrease in the number of drugs approved, which is linked with stricter rules of FDA & EMA, and expirations of patents- the generic entrance of the cheaper substitutes of branded medicines effecting in pricing burden- result in increasing pressure of the pharmaceutical firms. In parallel to this, there is a historical breakthrough in the understanding of biology of disease, which evolved twenty years ago and connected to it an *old business model* of companies introducing blockbusters, which has ultimately come to an end.
In addition to the lack of productivity in the lab, there is an exponential demand for new therapies which meet the *unmet* medical need. Having this in mind, the aging population will require additional heath care and resources, since more patients will require specialized treatment. Also, the noteworthy rise of emerging markets in India or China makes pharmaceutical companies to constantly observe, innovate and be on guard on what happens.

Since such occurrence bumped the pharmaceutical sector profoundly, there were several solutions undertaken to mimic such problem. The most common are seen within licensing of development stage molecules: in- and out-, consolidations through mergers and acquisitions and aggressive cost-cutting measures, such as outsourcing of work to low cost-labor providers. In spite of the fact that these solutions have potential, they might result in short-term fixation, unless the scientific innovation is turned into a clinical value.

Apart from collaboration between two companies, another approach seen in the industry is the collaboration with an academia, which was proven to facilitate the innovation process. The base of these is to exchange the basic science across discovery disciplines that can find applicability in the drug discovery process. Amongst those there are: molecular and cellular biology, biophysical sciences, pharmacology, computational science and synthetic chemistry. The reason of collaboration between industry and an academia is a reciprocal interest in advancing innovative science and create medicines to help patients. Based on the above, there is an increasing number of companies interested in an *open innovation drug discovery* program. The goal of this is to identify novel molecules active in relevant disease biology models that can serve as the foundation for

collaborative work between pharmaceutical companies and external participants/ investigators/ interested bodies.

New ways of companies' collaborations or company- academia collaborations are being expanded and new business models are being explored. As an example, it is possible to develop partnerships around sensitive areas, such as compounds and ultimately IP, which used to be implausible less than a decade ago. However, these rapid changes are having a serious impact on how businesses and organizations are conducting marketing and communication campaigns, which will be explored within this research report.

Up to date, there has been research in the following topics; open innovation for drug discovery, collaborations between companies' & industry and academia, and finally partnerships focusing on the pre-competitive stage of the drug discovery. However, the interconnection between all these three fields is nearly unnoticeable. So far there has been little discussion about the marketing strategy in order to leverage the communication in open innovation platform for drug discovery and the subsequent implication resulting from the disruptive innovation launch. Additionally, no research was found that investigated participant's perception of such initiative, which the focus of this study is laying on and hence makes it unique.

2. Purpose of the thesis

The objective of this research is *to explore and understand factors that enable or inhibit marketing strategy from a communication perspective when introducing a disruptive innovation on the market.* In order to investigate this, customer segmentation will be identified so the marketing can be ensured to be aimed to a specific group of customer. In addition, in order to facilitate the research to move forward, a qualitative method will be conducted, in which empirical data explicitly will be taken into consideration and hence information will be analyzed based on the interviews with various contributors. Likewise, the examination of the data will be a base for the value proposition formulation, which will be directly linked to the individual customer segment, thus there will be more value propositions than one. Finally, the researcher intends to draw conclusions based on the interview, which will have guiding purposes since it will be conducted with Open Innovation Drug Discovery director of Eli Lilly and Company (referred here to as- Eli Lilly).

2.1 LEO Pharma case- overview

LEO Pharma is a Danish pharmaceutical company based in Ballerup and is focused on the dermatology. The company's revenue is estimated to approximately €1.04 billion with around 5000 employees and it operates globally. For more information please refer to LEO Pharma's website[i].

LEO Pharma has recently established an Open Innovation Platform, in which it welcomes participants with compounds for *in vitro* assays screening in order to explore partnership opportunities that could lead to new treatments. In addition, the collaboration is based on the mutual sharing of assets to explore the synergistic overlap that could create the foundation for new drug research collaboration and ultimately new treatments for patients.

The invitation to the external collaborators to submit compounds for profiling in specified assays is aimed at research progression. In addition, the partners maintain IPR of their compounds throughout the whole period of the partnership. Once such compound's profiling shall come to an end, the results will be provided to the partner, and if are promising enough, there might be a possibility to continue with research collaborations.
Based on the OI website, the key points regarding the initiative are: research-focused ingenuity aiming to explore the collaboration opportunities, free of charge, confidentiality concealment assured, known assays (website), no legal binding thus no business constrains, generated data returned to the external partner who is free to publish the results. Finally, the offering aims at augmentation of new compounds for drug discovery projects[ii].

3. Theoretical Framework

This paper investigates the marketing strategy and communication patterns in order to raise awareness of newly introduced Open Innovation platform in Drug Discovery by LEO Pharma and examines whether the value proposition addressed to different customers' segments will differ and hence would need to be worded differently. If so, that will further strengthen the research hypothesis that the way of communication is dependent upon the type of customer segment the company wishes to approach.

The theoretical framework is introduced by the concept of open innovation itself, the reasons for "opening up" in the industries, especially these relying heavily on R&D and the subsequent advantages rising from sharing internal capabilities with external resources. That said the framework continues with presenting open innovation paradigm in the pharmaceutical industry specifically and the difficulties that shall be solved when joining different types of collaboration. Specific examples of open innovation in practice are found on p. 12.

Next, the paragraph explaining open innovation collaboration focusing on a pre-competitive stage is described, which enables the reader in better understanding of the primary partnership leading to the compounds' screening and molecule's hit, which afterwards will ultimately lead to a long-term collaboration focusing on commercial perspectives. In order to realize which collaborator it might be, the customer segmentation is then indicated and hence the company can target specific group of participants. The customer segmentation is therefore outlined in the subsequent paragraph.

In addition, in order for LEO Pharma to realize a great advantage of collaborations with potential stakeholders, a concept of absorptive capability was outlined. The fact that the company opens up in order to fill the pipeline indicates that it understands how beneficial the integration and application of new and fresh insight is and since the company also offers something that is desired by the participants; screening facilities for compound profiling, which are for free and with "no strings attached"- *ergo* the concept of marketing myopia was likewise mentioned.

Even though LEO Pharma's offering is with "no strings attached", it may be assumed that the skepticism of audience will rise, since OI platform involves new compounds' screening and hence IPR. This can hypothetically worry participants- (small) biotech companies because of moral hazard issue, the concept is thus explained in order to acquaint the reader with such issue and in addition, a description of IPR is followed since one it directly linked to another.

After the introduction of absorptive capacity, marketing myopia, moral hazard and IP concepts, a course of theoretical framework is directed towards a review of open innovation utility studies in the Scandinavian market, which show a general lack of knowledge about such trend.

As mentioned in the introduction, the researcher of this thesis aims to examine the marketing obstacles in launching new products or services, which are not familiar to the customers. In the view of the investigator, the new platform of open innovation offered by LEO Pharma is disruptive since it "disrupts" the conventional

way of drug discovery and offers something inaccessible for the "customers" to be explored. The disruptive technology paragraph is hence followed by the obstacles resulting in its launch.

In order to understand the necessity of value creation in the pharmaceutical industry, one should realize the cycle of new product, so the product life cycle is described. In addition, as (usually) each product in pharmaceutical industry is patented, the significance of its timeline is of greater importance.

As the previous subchapter touches on the life-time on the product, this one focuses on the whole development process from the discovery stage, which will enhance the understanding of the crucial part of launch in order to mimic the losses occurred throughout the development of the product in the pharmaceutical industry.

Since the main objective of this thesis is emphasized on the value proposition and the customer's segmentation, it is advisable to take a closer look on that relationship and in order to aid this understanding, a business model CANVAS will be outlined.

Even though, the initial emphasis in this master's thesis is not on the marketing relationships and different structures of that relationship, it is still important to pinpoint the significance of the trust that is needed in such connection.

3.1 Open Innovation

The term was first described by Henry Chesbrough (2003) and is coined by two principles:

-to acknowledge and look for external knowledge, skills, innovations and talents and

-to be willing to open up the bank of IPRs within an organization, which just recently was tightly closed, and to sell or license the knowledge (patent) the company does not find useful.

The phenomenon is also associated with such quotations as; "There are a lot of smart people out there, but most of them don't work for you" or similar "not all the best people work for you", which implies that there is a need to share knowledge externally and open up for new possibilities coming from the outside of the organization's boundaries (Atterfors & Farneman, 2012).

That said open innovation enhances the internal innovations within the organization by the exploitation of both inflows and outflows of knowledge. Moreover, it leads to the market expansion and development via innovation done outside the organization. Hence, in order to hasten the technology, companies shall use both internal and external concepts; it is proven that this will lead to faster and more effective technology launch and commercialization (Chesbrough, 2009).

The dynamic nature of innovation and R&D has changed the perspective on the way companies conduct their novelties. Therefore, it can be seen that more and more organizations engage in the open innovation since the potential of beneficial knowledge, which is spread globally, should not be squandered. Ultimately, with this flow, one can expect the restructure or decentralization of R&D that will take place. This will lead to the

embracing of previously mentioned knowledge developed externally and will be harmonized with the internal R&D. In this way it will be feasible to create new, unique value (Chesbrough & Crowther, 2006).

Apart of keeping up with innovation and increasing the *creativity* of companies' pipeline, the organizations may also use an open innovation as a way to stay competitively advantage in the *battle* between the companies, which are more internally innovative. This means that the companies innovating externally (and less novel internally) have better chances in reducing risks and costs in developing product from an idea. It can be seen that these companies are involved in a lot of associations and institutions in i.e. outsourcing or manufacturing, which help them decreasing the threats of future product launch and consequently facilitating the rivalry situation of new, potential entrants (Chesbrough, 2009, Rodriguez *et al.* 2015).

As previously mentioned the paradigm of an open innovation, the idea will be further explained, contrasting it with a closed innovation.

Closed innovation, also known as a traditional innovation, as name implies is the way of conducting innovation and also further product development, which takes place in-house (Chesbrough, 2003). This assures the organizations to *protect* their IP within the boundaries of company and that the knowledge created during the innovation will never leave the company's unit. The advantages that rise from the closed approach are full control of the whole process of technological innovation and knowledge creation (Motzek, 2007). Other embedded benefits state that companies will have the best people, since "all the smart people work for me", the first mover will gain the biggest market shares and the internal R&D will bring the most fruitful innovations (Chesbrough *et al*. 2006). This results in a positive feedback, where new advanced technology will generate huge income for the company and that profit will be further invested in the internal R&D, which will consequently lead to another breakthrough technology.

The below graphical representation helps in understanding the paradigm of closed innovation.

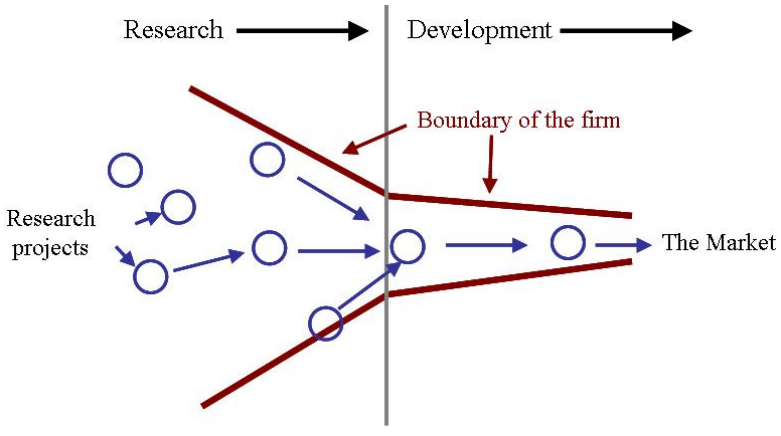

Figure 1 The closed Innovation Paradigm- reproduced from (Chesbrough, 2003).

As can be seen above, the closed approach indicates that the flow of innovation from the very beginning to the end are kept within the innovation funnel, the R&D is held inside the organization's boundaries and no involvement of external stakeholders takes place (Grönlund, 2010).

The closed approach, even though still used by many companies, may not be sustainable anymore, since a new way of knowledge attainment via open access to external ideas has evolved. Because of the lack of productive pipeline in many industries, and pharmaceuticals in particular, the companies which rely heavily on R&D had to reshape their business strategy. The saying that "all the smart people work for me" is no longer applicable since people get more mobile and it is much easier to rotate and change the working environment. Finally, the product's lifecycle decreases since the competition from all around the world increases and so it is much more difficult to innovate on *its own* (Sciences, 2008). These factors lead to introducing an open approach within the industries.

The Open Innovation will be best defined using Henry Chesbrough's quotation:

"Open Innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology."

As the closed model is not holistic any more, companies need new and fresh ideas coming from the outside of the organization in order to engine their R&D. As the below image shows, the open innovation paradigm relies on exploitation of external resources by eliminating the organization's boundaries, so as to aid information flow inside and outside of the firm.

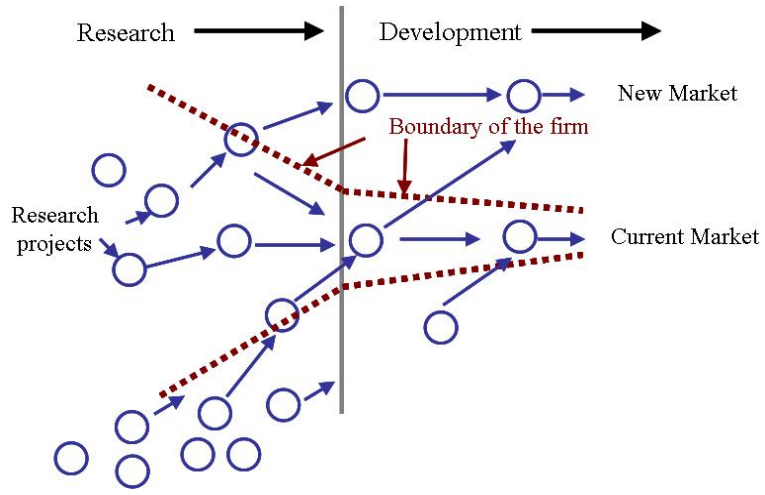

Figure 2 The Open Innovation Paradigm- reproduced from (Chesbrough, 2003).

From the above it can be seen that the open approach indicates that the flow of innovation is shared and exchanged between internal and external R&D and hence external stakeholders are indeed involved in the innovation development. The outcomes may result in booster of existing market or emergence of a new one (Chesbrough, 2003 & Enkel *et al.* 2009).

That said the technology (patent) might be either licensed in or out or a spin-off of the subsidiary company may take place, resulting in the creation of an i.e. start-up. An analytical framework of an open innovation research based on the two dimensions of inbound vs. outbound and pecuniary vs. non-pecuniary innovation focus is provided; revealing, selling, sourcing and acquiring, respectively (Dahlander and Gann, 2010). Another approach of exploitation of the innovation may be seen in the joint venture that is the collaboration between two organizations, where both incur the same degree of risk (Hedner, 2012).

3.2 Open Innovation in Drug Discovery

According to Powell *et al.* the history of openness within the pharmaceutical industry between 1983 and 1991was comprised of partnership agreements of structured and hierarchical networks, which were allied by a small number of participants. Those partnerships involved other pharmaceutical companies as well as universities, laboratories and public funders (Powell *et al.* 1996).

Furthermore, the paradigm of an open innovation drug discovery was described by many authors; i.e. Allarakhia *et al.* see it as a solution for management of product development complexities within companies relying heavily on R&D. To those the main one include: "upstream knowledge-based complexities associated with complementary assets, technological complexities given the scale of research and interdependencies between disciplines and downstream commercialization complexities".

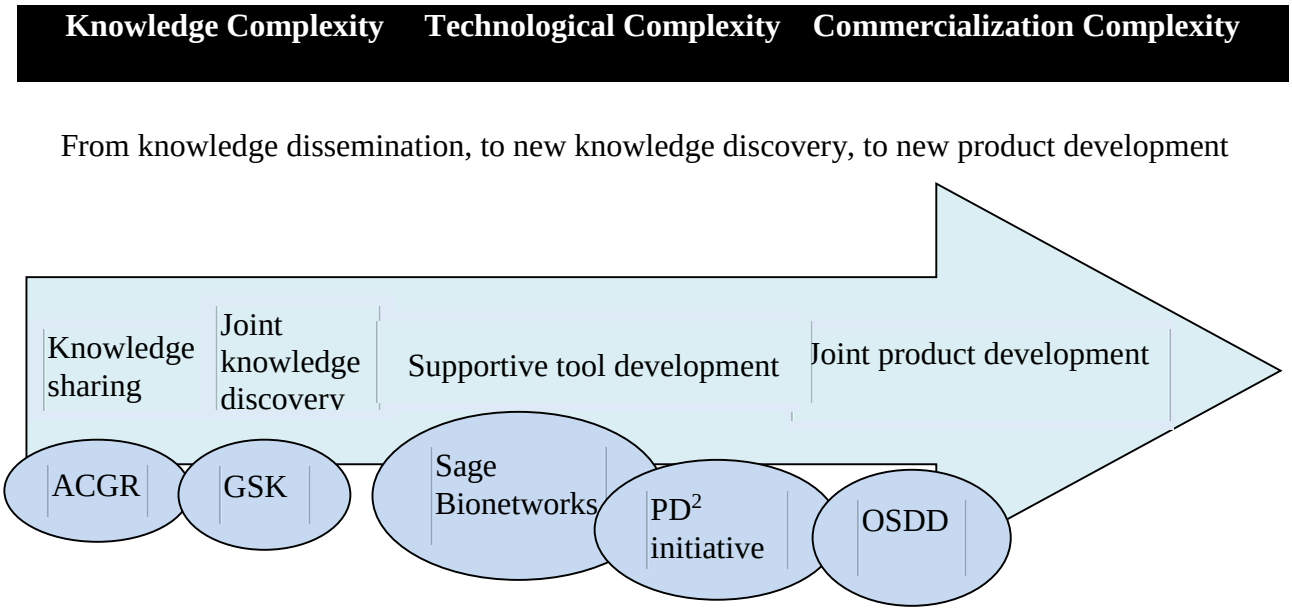

Figure 3 The complexities that arise during Open Innovation Drug Discovery- adapted from (Allarakhia, 2010).

All this leads to the conclusion made by Ostrom *et al.* that individuals shall interact, share resources and participate in adoption and endowment activities, which will subsequently lead to more effective way of problem solving (Ostrom, 1994).

In addition, open knowledge sharing and other strategic initiatives enable pharmaceutical firms to access knowledge- based assets, which are significant for downstream processes- pharmaceutical drug development (Wagner *et al.* 2010).

Foray talks about the knowledge- based networks, where gathering of communities occurs with the aim for producing and propagating the knowledge, which is supported by IT and communication, and are hence able to distribute globally, since researchers from different kinds of environments will have equal access (Foray, 2004).

This is seconded by Fuller *et al.* who touch upon the open source model as a way for shared knowledge production and distribution. The open knowledge networks and other supportive initiatives enable pharmaceutical firms to access disembodied knowledge- based resources which are critical to downstream drug development. Thus, the objective of such strategic cooperation is to reserve the downstream technical possibilities for several firms. If the drug discovery is unable to yield any prospective molecule and if the upstream competition costs are too high, pharmaceutical firms benefit from the join enterprise of knowledge production and open knowledge dissemination (Fuller, 2010).

As one cannot go without the other, it is worth mentioning what the relationship between open innovation and IPR is. Walsh *et al.* outlines the impact of the radical change in screening, discovery and manufacturing of medicines on the intellectual property management scale. This is important especially in the pharmaceutical industry since companies show high degree of sensitivity towards their IP, which constitutes their competitive advantage. It has been shown that large firms and SMEs as well as public institutional knowledge generators have come up with a solution to develop new IP management systems using consortia- open source initiatives- in order to manage the complexities of knowledge generation. The concern existed that in the mutual collaboration between two institutions, the more powerful will take advantage of the other's *know-how* (Walsh *et al.* 2011 & Hunter and Stephens, 2010).

Using open source drug screening companies could benefit both in tangible and intangible assets, such as; cost reduction of failures by access to predictive biomarkers, leverage of an unused IP, external funding, access to talent and innovation and finally augmented trust and transparency with patients and other participants (Hunter, 2014).

3.2.1. Open Innovation in practice

To date, there are numerous pharmaceutical companies engaging in the open platform service. Amongst these, one can include Eli Lilly & Company, Pfizer, Astra Zeneca and GlaxoSmithKline (Alvim *et al*. 2014).

Eli Lilly & Company uses resource-sharing platform as a way for collaboration based on expertise and experience. Lilly launched "PD2" in 2009, which is a platform allowing scientists to have their compounds screened against phenotypic, disease relevant assays that were already established with Lilly's portfolio. The company provides all the data free of charge and with no obligation to the investigator; moreover, the investigator has the full ownership to the chemical entity that was tested. This initiative yielded in a network of 70 small biotechnology companies and 174 higher institution bodies.

In 2011 Lilly provided "TargetD2", which gives an external access to well- validated target-based assays against targets of interest. In addition, it provides bioinformatics computational methods to enable researchers conduct structure- based research on the primary model. The collaborations with various institutions are spread globally and Eli Lilly's outreach can be seen in the below figure[iii].

Figure 4 The OIDD Global Outreach - reproduced (Alvim et al. 2014)

In contrast to Eli Lilly, GlaxoSmithKline uses an open innovation in order to access expertise and *know-how*. The British-based pharmaceutical company established Scinovo, which is built within R&D department of the company with access to the entire R&D continuum. The rules are very *elastic* and GSK is able to build strong links with cooperative partners. The initiative has been running for couple of years now and is in a close collaboration with Stevenage Bioscience Catalyst, the recently established open innovation campus adjacent to GSK's UK Pharma R&D site. Another example of an open innovation run by GSK is "Open Innovation Labs" in Spain, which focuses on neglected diseases and are run by a non-profit organization. Researchers from all around the world may join and work in the labs and gain access to the company's capabilities, practices, services and organization, to which high-throughput screening facility and Biosafety level 3 *in vitro* and *in vivo* laboratories may be included. Also, GlaxoSmithKline proclaimed 5-year collaboration with Harvard stem cell institute, where lab and resource sharing takes place (Hunter, 2014)[iv].

Takeda, on the other hand, is delivering the incubation facilities for both academia and the industry in Shonan Research Center- Japan. This will afford the opportunity for external researchers to work in parallel with Takeda employees[v].
UCB declared to make new mammalian cell culture bioplant, which will- together with the in-house expertise- be available to external partners[vi].

There are also intentions for the pharmaceutical companies to conduct an open innovation via academic collaborations.
Pfizer and Centers for Therapeutic Innovation (CTIs) are building open innovation partnerships with academic medical centers globally. Up to date, Pfizer established 20 collaborations with significant academic medical centers in the USA and 4 CTI labs in Boston, New York, San Francisco and San Diego. This resulted in Pfizer receiving 300 projects and then selected 20 for the support. It has the first right to license any probe that ascends from the partnership, and if it is not interested in the potential collaboration, the academia is free to improve the probe via other collaboration[vii].
In 2013 Karolinska Institute and Astra Zeneca got into joint venture known as Karolinska Institutet/ AstraZeneca Integrated Medicines and MedImmune. Both industrial and academic scientists will work together sharing the institutional access to all the facilities[viii].

The pharmaceutical companies make their chemical compound collection available to academia and biotech companies for pre-clinical screening.
Merck Sereno offers a Mini Library, which comprises of research, derives and compounds, which is free of charge for scientists, who might use them in their assay systems[ix].
Ersai and John Hopkins Brain Science Institute entered a strategic collaboration, which relies on building assays against neuroscience targets by academia and transferring for high-throughput screening to Ersai. The JHBSi might conduct additional hit-to-lead work via milestone payment for prosperous projects (Hunter, 2014).
AstraZenaca and Medical Research Council worked to offer access to 22 clinical and preclinical compounds to all UK-based Researchers, whereas the National Center for Translational Sciences offers access to more than 50 compounds across the USA[x].

The collaborations between pharmaceutical companies also exist, i.e. AstraZeneca and Bayer share compounds with each other as to enlarge the variety of compounds they are able to screen their targets against[xi] as well as the collaboration of large pharmaceutical companies with academic institutions and SME's on solely a pre-competitive research: The European Innovative Medicines Initiative[xii].

To sum up, Open Innovation in Drug Discovery is believed to be a "cure" for the prevaricating pharmaceutical industry. Researchers have claimed that open innovation might be an answer for neglected diseases (Kar, 2010), power pre-competitive research (Hunter and Stephans, 2010) and syntactically match public and private data (Ecker and Williams-Jones, 2012).

3.3Pre-competitive stage of OIDD

Hunter talks about the solution to aid strategies around a pre-competitive cooperation of an open innovation, which is the moment until the drugs are screened and the results are returned to the interested bodies (Hunter, 2014). This has been defined by Janet Woodcock as "science participated in collaboratively by those who ordinarily are commercial competitors" and "biomarker identification and validation, preclinical safety and toxicology, method development and the design and validation of patient reported outcomes." Yet, in order to accomplish such mechanism, the conservative environment of the pharmaceutical firms with a lot of control and hierarchical R&D will need to come to an end (Woodcock, 2008).

3.4Customer segments

It has been identified that customer segments are all researchers or scientists placed in different organizational units (Allarakhia, 2010). That said since the open innovation focuses on drug discovery, the innovation is what matters and therefore *innovators* and *early adopters* play a primary focus in the OI clientele identified by LEO Pharma. However, this does not necessarily mean that these are segments to which the marketing strategy will be addressed. The customer segmentation analysis will be analyzed based on the primary data of participants' feedback; just then a clear segmentation can be made since it will be backed up by the participants' needs and wishes.

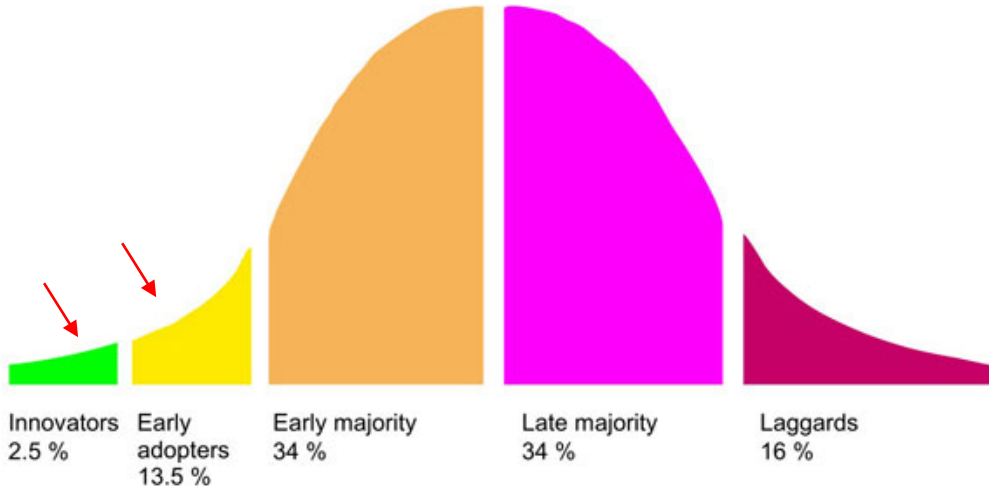

Figure 5 Diffusion of Innovation- based on (Rogers, 2010)

Since both innovators and early adopters constitute potential participants; innovators belong to the category, in which any idea may become a potential new technology, product or service and hence innovation itself plays a chief aspect here, whereas early adopters, still very involved in innovation, constitute a gather or cluster of technological innovation (Rogers, 2010).

Targeting innovators and early adopters is important: they appreciate innovativeness for its own sake and are genuinely interested in learning about new innovations (Rogers, 2010). They are adventurers and they play a gate- keeping role in the innovation diffusion process, which makes them an important target group (Easingwood et al. 2000 & Moore, 2002).

Moreover, since the target segmentation assumes that all of the potential stakeholders are scientists or people with the educational background within life-science, they still play different roles within the organizations. This is in reconcilement to Webster *et al.* who talks about the fact that in the organization there are more people in decision-making involved. Those are: buyers – purchasers – gate-keepers – influencers – decision- makers. This indicates that there are more people involved in the organization, who may have initially same education and training, but different employee's position and hence different employee's power (Webster *et al.* 2010).

In addition to the above, it is of high importance to underline that the biggest value for academic researchers are not necessarily tangible assets, but rather an access to tools, reagents and expertise, so as to make them curious, creative and willing to solve problems (Ghanadan, 2012). In addition, Ghanadan talks about scientists as the most skeptical audience and the subsequent issue resulting in marketing science.

3.5 Absorptive capabilities

The pharmaceutical companies may benefit in absorbing different types of benefits while joining collaborations with particular entities. In addition, a huge increase in the partnerships both between a pharmaceutical and a biotech firms and biotech-biotech companies have been noticed (Ernst & Young, 2009).

Absorptive capacity is the firm's ability to identify, assimilate and exploit valuable technological knowledge developed elsewhere. Firms invest in R&D to discover new knowledge and learn from elsewhere. R&D activities should be organized to accomplish both tasks, and integrate internally and externally developed knowledge. The companies should find the right balance between knowledge produced inside the boundaries of the organization and knowledge sourced from the outside (Cohen et al. 1990, Cockburn and Henderson 1998 & Lakhani and Von Hippel 2003).

The industry benefits of absorptive capabilities include: firms increasingly combine internal R&D capacity with external sourcing ("open innovation"), access to know-how and infrastructure, recruitment of R&D personnel, access to networks and reduced costs of in-house R&D. The academia benefits of such phenomena are: source for funding, better labor market for graduates, new impulses for research and education, access to materials, data and equipment and personal gain (Valentina Tartari, Management of Innovation). "Internal capability and external collaborations are complementary: Internal capability is indispensable in evaluating ideas or skills developed externally, while collaboration with outside parties provides access to news and resources that cannot be generated internally" (Kracklauer, 2004).

3.6Marketing myopia

It is of foremost importance for the companies to understand the participants' needs, who in this case, are scientists and therefore there shall be different approach in interacting with them than when marketing commodities to consumers. Providing a service which fulfills scientists expectations, as it offers them an opportunity to explore their hypotheses, is indeed desired and hence it fulfills their needs. Marketing myopia suggests that "businesses will do better in the end if they concentrate on meeting customers' needs rather than on selling a product" (Levitt, 1960).

3.7Moral hazard

As outlines in the previous subchapters, there is an assumption that once two organizations come into collaboration, there will be a threat of one- having more power- taking advantage of another –weaker (Walsh *et al.* 2011 & Hunter and Stephens, 2010). This can be potentially seen in the interaction between a (bigger) pharmaceutical company and a (small) biotech firm. Then, the later one may feel frighten or fear to be taken advantage of by the former. This usually occurs under a condition of information asymmetry, where one party (risk-taking) of a transaction has the bigger knowledge of its intentions than the party, which pays consequences and therefore has an incentive to act inappropriately. This occurrence is also known as principal-agent theory, where agent is the one that knows more about an enterprise, whereas principal less, due to not being able to monitor the agent. The incentive arises for the agent to take advantage of such occurrence,

especially if the agent-principle objectives are not allied (Leone and Reichstein, 2012 & Robinson *et al*. 2007 & Agndal and Nilsson, 2010).

3.8 Intellectual Property

"Intellectual property, IP, refers to creation of the mind, such as: inventions; literary and artistic works; designs and symbols, names and images used in commerce." Intellectual property is protected by patents, copyrights and trademarks, and hence is regulated by law. This enables people to benefit from their inventions through their acknowledgements, recognition or financial profits. It can be stated that IP has a constructive influence on the science progression since the innovators' creativity is encouraged by the provided security and exclusivity. There are five types of IP: copyrights, patents, trademarks, industrial designs and geographical indications[xiii].

As outlined in the beginning of the theoretical framework, Open Innovation enables sharing internal and external capabilities; however, it does not imply that the IP is not needed, what seems to be a main misconception of the public. IP does indeed protect innovations, but does not necessarily need to be *contradiction in adjecto* with the concept described by Cheesbrough in 2003 (Chesbrough, 2003). Furthermore, it can augment the process of interaction between two entities via different types of agreement set- up, i.e. it may be used as a *bargain* for the licensing purposes. The company, which out- licenses the IP constitutes a supplementary source of information for the in-licensor in the way of technology, product or service production or utility (Bronwyn, 2010).

3.9 The usefulness of open innovation in the Scandinavian markets

There has been a study conducted, which investigates the level of knowledge and utilization of an open innovation for profit companies in the contemporary Swedish bio-pharmaceutical industry. According to Remneland- Wikhamn *et al.* only 12% from the examined group of Swedish bio-pharmaceutical firms were familiar with the term "open innovation", from which only 2, 6% had the official strategy. None of the investigated companies performed a follow up on open innovation activities and in addition, none admits that the key drivers for an open innovation within their companies are external partners.

When it comes to the provided risks in an open innovation, the respondents admitted that risks are associated with competitive rivalry, so that the competitors will gain knowledge, reinforce their strategic market position and advance more profits from the partnership than the company itself, so the benefits of the collaboration will be imbalanced.

On the contrary and not surprisingly, the companies who were not aware of an open innovation do conduct open innovation activities. From there, almost 90% of companies do engage in external networking, from which almost 50% engage non- R&D staff in this process (Romneland and Wajda, 2014).

The conclusion can be drawn that the regularity of application and the awareness of an open innovation are inter- related. However, what's interesting, the companies that lack the familiarity with an open innovation do indeed employ open innovation activities in practice.

3.10 Launch of the disruptive innovation

"Disruptive innovations are innovations that involve significant new technologies, require considerable change in consumption patterns and are perceived as offerings substantially enhancing benefits" and "enabling a larger population of less skilled people to do in a more convenient, less expensive settings things that historically could be performed only by expensive specialists in centralized, inconvenient locations" (Cumming, 1998 & Christensen *et al.* 2000 & Rigby *et al.* 2002 & Hwang *et al.* 2009). Finally, "A disruptive innovation is a successfully exploited product, service or business model that significantly transforms the demand and needs of an existing market and disrupts its former key players (Lettice and Thomond, 2002).

As the new LEO Pharma's offering provides benefits to participants, who are not capable of managing the drug discovery themselves, it is indeed disruptive. The platform offers new solution to the process and enables stakeholders, who are otherwise unable to conduct drug-based profiling, to take advantage of the service. Hence, even though the technology of compound screening may not be innovative, the approach of providing such technology disrupts the traditional way of discovering the drugs.

3.10.1. Issues resulting from the launch

Innovative companies cannot be solely proactive in the product or service development; they also need to be proactive in marketing, which may be problematic in companies which develop disruptive innovations (Sandberg, 2002). In addition, since the disruptive technology creates something which is not known for the customers, it is difficult to examine opportunities it may create on the market and hence convince audience to the *discontinuous* solution. Even though the disruptive technologies are believed to bring a lot of benefits, these benefits are not beforehand acknowledged and for that reason it is essential to communicate them to the potential customers (Christensen *et al.* 2000).

Using opinion leaders for word-of-mouth communication, and reference sites as means of acquainting the customer with product benefits, seem to be common in launching disruptive innovations (Sandberg, 2002). Moreover, "the more disruptive the technological capability inherent in the innovation, the greater is the need for market education". With disruptive innovations, market education may be even more directed towards communicating a vision of the future than with the nature of the technology itself (Beard and Easingwood, 1996).

As mentioned in chapter 3.4 it is also much more cost effective and beneficial to target segmented group of stakeholders. Previous studies have shown that targeting enhances the diffusion rate, if done correctly, however, if a targeting reaches wrong segment, than the effect is reversed and hence harmful (Sandberg, 2002).

3.11 Product Life Cycle

As the life of the new product decreases and the competition on the market increases, customer needs become more complex and diverse; resulting in the firm's constant need to innovate let it be throughout the radical or incremental innovation (Christensen *et al.* 2000). One should, therefore, be aware of the product lifecycle, which is especially important in the pharmaceutical industry, where the whole pharmaceutical drug development process (explained below) takes extensively long time.

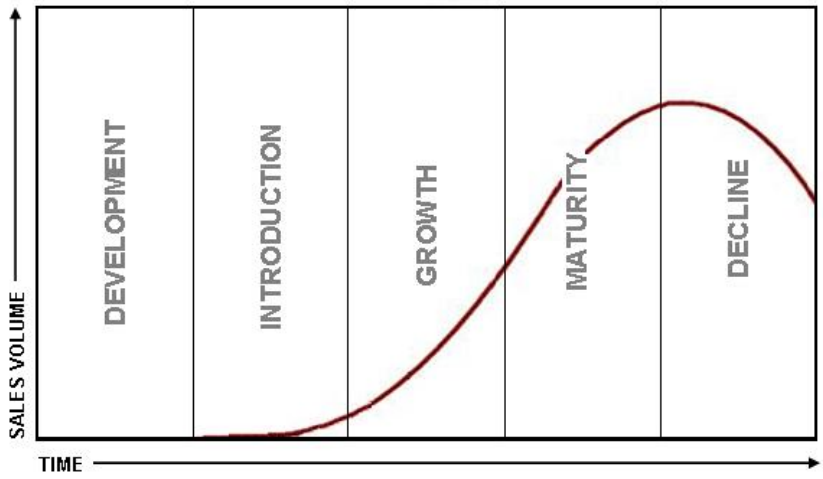

Figure 6 Product Life Cycle- based on Baines *et al.* 2008

As can be seen above, the life of the product changes over time. Before the introduction, there is a development stage, where a product or service is being created. In the first phase- introduction- product emerges on the market, there is no clear product definition and hence the sales are poor and there is a threat of competitors. In the next one- growth- product displays the steep increase in the sales rate and hence customer's acquaintance is achieved and credibility gained. The third phase- maturity- product is characterized by the peak of sale's number and thus profit where the number of competition is stable. Finally, the decline phase indicates decrease in the number of sales and so decrease in revenue generation (Baines, *et al.* 2008).

3.12 Pharmaceutical drug development process

It takes a pharmaceutical company up to 13 years from the moment of a drug hit and approximately $4 million (Herper, 2012) in order to develop the pharmaceutical candidate. The step-by-step process of bringing a medicine to the market can be seen in the below graphical representation. Please note that the development

phase- stage zero- is not shown in the figure; however, it is the longest stage in the product life cycle of the pharmaceutical sector.

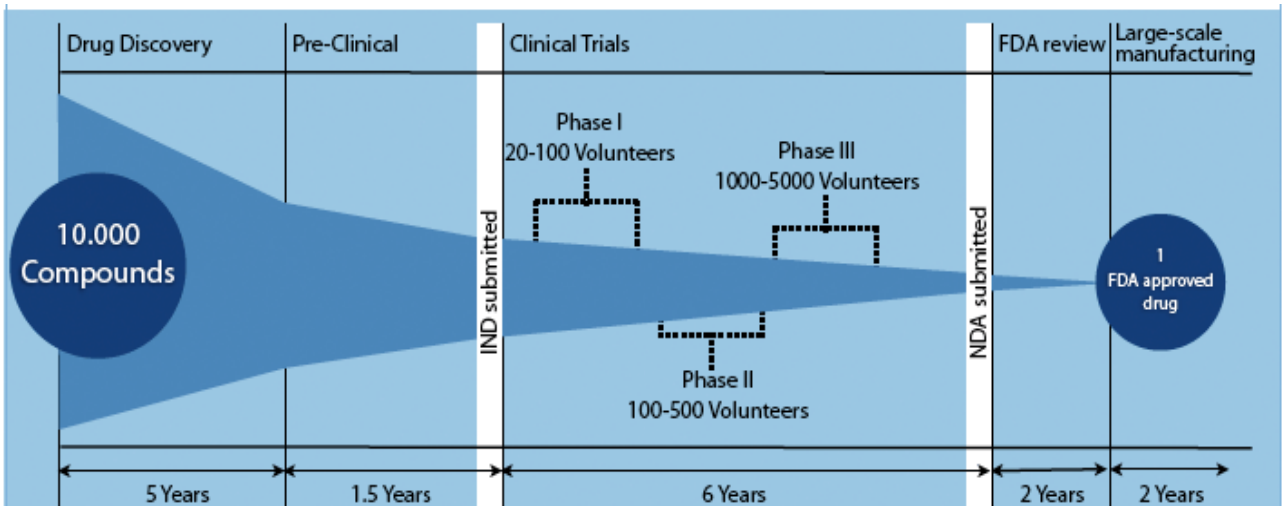

Figure 7 Pharmaceutical Drug Development Process[xiv]

Figure number seven shows the whole process from the pre- discovery stage with the aim to understand the disease and choose a target molecule, through discovery stage with the objective to find a drug candidate, to the pre-clinical studies, where testing on animals takes place, in order to define the drug's safety. Once this is obtained, the development stage takes place: first the FDA approval takes place and IND (Investigational New Drug Application) is submitted, then human clinical trials are conducted (phase I-III) in order to check for the safety and medicine's efficacy. The clinical trials are first conducted on the healthy people and then are continued on the bigger population of patients. Once this is completed, FDA reviews the results and decides on the approval of the product taking also into account the proposed manufacturing and labeling. Afterwards manufacturing happens with the formulation, down- streaming and drug's production. Once the product is launched, phase IV studies take place, where the company monitors whether the drug causes any significant adverse effects in the bigger group of population.

3.13 Business model CANVAS

The business model CANVAS, also known as nine building blocks, is a tool used by managers to "describe the rationale of how an organization creates, delivers, and captures value" (Osterwalder and Pigneur, 2010).

<table>
<tr><td rowspan="2">Key Partners</td><td>Key Activities</td><td rowspan="2">Value Proposition</td><td>Customer Relationship</td><td rowspan="2">Customer Segments</td></tr>
<tr><td>Key Resources</td><td>Channels</td></tr>
<tr><td colspan="2">Cost Structure</td><td colspan="3">Revenue Stream</td></tr>
</table>

Figure 8 The Business CANVAS model, adapted from (Osterwalder and Pigneur, 2010)

The model is comprised of nine blocks:

1. Customer Segments- the different groups of people or organizations an enterprise aims to serve.
2. Value Propositions- the bundle of products or services that creates value for a specific Customer Segment.
3. Channels- the way company communicates and reaches its Customer Segments to deliver a Value Proposition.
4. Customer Relationships- the types of relationships a company establishes with specific Customer Segments.
5. Revenue Streams- the cash a company generates from each Customer Segment.
6. Key Resources- the most significant assets required to make a business model work.
7. Key Activities- the most important things a company must do to make its business model work.
8. Key Partnerships- the network of suppliers and partners that make the business model work.
9. Cost Structure- all costs incurred to operate a business model.

(All information is taken from the book "Business Model Generation" by Osterwalder and Pigneur, 2010).

As can be seen, the model gives a thorough overview of the company's businesses and works like a proposal for a strategic representation that can be then employed via organizational structures, systems and processes. It is therefore a common language for unfolding, picturing, accessing and adjusting business models.

The researcher focus will be on Value Proposition targeted towards Customer Segments in order to leverage the communication strategy of Open Innovation by LEO Pharma and thus other blocks will be neglected. To do that, next model will be used and the analysis will be made (please refer to p. 43).

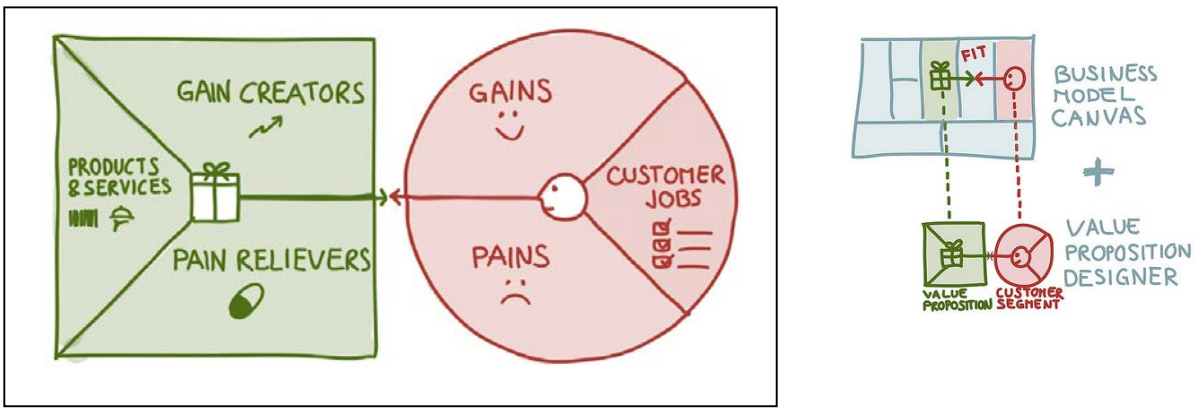

Figure 9 Design Value by Understanding your Customer, reproduced from (Osterwalder and Pigneur, 2010)

The diagram above indicates that there should always be fit between value or the needs customers are actually looking for and the corresponding segments. If there is no fit, then the services or products delivered are contradictory of what customers want and therefore are not needed, so they do not meet the *unmet customer's need*[xv].

3.14 Trust in marketing relationships

Since the introduction of new offerings on the market takes place and the potential consumers are not familiar with the concept, it is a key to acquire their trust (Raimondo, 2000). In addition, the trust between firms and between organizations and customers is a critical element in the move from discrete market transactions to continuous exchange relationships and therefore, the trust in the management of market relationships is fundamental, especially in the context of business to business markets. This means that all the activities are intended in establishing, developing and maintaining exchange relationship with clients (Morgan and Hunt 1994).

The concept has been defined by many researchers and is linked with disciplines of sociology, social psychology and behaviorism (Rousseau, 1998). According to Castaldo *et al*. trust is defined by two constitutive components: likelihood of the actions of the subject, or organization, where the trust rises coming from learning processes based on experience, and the certainty that the individual shall not behave in an opportunistic way and that their actions will aim to attaint reciprocal benefits (Castaldo, 2010). Consequently, a reputation is certainly a determinant of trust, but it is equally definite that it is one of its main consequences (Raimondo, 2010).

All in all, it is believed that an open innovation is a very beneficial model for the pharmaceutical industry since it offers flexibility in enhancing an understanding of the rapidly changing external research community. In addition, thanks to risk-sharing collaborations, it is easier to face the drastically rising cost of the product launch. Finally, an open innovation model will make companies become better in understanding patients' and other stakeholders' needs.

The next chapter explains the research that was conducted, in order to work toward theorizing the agenda of the value creation in the open innovation platform offered by LEO Pharma, on the basis of semi-structured, individual interviews and a focus group, which targeted to generate data on how the communication of the new offering should be formulated in a holistic approach. Furthermore, the interview guides were sent to the interviewees' *ex-ante* the meeting and they can be found in the appendix on page 59.

4. Methodology

This chapter intends to provide reader with a thorough understanding of the qualitative study that was carried out in order to establish the research project and objectives. Several tasks will be outlined and validated to obtain answers to the research project and an attainment of the research objective.

4.1. Introduction

With the research title in mind "the communication strategy of the value creation in Open Innovation Platform" the purpose of this project *is to explore and understand factors that enable or inhibit marketing strategy when introducing a disruptive innovation*. It focuses on different customer segments and the formulation of value proposition in the message part of the offering, so each participant can be treated individually. Furthermore, this paper targets to establish an agenda, based on both theory and empirics, for the application of a strategic marketing communiqué through the medium of a digital platform.

4.2. Theoretical foundation:

Research methods can be distinguished between quantitative and qualitative. The former highlights positivism which integrates a deductive method throughout testing theory and concerns the natural science model as a satisfactory knowledge base (Bryman and Bell, 2007). Its ontological position defines that there is only one truth non-dependent of human awareness, where its variables can be empirically quantified and exemplify the truth. Hence, the investigator can undertake a study without manipulating on or being manipulated by the variables (Sale *et al.* 2002). Its object is to test the principle in a structured manner to generalize its conclusions on a big scale. The latter, conversely, is based on constructivism and interpretivism, thus based on the investigator's publically created reality which has numerous truths that can alter, depending on the situation. Throughout the collaboration with contributors, judgments are made in the context of the investigation and construed in the context of connotation. Models within a qualitative method are thus chosen minor as they are not destined to symbolize a large population. This research targets to cultivate theories via data collection in a structured manner to apprehend social patterns of small-scale features of social sciences. As the data is gathered and interpreted in the same time, it ensures a great level of flexibility and aids the intricacy of data. In order to develop explanations for better understanding and analysis of interviewee's intentions and opinions, a rich description approach is adopted, which means that the obtained data is described with the highest details.
In addition, since the generation of qualitative data took place, a case study approach was used. This allows the investigator to retain the holistic and meaningful characteristics of real time events- such as individual life cycles, small group behavior, organizational and managerial processes (Yin, 2009). The tools used in such field of research are in-depth interviews and participants' observations (Sale *et al.* 2002 & Gillham, 2000).

Furthermore, according to Gibbs *et al*. there are two methods of data analysis. These are: an inductive and an ideographic method, respectively. The first one is used when analysis of repeated perceptions and debates within contributors is made to clarify the studies phenomenon. The latter one is applied when individual activities or involvements of contributors are studied to create a generic observation "within the sample" (Gibbs, 2008).
In order to enhance the exploration of multiple different perspectives offered by the experts, it is of high importance to take a research stance. As each of the participants will have their own created reality by different perception angel, it needs to be assumed that there will not be any generalizable fact. An interactive approach is hence necessary, as it enables the researches to explore these different truths.

4.2.1. Research study design

The two research methods above specify that a qualitative method is more suitable for this research project as the communication strategy of the value creation in OI platform by LEO Pharma is going to be explored. There is no clearly defined problem in the focus area that is supposed to be answered, but there is a situation in which pharmaceutical companies enter pre-competitive stage of collaborations in an open innovation manner. In addition, for the exploratory study of this topic of interest, the qualitative design is the most applicable and hence it has been chosen.

4.2.2. Secondary research

The literature area on the communication strategy of the value creation of Open Innovation is widely described containing a remarkable quantity of studies and empirical data to many different aspects. The resources available, however, do not combine the communication strategy within the pre-competitive stage of open innovation in drug discovery and the empirical data of participants' feedback.
Therefore, these foundations pose obstacles in synthesizing the right sources in order to validate appropriate outcomes that contribute towards the initial project (Jarratt, 1996 & Smith, 2012).

"Secondary sources are a cheap and fast way of gaining data relating to the area of interest and especially the Internet is providing the opportunity to conduct research without expenses" (Gaafke, 2011). There is also a possibility of doing a re-analysis of already existing data in an altered context from new point of view. Yet, the researchers need to be aware of the fact that there is a chance of misinterpretation of those sources due to their complexity and unfamiliarity with the data. Furthermore, these data will mostly not be as precise and proper as primary research data and the proficiency of the data cannot be guaranteed.

4.2.3. Semi-structured Open-ended interviews

A research interview tries to gain data and understandings relevant to the general topic and the aim of the research project (Jarratt, 1996).

For the semi-structured interviews in this study the researcher prepared an interview guide as a pattern of topics to follow, which were covered in the course of interviews. As the interviews had an open-ended approach, the interviewees were given a flexibility to reply and express their point of views. This process allowed a freedom to speak up during the conversation with the aim of investigating specific issues of the focus area and drawing the attention towards important aspects for the participants rather than the interviewer. Using this structure it was ensured that the researcher had the ability to repeat the interviews with different contributors but getting analogous responses.

Gillham *et al.* draw the consideration towards the non-verbal elements of interviews, which is an important aspect that needs to be taken into account. "Facial expressions, eye contact, gestures, physical contact and posture orientation" have to be thought through by the investigator when undertaking an interview, as those factors affect the relationship between both parties' thus affecting reliability and honesty (Gillham, 2000).

Jarratt criticizes this theory as it certainly provides the investigator with a scope of information that can approve and widen up-to-date knowledge, but feelings and emotions are difficult to gather if there is a lack of honesty between the two parties (Jarratt, 1996).

For this research project the interviews were conducted with the participants from different organizations, refer to p. 33. The participants were contacted via e-mail, in which the research description was sent, refer to appendix on p. 58. The researcher intended to conduct the interviews with different stakeholders. Once the participants agreed to join, the date was set-up and another e-mail with an interview guide covering the main topics of the interview was sent. *Prior* to the interview, the information from companies' websites were taken for data processing. On an agreed date the interviews were conducted either face-to-face or via the teleconference or mails. The interviews were conducted with each of the companies in different time slots, refer to p. 32.

The interviews offered the opportunity to study the way participants perceived the current situation of the pharmaceutical industry and the collaboration's opportunities. In addition, they offered the illustration of various reasons and perceptions towards the research issue and contributed towards building a foundation to conceptualize a generic framework of "the communication strategy of the value creation in Open Innovation Platform."

Some of the interviews being held were recorded and some were obtained via e-mail. Both ways of the interview conduction resulted in a comprehensive accuracy (Yin, 2009).

The recorded interviews were not transcribed, but rather summarized, what resulted in great time efficiency for the researcher; please refer to p. 61,-79. For the full recorded interviews see attached memory device provided together with this research project.

4.2.4.Focus groups

Focus groups usually fulfill a specific function in order to explore a situation, state or matter in profundity. A distinguishing factor is compromised of the observation of group debate and communication among contributors. Thanks to the possibility to observe contributors' interaction, disputes can be revealed that the investigator has not realized before, or considered as less imperative or non-contributing to the research objective. A focus group differs from an interview by asking a group of people rather than an individual, about their perception, beliefs or comments towards a specific concept, product or service. "The researcher as the moderator is supposed to guide the discussion without being intrusive or biased" (Bryman and Bell, 2011).

For this research project focus group has been chosen that was conducted with scientists of LEO Pharma. This afforded the possibility to investigate the way participants perceive the phenomenon of an open innovation, the meaning of value for the company using such approach and the trade-offs the LEO Pharma scientists' see as a fair transaction. Moreover, since the scientists had worked in different institutions before joining the dermatological company, questions were made whether they participated in similar initiatives. This was very helpful for the researcher since the participants are experienced in joining different collaborating agreements and their suggestions in the launch of LEO Open platform were very beneficial. This offered the illustration of several explanations and observations towards the exploration issue and funded groundwork to conceptualize a framework of *the marketing strategy in order to leverage communication in Open Innovation for Drug Discovery.*

Participants from New Molecular Entity- Ideation Department were contacted in the form of e-mail, where the project was described briefly and they could reply whether they would like to contribute. As well word-of-mouth was used as to spread information about the task and attract contributors.

Ahead of the session, personal details were obtained for data processing reasons, which will be published in the dissertation, i.e. name, age and position. Scientists were informed in detailed about the process in advance and consented that general information is allowed to be published.

Finally the session was held on the LEO Pharma headquarter in Ballerup in a familiar surrounding for the participants in order to create a setting that was as natural as possible.

Like other methods of research, the focus group has likewise limitations that ought to be discussed. First and foremost, when the focus group is being conducted, the moderator has no control over the group and the direction of discussion, which might result in information irrelevant to the conductive theme. Even though the discussion can be channeled via the guidelines of questions that participants were given, the moderator is not able to interfere constantly, since the flow of contributors' interface would be interrupted. Moreover, there are three participants in the focus group, and hence the number cannot represent a population so the generalizability is not given. Additionally, focus groups are conducted once rather than couple of times. What's more authority of the attained records is in dispute since there is a possibility of the investigator's interference

in the attained records by inquiring inclined questions or interfering in the inappropriate moments. "As well external validity of the generated data is questioned as the settings of the discussion are often artificial rather than natural" (Nachmias *et al.* 1992).
Finally, as the participants are given freedom in discussion, there is a possibility that an initial agenda of the focus group will go in different direction as contributors are skilled in the art.

Apart from the interviews and the focus group, a consultation for feedback session and a meeting to inquire about the involvement of the TTOs and LEO Pharma collaboration constitute a primary data. For the confidentiality reasons, all the participants were anonymized.

4.2.5.Other research approaches

For the research project, qualitative methods have been taken into consideration. However, especially quantitative approaches have been neglected from the very beginning due to the general approach of this method which is improper to the research objective of exploring a phenomenon.
Unstructured interviews have also been dismissed as a proper research tools due to the fact that the research project targets at a certain aspect of the strategic approach of branded pharmaceutical firms on the generic erosion, so it is a key to channel the conversation in order to gain meaningful and rich data.
Another approach of qualitative research method- web questionnaires (web-based, open-ended questionnaires)- was likewise rejected due to many disadvantages, such as; poor worded questions, bad graphic design, technical problems; accessing, saving and sending the questionnaires, program compatibility, self-administration of receiver and inaccessibility of searching or communication with the receiver while responding to the questions (Gaafke, 2013).

4.2.6. Research sample

"Due to its nature, the research sample in qualitative methods tends to be on a small- scale" (Gaafke, 2011). By allowing interviewees to talk to the investigator rather than ticking boxes, an insight into their beliefs and experience is possible. This method might reflect on participant's feelings, subconscious ideas and prejudices which may not be the case when using a structured approach (Smith, 2012). Representatives from various organizations; both public and private, were targeted population for the interviews.

4.2.7. Ethical issues

There are several stakeholders in this study project that contributed to the exploration of the examined problem or phenomenon, which are the participants, the investigator and potentially the body of funding (Smith, 2012).

"The request of information among participants can create pressure and anxiety, but the researcher assumes that participants voluntarily take part in the project when they agreed to that" (Gaafke, 2013). The participants, thus, will have an optimistic approach to the interview sessions and give a constructive contribution if they are ensured that the study project is appropriate and meaningful. To certify census, a declaration was given stating that the data is kept confidential and analyzed thoroughly to each of the member participating in the session.
In addition, participants were notified about the agenda of the interview (the aim and the nature of the research as well as the procedures) *prior* to the meeting and the list of topics the researcher intends to cover was sent to each person. This ensured that the interviewees felt as relaxed and comfortable as possible. Since the project study involved different representatives from the pharmaceutical companies, it is important to emphasize that the interviews did not intend to get to the bottom of participant's morality or their personal opinions and beliefs, but remarkably their perception of the strategic approaches in the pharmaceutical-biomedical industry (Gaafke, 2011 & Gibbs, 2008).
Ethical issues rising from the research project contained avoidance of biased opinions, which ought to be differentiated from the subjective ones. The latter one is linked with the investigator's capability to undertake a project in a proficient method, whereas the former one is based on manipulating and having an influence on the acquired data and is done on purpose. Additionally, the application of the research methods in the project is the investigator's obligation and it is immoral to intentionally select a method that is knowledgeably unsuitable to the topic. Moreover to the previous, the summaries of findings should underline the essence of what was stated, not what the investigator would like to understand (Gibbs, 2008).

4.3. Data collection

Throughout this research report, all data was gathered entirely within qualitative methods using both semi-structured open-ended individual interviews and a focus group. They were recorded and in-depth notes were taken during the course of each meeting; the summary of each interview can be seen in appendix. The interviews were not transcribed, but summarized instead, what resulted in time efficiency when conducting this project. The recorded audio file is attached to this research project in a form of a memory card.

4.4. Data processing

According to Kumar, there is a framework that shows steps of data processing that should be taken into consideration (Kumar and Phrommathed, 2015). The framework was altered and the adaption can be seen in the second table on the next page.
In order to exclude or minimize any possible errors or incompleteness, the obtained data and materials from the interviews needed to be revised after the research project. A viable step in this part was to check the

recorded files for any problems, like forgotten recorded replies and any discrepancy resulting from the interviews.

To solve these problems, the researcher either recalled participant's responses or contacted the participants again for the verification of the data. The raw data was then analyzed and the way of data presentation was chosen. It is the researcher who is responsible for an understanding of current link between diverse variables and making sense of them in order to realize the research objectives.

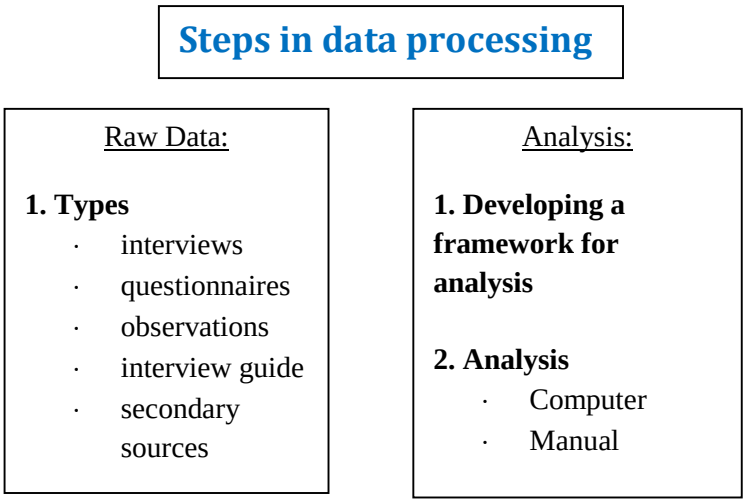

Figure 10 Steps in data processing- adapted from (Kumar and Phrommathed, 2015)

As can be seen, once the data is obtained via different ways of empirics' gathering, an analysis is made with a vital step of a conceptual framework development. The analysis can be made either manually or electronically; the first approach was used in this research study.

4.5.Limitations

Main disadvantages and risk factors that may impact the research project have been mentioned in previous sections of this chapter 4.2d and e. Likewise ethical issues have been outlined in chapter 4.2g.

Yet, there are numerous of minor factors on each process that have not been mentioned. These issues may have a considerable negative impact on the research study if are not taken into consideration.

When preparing an interview guide and an agenda for the semi-structure open-ended interviews, it is of high importance to formulate the questions carefully, as some of the same words might have different meanings to different individuals. The investigator has to be acquainted with the language the interviewees use, so to communicate with them on an equal level. Unless this happens, the possibility of misinterpretation or misunderstanding may be a raising threat that can sabotage the authority of the research. In addition, as both the researcher and the participants speak English as a second language, there is a risk factor of verbal communication.

When the interviews are carried out, it is very important that the investigator is attentive both toward the body language of participants and its own, because this may have a great impact on the research situation, and in turn, the achieved results.

Another limitation of the research was the time devoted for the interviews to be carried out. For each interviews, 20-minute slot was signed. This time constrain can result in a stressful atmosphere from both parties' side and the risk that the investigator will not be able to cover all the topics from the agenda. The participants can feel answer- limited and consequently not being able to reply as freely as they wish to.

Moreover, there is a possibility that participants having different role within the organization will likewise have different knowledge on the specific topics. Yet, it was the researcher's aim to have asked the same questions to the audience in order to enhance the data analysis comparison and not having influence on the interviewees' responses, so that the audience is not biased by the researcher's agenda.

Finally, organizations' websites are considered to be firm's "propagandas", which usually include inclined information, so they are not the most reliable sources of information.

5. Gathered Data

The research data was gathered throughout the period of two months and was collected either via mail or skype. The primary data includes both the interviews and a focus group. In addition, in order to explore the suggestions of contributors, the sources of empirical data were increased and so two additional meetings were conducted, however, they had feedback purposes and did not aim at market analysis.

5.1. Naming

For the purposes of this project, potential *customers* willing to join the collaboration with LEO Pharma Open Innovation will be called participants. Other naming took into consideration at the beginning of the project work was: customers, stakeholders and submitter. However, since this initiative provides a solution within a very narrow and specific field of pharmaceutical industry, entities that decide to join are mostly scientists or scientific organizations and hence the word *customers* does not seem appropriate. In addition, a word *stakeholder* is very wide and may have misleading effects so it is not specific enough; e.g. there may be a lot of stakeholders within an organization and not all of them may necessarily be involved in the partnership with LEO Pharma. Finally, *submitters* was likewise rejected because there might be a potential participant, however, not submitting any application on LEO Pharma's OI website, hence not submitters *per si.*

5.2.Participants

As it can be seen in Table 3, the participants come from various organizations, both public and private, and when it comes to the geographical criteria, the respondents are from different parts of the world.

Table 1 Contributors taking part in the research project.

No	Name	Institution	Position	Date of session	Interview method
1	Dr. A	Red Glead in Medicon Village, Lund- Sweden	Executive Vice President; Red Glead Discovery	27-03-2015	Mail
2	Dr. B	College of Life Sciences- University of Dundee, Dundee, Scotland- UK	Reader in Chemical and Structural Biology	30-03-2015	Skype-recorded
3	Dr. C	Research & Knowledge Exchange Services, University of Strathclyde, Glasgow, Scotland-UK	Strategic Research & Knowledge Development Manager	10-04-2015	Mail
4	Dr. D	Zealand Pharma- External Innovation and New Opportunities	Senior Scientist- Evaluation Manager	14-04-2015	Mail
5	Prof. E	Technical University of Denmark- Faculty of Chemistry	Professor; Researcher	14-04-2015	Face-to-face-recorded
6	Dr. F	Eli Lilly	Open Innovation Drug Discovery Director	01-04-2015 & 16-04-2015	Teleconference-recorded and mail
7	Dr. G	LEO Pharma- NME Ideation	Principal Scientist	17-04-2015	Face-to-face-recorded
8	Dr. H	LEO Pharma- NME Ideation	Scientist		
9	Dr. I	LEO Pharma- NME Ideation	Scientist		
10	Dr. J	LEO Pharma- Front End Innovation	Director	23-04-2015	Face-to-face-notes gathered, not recorded
11	Dr. K	LEO Pharma- R&D Pipeline Sourcing	Business Development Manager	30-04-2015	Face-to-face-notes gathered, not recorded
12	Prof. L	The Scripps Research Institute, Skaggs Institute for Chemical Biology	Professor; Researcher (Organic Chemistry)	22-05-2015	Mail

5.2.1. Research data

The interview guide is found in appendix on page 59. Since most of the interviews with contributors were conducted simultaneously with another internee- Hamza Al Deiri, the interview guide likewise has questions from both researchers. This facilitated faster responses from the interviewees' site.

Also, since the researcher considered that an interview via teleconference would be valid for the progression of this research project, the contact with OIDD director was established. Yet, since the contribution was intended to progress the understanding of OIDD launch, as Eli Lilly is known to be a pioneer in open innovation, the interview questions differ from the one addressed in the interview guide. The questions are found in appendix on p. **Error! Bookmark not defined.**. Not all the questions were covered during the initial teleconference, hence the follow-up was necessary. The teleconference transformed in a talk about OIDD in general, in addition since the website is rich in the required information it was likewise used for data handling. The second set of questions was sent via mail and was likewise answered through the same method. The interview questions for the focus groups were changed, since the researcher conducted interviews with the internal scientists, so some of the questions were not appropriate for the audience. In addition, sometimes the investigator asked scientists about their previous experience, while they were still working in academia. This allowed for the more unified outcome of the conversation.

5.2.2. Individual Interviews

In this project six interviewees from various organizations participated and each interview was conducted individually hence there were six interviews. Contributors were coming from different institutions; science park (Medicon Village), academia- screening house (College of Life Science- Dundee), university- tech transfer office (University of Strachclyde- Glasgow), academia- faculty of chemistry (Technical University of Denmark), industry- Zealand Pharma (Denmark), which is a biotech company having around 100 employees and finally academia- department of organic chemistry (The Scripps Research Institute at the Skaggs Institute for Chemical Biology, University of California, the USA). The age of the participants is not known, the gender on the other hand, is. There are three females and three males that took part in the interview.

All interviews started off by the introduction of the research, the investigator tried to make the interviewees as comfortable as possible, all the data was gathered and the detailed summaries were made.

All interviewees claimed accordingly that they do indeed have compounds to be profiled and they use external services in order to test them. All of them said that the initial *in vitro* screening is done in house, and then they look for further development externally. In addition, when asked about the obstacles of such way of compound profiling, most stated that the cost is an issue. On the top, the access barrier, IP and legal issues and bureaucracy between the two companies are also seen as problems. Similarly, it has been claimed that a direct discussion with biologists is always a very difficult and hence they would like to find a fast- paced collaborator.

A statement was also given that the OI platform results in a lot of opportunities and is very coveted by researchers, however, the problem is that it is difficult for them to choose a specific organization: "…the challenge for a scientist is WHICH place to send your compounds to!"

Asking about a consideration of using a platform for compounds' profiling outside the native institution with the aim for the collaboration gave consented results, since everybody did consider participation in similar initiative and see a great value of new knowledge sharing about existing assets. The participants stated they are in the planning stage, in which they make compounds' selection and contact the institution of interest via direct e-mail with enquiries. They added that they would like to see the dedication from the OI manager at the company offering such service and would like to retain IP and ownership, rather than giving up ownership in exchange for data.

The answer given to the questions about the advantages the participants see in the external collaborations varied from: intensification of relations with external companies, mutual benefits and new business opportunities through having a company generated data, which is more reliable than the university generated data, to the mutual learning opportunities with a win- win situation as the reciprocal expertise of two institutions result in faster progression of a project. Finally, all in accordance said that "The pharmaceutical companies know what they are doing, they are experts".

Each interviewee provided different answers when asked about the barrier of external collaboration for compounds' testing. Main issue was seen in the lack of trust and the issue that the collaborator would not handle the IP correctly. The responders see a personal dedicated relationship of OI manager as a prerequisite. In addition, the phrases, such as: "Commitment, mutual collaboration, support" were repeated plenty of times. Also, academics say: "…and ensuring that the academia is not to be taken advantage of, but rather results in a reciprocal discussion with the aim for the clinical development and further product launch"- Dr. B 09:20. The participants would like the whole initiative to result in a transparency and the rules of collaboration must be likewise transparent. They also expect the company to be more flexible: "It would be good to have a discussion of even negative data, rather than an immediate *no-go* decision". Finally, there is an obstacle seen in the waiting time for MTA. Also, IP management constitutes a barrier, especially at the University site: "Our lawyers always overvalue very early discoveries"- Prof. E 06:01.

A unanimous *No* was made when asked about the trust issue using a digital platform (company's website) for OI.

The interviewees' responses were in accordance when a question regarding the type of set-up for testing externally would be attractive to them. The respondents claim they would like to have reliable and robust data with the possibility for publication. They would also like the agreement to be easily given so that the start of collaboration would be fast and the awaiting time for the results not long. An academic professor added that IP protection and confidentiality need to be there, so the collaboration would be trustworthy: "It would be very good if LEO could get upfront agreements- MTAs with our legal department, then I wouldn't need to explain

our lawyers the reason every time I would like to send the compound for testing, and also my colleagues wouldn't need to do that because it will be already there"- Prof. E 08:50.

Asking more specifically about the kind of data participants would need to obtain to move their research forward gave complied responses. The interviewees would need convincing data (both *in vitro* and *in vivo*) with a strong scientific value and good IP situation, so there would be investment and patentability opportunity: "It would be very beneficial to have somebody from LEO OI environment to discuss the investment opportunity"- Prof. E 11:35.

When the contributors were asked about the benefits they expect from the external collaboration, the responses were undivided. They would like to see that there is an interest to follow-up if data looks prospective and there are already resources gathered to start business dealings. Also, they would like to see the opportunity to engage in the development and get subsequent return via royalties and milestone payments. The academics also added that the possibility to publish would be very important since the master's students or PhD need to publish their theses. Everybody contented that a mutual trust and commitment have to be there in order to drive the project forward: "I am looking for a real deal, so my compounds have a chance to eventually reach the market".

Finally, when the contributors were asked about the losses they are ready to *sacrifice*, the obtained responses differed between academia and industry. Academics claimed that time is what they sacrifice and this is the most important cost in academia: "The University sacrifices costs all the time by doing under- paid work, particularly academic time". The industry representatives said that they are ready to sacrifice the collaboration by the in- kind contribution and the cost has already occurred. In addition, the representative from the biotech company added: "Our company values collaborations very high and we are ready to invest resources, expertise and money in right collaborations". Also, an exclusive type of licensing was what participants pointed out; however, they added that a spin- out with LEO or join venture would be more attractive to them.

5.2.3. Focus group

When most of the interviews were conducted over a period of four weeks, participation generally declined, which was the reason for additional interviews with the participants in a form of the focus group and this also allowed for the group dynamics. The focus group was used as an opportunity to use the methodological approach of triangulation in an attempt to find out whether the findings of the focus groups correspond to a certain degree with the individual interviews or whether they contradict to each other.

For this reason the general agenda for the focus group was taken from the interviews, however, some questions were added and some taken, in order to stimulate similar conversations and produce comparable answers.

All three participants were males belonging to the age group of 38-40. Their fields of expertise covered primarily pharmacology studies; they were also experienced in participating in collaboration while working in academia. All participants work in the New Molecular Entity Ideation Department at LEO Pharma.

The findings show that there are overall great similarities given between the focus group and the individual interviews. Everybody accordingly considers the Open Platform as something of great value. The participants add that the offering would be a great selling point if the OI of LEO Pharma was indeed with "no strings attached" and hence this fact should be highlighted "But you know there is always a trust issue between the company and an academia, so if you can make a clear statement: We test it for free without knowing what your compound is and you remain full ownership- it would be as clean as it gets!"- 11:43. The participants add that they were familiar with such initiative, because it was previously introduced by Eli Lilly.

Asked about any previous experience of the external collaboration, the participants claimed that they did indeed take part in, but it was basically a case of out-licensing the compound to the company, so even though they were generally satisfied with the relation, it had rather a nature of a typical commercial service, or transaction. A statement popped out, that in general when comparing both the US and Swedish markets, the latter is much more reluctant when it comes to the collaboration between academia and industry and hence do not welcome companies on the same level as the USA.

One of the participants added that he did not have the best memories from the collaboration with a company back when he was an academic, since the company used the results for publication without even letting the interested bodies know about it and he supplemented: "And therefore LEO needs to make it clear that there is a full confidentiality in such collaboration"- 17:50.

Then, the researcher asked about the benefits for LEO Pharma in the collaboration with SMEs or other companies. The participants accordingly agreed that the biggest value would be seen in the access to the platforms and compounds that are not available to the company otherwise. Especially platforms in the medicinal chemistry and screening, since they are costly and only a very specific group of researcher would have it. Also, they see a benefit of hiring special group of scientists for a specific project, so hiring experts in the particular field of discovery.

Asking about the benefits for LEO Pharma in the collaboration with academia, participants claimed that the access to the most novel approaches, technologies and discoveries would be the biggest benefit. One of the scientists added that the great impact on LEO Pharma's perception outside, would be the fact to have the best people working with LEO: "If you want to sell the technology, it will do a great difference to say that you work with this or that person, who is well- known in the scientific environment, so you know you gain your credibility and it is a selling point, so whatever you work on sounds sexy"- 22:50.

Same as in the interviewees, none of the participants had any trust issue with the fact that the OI Platform is offered on- line.

Lastly, the participants were asked about the costs they were ready to *pay* while being involved in the collaboration when they worked in academia; everybody accordingly replied that they devoted their time, and in return they wanted to get good quality data, in order for further data handling, grant's application and publication.

5.2.4. Teleconference

This interview had guiding purposes, since it was conducted with Open Innovation Drug Discovery director of Eli Lilly and Company, which is the first company to offer open innovation platform in a pharmaceutical industry and hence the researcher decided to treat the opportunity of a teleconference as a learning process in understanding the concept.

The interviewee, as previously mentioned, is an OIDD director, who holds a PhD degree in organic chemistry from Indiana University Bloomington and have been working for Lilly since 1997 and became OIDD director in 2012.

When asked about the communications patterns and marketing actions Eli Lilly did when introducing the program on- line in 2009, a suggestion was made to compare the current website with the one that will be shortly introduced. The main concern was that the information on the website might have been overwhelming for the participants and in order to investigate the satisfaction from using the website, a survey was made and so the participants' feedback was investigated: "Our current website is overwhelmed with the information and is not clear enough. The new website will be more transparent and easier to navigate and the additional information one wishes to find will be found in the whitepapers, and not on the main website, which makes it a clearer and more transparent platform"- 03:57. The participant added that one can never use any form of advertising, since any signs of commercialization are considered derogatively by scientists. The interviewee pinpoints the importance of communication pattern using OIDD website, since "it is the basic remark for communication and our ability to reach the crowd, particularly all round the world; i.e. a lot of research centers that are not in Europe or in the US"- 02:22. Finally the importance of the website, which represents the whole initiative of OIDD was identified to the following criteria: it needs to be attractive (for scientists), easy to navigate, cannot look commercial and most essentially needs to be scientifically legitimate, so needs to indicate that it is a *real deal*.

The marketing strategy is comprised of the involvement of the Ambassador Program, and hence the training of the staff is of key value, since the internal networking is used actively in order to leverage the marketing of OIDD and so the Eli Lilly's employees are educated inside the company and spread the word about the platform within their affiliations.

When asked about the proactive marketing before the launch of the platform on- line, an answer was given that actually the website was created after the open innovation initiative, and the marketing used to promote the offering was a direct marketing promoting it on the scientific conferences, poster presentation, research congresses and in addition, to enhance the message signaling, the networking with four "big" universities was used and so the fact that Eli Lilly collaborated with such institutions aided the significance and the authority of the inventiveness. That said an interesting fact is that word-of-mouth took a primary role in the marketing and then a website was used as a tool to support it. This resulted in: "We started with four institutions- then to

biotech industry, media and then it went viral, and so no active marketing was necessary in 2010, in 2011 we reached critical mass…"- 13:10.

Another important finding is the fact that in order to ensure support and help, the company devoted resources to create a supporting group (on call and mail), which is ready to answer any queries coming from potential participants: "Because you know, you cannot market something and then go away, once you are in, you are in for good!"- 23:10. In addition, the OIDD team is comprised of members, who are scientists themselves, and hence have clear understanding of research- based queries and may engage in a scientific discussion.

Asking about the trust maintenance between the participants, the answer was given that due to the fact that the participants are scientists and hence are "special" group of people; they need to be treated differently than "normal" participants. In addition, they need to feel supported throughout the whole process of collaboration, there needs to be assurance that both parties share a common language- language of science, and inaugurate a joint understanding: "Scientists wanna talk about science, so we talk science, scientists do not want to talk about transaction"- 22:30.

The interviewee also talked about the biggest barrier in the OIDD implementation. Since the offering was very novel and thus has not been offered by any other pharmaceutical unit, it was very challenging to make a legal agreement good enough to fulfill expectations of all the participants. In order to overcome this, a networking with the "big" universities was used, so the agreements were made based on the consulting. In addition, the interviewee added: "We had to build this up so to gain institution's trust so they are not reluctant to the platform and afraid that we take their stuff and go forward without them"- 27:40.

Also, since this master's report touches upon the customer's segmentation, the investigator's interest was to examine what the customer segments of Eli Lilly are. The answer was given that it is certainly important to realize who your crowd is. OIDD has identified two segments: academia and industry, and out of this each segment has two groups: administrators and scientists, hence there are: academia: academic's administrators and scientists and industry: industry's administrators and scientists. The statement was given that due to the formality and bureaucracy, generally it is easier to talk to industrial's administrators in small biotech companies since the scientists are the administrators in the same time.

Asking the question about providing trust and comfort for the participants, the following was mentioned: "Patience! You need to listen to them, you need to be there and you need to be there for them. Scientists respect scientific excellence and you need to be present in the discussion all the time!"- 35:45. The OIDD diretor added that if there is a transparency in the context of the scientific value, the trust will ultimately grow, but one needs to be aware that the trust will grow over long period of time, not quickly and suddenly.

Finally, it was emphasized that the responsiveness to customers need to be provided to everybody on the equal level, so the inquiry of an entity without promising result shall be treated the same way as one, which may result in a profitable collaboration.

5.2.5. Feedback session

The meeting was held with Front End Innovation director in LEO Pharma and had the aim to get the feedback and comments on the data analysis based on the interviews and focus groups with the intension to marketing of the Open Innovation Platform LEO Pharma.

The first comment made was to underline the potential challenges in OI platform launch and what one could do to weaken that. Also, the implications of the Tech Transfer Offices (TTOs) for the marketing purposes of LEO's service seemed to be of interest, since this was already brought up by one of the contributors on the focus group. In addition, the commenter mentioned that it may not be entirely clear for the audience of what the steps of the collaboration in an open innovation are and what the pre-competitive stage actually is. That said a suggestion was made that it would be very useful to make a short video of the initiative explaining the steps of such participation, so it could basically look like an instruction of how to use it.

It was also brought up to the attention that considering the selling part of the platform, it would be a good idea to emphasize that LEO Pharma as a company is fully owned by the foundation and hence the capital is re-invested inside the company. So all the resources will be invested for the sake of the research progression and focused on science improvement, which has the most important value for the participants.

In addition, the debate was made that it needs to be well known that LEO Pharma is a business focused company and its core competency is within the dermatology treatment, so it cannot afford the possibility to accept "everything", this fact needs to be a selection criteria, so the audience is not confused about who actually can join; this should be clearly indicated.

Finally, the contributor mentioned that it would be very *attractive* to have a reference point that can be associated with a collaboration done in the past with a well- known and acknowledged institution or entity: "This is a reference point showing that LEO did indeed engage with a *big fish* before, so if you can prove that; LEO gains sincerity in the science world". An example of such collaboration was given.

The commenter also agreed with the interviewees' responses that it is of essential importance to highlight that LEO strives on long- term scientific mutual relationship, where scientific discussion will take place on daily basis and which will result in the common commitment and engagement.

5.2.6. Inquiry about the Tech Transfer Offices and LEO Pharma

The meeting was used to talk about the involvement of TTOs in the potential commercial partnerships with LEO Pharma and essentially the frequency of acquiring discoveries from universities by the company. This very topic was already brought up by one of the interviewees, participants of the focus group and a commenter and thus it was a researcher's interest to investigate it in more depth.

The session started off by the given statement that TTOs-LEO meetings usually take place on speed dating and partnering meetings and one of examples can be: Bio-Europe. The institutions meet and engage in conversations where different universities' discoveries are reviewed. However, what was brought to the researcher's consideration is the fact that there have not been many business engagements done between TTOs and LEO: "The problem with the TTOs is that they don't really know what they offer, they tell you: This is what we have, if you are interested take it, if not then don't". Taking into account this, it may be assumed that it may not make much sense of treating TTOs as potential participants; however, they might still be very useful in the communication part of the marketing strategy. Since they are connected to all the research units and labs universities have; TTOs may fulfill a role of an interface, or medium by sending signals to scientists and researchers in various study units that such service as OI exists: "This would be a big incentive for LEO and will also constitute a channel to communicate with the research centers around the universities that are in contact with TTOs".

The meeting was summarized by the following sentence: "the relationship between the TTOs and LEO would be to provide the information about the OI platform, not necessarily the collaboration".

6. Analysis

Based on gathered data from both primary and secondary sources there are several implications regarding the research aim of introducing a concept for using marketing strategically to implement a communication pattern within customer's segments that have to be analyzed. The analysis will aim to explore and investigate the factors that enable or inhibit marketing strategy when introducing LEO Pharma Open Innovation platform.

Throughout the focus groups and individual interviews with participants it has become apparent that external collaborations are perceived as very valuable ventures, therefore the open innovation in drug discovery approach seems to be very useful and is regarded as a very advantageous offering in the eyes of scientists. They accordingly agreed that openness will result in advantages of having the best people working for the company and having access to the most novel technologies or compounds. When it comes to the industry collaboration, LEO Pharma benefits by getting access to the platforms that are expensive and inaccessible. When it comes to the academic collaboration, however, the company benefits by getting access to the novel and innovative technologies and discoveries that are only done by the public research institutions- universities. This brings back the well-recognized sentence: "There are a lot of smart people out there, but most of them don't work for you" (Chesbrough, 2003), which was introduced in the theoretical framework. The concept of open innovation is indirectly linked to the absorptive capacity thought, since the realization of the necessity to open up and absorb external talents and resources took place as after all LEO Pharma has indeed launched Open Innovation Platform.

One of the considerations is that participants mentioned about issues regarding law- IP and fear of having collaboration on an unequal level, and hence unshared collaboration, which leads to apprehension of one party taking advantage of another. The so called moral hazard issue, outlined in the theoretical foundation, may constitute a big problem in partnership, especially when the agreement is made around a sensitive area such as IP. In addition, since the offering of Open Innovation by LEO Pharma is new and hence the audience is not familiar with the concept, an explanation must be given of what it is. Consequently, the trust needs to be raised in order to attract participants since it is the key in any marketing relationship. Both of these conclusions are in accordance to the concepts outlined in the third chapter.

Once a trust is recognized, reputation will come as a consequence of the former one. That said affiliation with a researcher respected all around the world within science world is actually the best point of reputation and credibility awareness. An example may be given of LEO Pharma's partnership with The Scripps Research Institute supervised by Phil S. Baran, a well-known scientists specializing in the organic chemistry working next to Nobel Prize Laureate- Elias James Corey. The experience from the collaboration was summarized by Baran in the following sentence: "…the team at LEO Pharma led by Jakob Felding has continuously supported and guided the synthesis strategies, and further provided critical advice for the types of structures that would

benefit for analog synthesis…which is the subject of two separate patent filings" (Quentin et al. 2015). This indicates that the trust was raised through collaboration with organization and ultimately led to LEO Pharma's reputation enhancement. A relative unknown brand such as LEO Pharma could benefit from exemplifying capabilities by working with an acknowledged entity, which will in turn promote Open Innovation platform.

The branding concept is in accordance to the gathered data based on Eli Lilly's interview. The company made it clear that it is important to be associated with well- known institutions or individuals, so the likelihood of more people joining is tremendously higher and *igitur* the trust and reputation play such a pivotal role. What critically contributed to raising awareness of OIDD, were scientific conferences, congresses and meetings where promotion and clarification of the initiative took place.

Since it may not be entirely clear of what OI platform of LEO Pharma truly is, it is very important to communicate about its benefits to the participants. Based on empirics, it seems that spreading the word about the initiative and also communicating about *this disruptive innovation* in a clear manner will ultimately enhance its usefulness. Ideally this should be done on the scientific conferences or poster presentations, so basically conducting word-of-mouth marketing, where scientific cluster is gathered; in addition, it can be concluded that the conferences should be strictly about science, not about trends or (open) innovation in the life sciences, since "open innovation" does not trigger scientists. The data also indicate that the potential participants would like to see an engagement for follow-up and the resources to start initial business interaction. They would like to participate throughout the whole process of development and benefit via the milestone and royalties payments.

When it comes to the platform offered on-line, the website needs to assure that the program is of scientific initiative and hence cannot include any advertising or commercial parts. Once the critical mass is established, the website is everything; it is after all the place from where the audience gets needed information. Since the needs of participants are of key importance, the offering has to fulfill these expectations and hence the marketing should be done in a myopic approach. This will subsequently show LEO Pharma's commitment towards the environment of scientists.

6.1. Customer's segmentation

Initially there were five groups of segment identified by LEO Pharma that took part in this research project. These are representatives from: a science park, a screening house as part of University, a Tech Transfer Office, Chemical Departments of universities, a biotech company (size~ 100 employees). Throughout the thesis progression and based on the responses obtained by the participants, it can be clearly seen that the initial assumption of five "customer segments" needs to be undermined. Most of the replies are in accordance to each other having only few differentiated answers, mainly when asked about the concerns in external collaboration in an open manner, *sacrifices* participants are ready to devote and *benefits* they are looking for when partnering

up. Hereafter, the initial five "segments" actually constitute two segments, which are academia and industry, respectively. This finding is confirmed with the customer segmentation identified by Eli Lilly.

As expected, the academics strive in the direction of publication, whereas the industrial participants in commercial direction. The academics are ready to enter the collaboration and devote their time as one of the most important resources at the university's site, whereas the industrials claim that the in- kind collaboration and internal capabilities is something they may dedicate.

On this basis a business model Canvas introduced in the theoretical foundation section will be analyzed and two value propositions will be created for these two segments. Henceforward, the researcher intends to provide the most attractive and *vocal* value proposition targeting scientists in both academia and industry. In addition, even though there are so called administrators involved in the decision making within the organization, the offering is of such unique value that it requires scientific understanding and thus it can be observed that all of the participants are familiar, if not experts, with different life- science areas. The question might pop out whether scientists can still fulfill the role of administrators in these two segments, but this is indeed what is required in the pharmaceutical industry, and so all the participants and scientists fulfilling the roles of administrators have built business education on the top of their life-science one. It was seen that this particular industry requires people, who can act as an interface between business and the R&D.

6.1.1. CANVAS model: Value Proposition ↔ Customer Segments

The below illustration, introduced in the chapter number three, shows the inter link between the Value Proposition and Customer Segments. Thus it enhances the design of the value proposition, which is based on the different types of the customer. The message may, therefore, be more specific and clear because appropriate offering will be sent to the specific group of receivers.

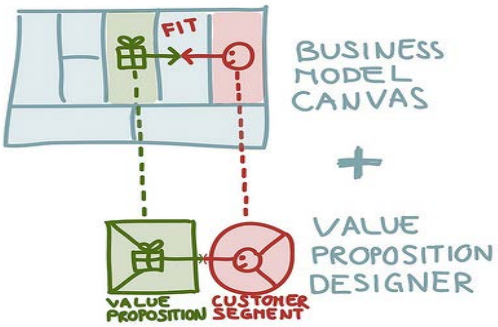

Figure 11 Fit between the VP and CS- reproduced from (Osterwalder and Pigneur, 2010)

Before the value proposition will be made, the offering of LEO Pharma Open Innovation Platform will be mentioned again, as to remind the reader of the service the company has just recently launched.

The OI platform offers:

- *in vitro* assays for the compounds' screening
- free of charge
- compound structure is not known to LEO Pharma (IP secured)
- ownership retained (by the participants)
- confidentiality between the participant and LEO Pharma
- data returned to the participant, who is free to publish, or use otherwise
- no legal binding
- no business limitation
- further collaboration possibility via licensing, joint venture or other type of agreement

The collaboration also assures the following:

- interactive relationship that will result in a scientific dialogue; participants get actively involved throughout the whole collaboration time
- focus on the dermatology treatment- idea applied in dermatology
- feedback from LEO Pharma about the data indicating possible way forward

Based on the above explanation about customer segmentation obtained after the participants' feedback, it can be concluded that the academics' primary interest is the commitment in the scientific discussion and the learning process of the pharmaceutical drug development process from the experts in the field, therefore the researcher decided to word an alternative value proposition, which will explicitly target this crowd:

We offer you the Open Innovation Platform to enhance your knowledge of drug discovery with the aim of the collaboration where the chief aspect is the value of the research advancement and where you can explore and test your hypotheses, which is free of charge and without giving up your IP rights.

Likewise, the value proposition for the industry was expressed and since the industry's expectations differ from the ones of academia so is its value proposition:

We offer you the Open Innovation Platform to explore your compounds and possibly bring them all the way to the market with the aim to impact well-being of patients with skin conditions, which is free of charge and without giving up your IP rights.

Both of the value propositions will result in the identification and the solution of common drug development challenges with the end goals of improving the quality of scientific data and intend to result in collaborations, however, the first one has a science-angle sound, whereas the latter one a commercial sound.

6.2.Marketing strategy for Open Innovation Platform at LEO Pharma

Throughout the research study there are several recommendations gathered either based on the results from the empirical studies or on the comments and feedback from LEO Pharma's employees, which constitute a marketing strategy for OI platform.

One of the main recommendations gathered throughout the work progression was that the promotion of the Open Innovation Platform in the early drug discovery needs to be perceived as a scientific initiative and cannot therefore include any signs of selling and commercial advertising: "The worst thing you can do is to sell it"…"I think then it would be dead before it even started!"

Also, it seems to be of great importance to promote such offering on the scientific conferences and presentations, so basically where the most condensed gathering of scientists take place. Hence, LEO Pharma needs to direct the critical mass through the communication channels used by scientists. Too, when it comes to the academia, Tech Transfer Offices may play a helpful role, so LEO Pharma shall communicate and signal such inventiveness to TTOs, with which it is in constant contact, and just then TTOs could fulfill the role of an interface to spread it further to research units at the universities' campuses.

What could also increase the external perception of LEO Pharma as a company is to reference it to publications and previous collaborations with accredited authors. Sometimes all it takes is to have the company's name mentioned in the "acknowledgements". This could greatly add to the reputation of the company without any actual branding *per si*. Consequently, spreading the massage via word-of-mouth will prominently contribute to raising awareness of Open Innovation platform externally.

The dedicated relationship of LEO Pharma must be ensured throughout the whole collaboration time since when it comes to making any human interaction, the experience from the collaboration is much more important than the obtained result of the compound's screening. This has to do with being responsive to the queries coming from all around. The company needs to be ready to increase its resources in the Open Innovation Department. Once the machine starts rounding, and participants start sending mails, an automated reply should be created saying i.e. *Thank you for your interest in Open Innovation LEO Pharma. We received your e-mail and will get back to you within next 72 hours...*In general, it is considered highly unprofessional not to answer mail within this period of time, so LEO needs to make its best and response to every single e-mail, since once there is a dissatisfied participant, all the resources put into OI communication and marketing will go down the drain, "because bad rep spreads much quicker than a good one". That said the questions coming from various groups of participants need to be equally important to the company and so every participant has to be treated on the same level, so LEO Pharma as the company should spend its time and resources no matter whether there is a general query about research or whether there is an intention for any business bond. This is of high importance since scientists need to feel supported and encouraged to solve problems so their creative mindset is stimulated.

Another essential factor that LEO Pharma should consider is creating a position, which will bridge the gap between the communication department and R&D. A discrepancy between these two departments have been noticed and there is a necessity for a person with a thorough understanding of what happens in the R&D and who can translate it into business opportunities and communicate it in a simplified manner.

Since the Open Innovation LEO Pharma website is a point of a reference, from where the participants seek the necessary information, it needs to be transparent, clear and not of commercial sound. In addition, it would be a good idea to provide a link to a specific group of seekers and hence specific information with value proposition could be seen, so there will be a link between value proposition and customer segments, just like as indicated in the business model CANVAS. Since every "customer" wants to be treated differently and in a special way, the sub- division with a link would assure that sense; so there can be five clusters of clientele, and according to their needs, the hyperlink will direct them to a specific segment, e.g. cluster A, B and C will be directed to Academia, whereas cluster D and E to Industry. Based on that, the number of hits or visits will be visible to LEO Pharma and so the frequency and proportion of the clusters will be known to the OI manager.

The problem in any collaboration between two entities, no matter whether they are companies, company-academia or academia- academia, is a legal part, which usually centers on the sensitive areas around the IP. Therefore, in order to reduce it as much as possible; LEO Pharma should prepare some legal documents with the administration part of the collaborator in advance, so they would already be familiar with the deal and all its assurances, i.e. to formulate a generic MTA that can be addressed to different entities. This will be very time efficient, since the MTA will be already there and so the collaboration may take place and in fact *happen*.

It seems to be vague what the "pre-competitive" stage of the collaboration really is, hence the figure implemented on the website[xvi] shall be also included in the poster when the OI is presented. What would ease that understanding is the short video explaining the rules of OI, which will act as an instruction and will again result in time saving for the participants.

Finally, factors as testing compounds for free without knowing the compounds structure and without giving up the ownership with full confidentiality are the best selling points and thus need to be stated as clearly, directly and unambiguously as possible. The commitment message should also contain the assurance of a mutual engagement, trustworthiness and transparency in the joint partnership.

The participants need to be aware that once a pre-competitive step is obtained, the relationship will acquire a *quid pro quo* manner.

6.2.1. Competitive gain

Based on the data, it can be seen that it is important for the participants that the Open Innovation Platform offered by LEO Pharma is *transparent*. The service offers new ways of compounds' screening and hence it is already a *novel* approach itself, however, it also needs to ensure the procedure to be relatively *fast* and offer the service in an *efficient* manner. In addition, from the moment of the service launch, the company needs to

ensure to answer potential participants' queries and hence be *responsive to the customers.* What's of the essential significance, the sole service is not enough as the OI platform will be focused on the interactions between the company and the participants. Thus, the company must ensure the *trustworthy and committed relationship*. Even though the initial collaboration may not result in profitable opportunities, the reputation of the company via OI will be enhanced, which will significantly contribute to raising awareness and attraction of the whole initiative, and will ultimately underline the competitive advantage of OI LEO Pharma, since "in a quickly changing and uncertain world, innovation is the key to competitive advantage" (Reeves and Deimler, 2011).

6.3. Thoughts considering qualitative research study

As the nature of this study was explorative, there are several limitations to the research design. Because of the fact that this research aimed to *explore and understand factors that enable or inhibit marketing strategy from a communication perspective when introducing a disruptive innovation on the market* a qualitative approach seemed to be necessary. Thus, the interview guides were provided in order to gain in-depth knowledge of the topic of interest, where no quantifiable data could be made for further analysis purposes.

Moreover, the scale of this research was very small therefore the representative status may be restricted. However, the primary data showed a great similarity in the responses obtained, which makes the empirics rather trustworthy source of information.

There may be a limitation factor resulting from the researcher's subjectivity, which ultimately has an impact on the consistency of the research outcomes, as the core of this master's thesis is based on assumptions. Due to the selection of the ontological and epistemological view point over the choice criteria in the sample method and population and further to the study method are all assumptions based on subjective interpretation of the researcher. Trying to be objective and not giving away personal opinion during the interviews proved more difficult than expected.

As previously mentioned, the case approach of interviews and a focus group may also result in restriction, because of the verbal barriers, time constrains and complex topics, the researcher may interpret the answer in different way as intended. Nonetheless, as this research project aims to explore the phenomenon best described by experts from the industry, it seemed of high importance to interact directly with the participants as this impacts the quality of the outcomes attained. The interviews provide information in more depth than the questionnaires, and in the case of something being ambiguous it is possible to contact the participants and verify it.

The experience derived after conducting this study proves that a personal relationship among the investigator and the contributors is central for the understanding of an explorative research. Moreover, a bilateral communication gave the investigator the possibility to emphasize how important the participants' contribution toward the research study is, which more likely affects the drive and enthusiasm to take part in the study. In

addition, as questionnaires are thought not to be as reliable source of information as interviews, they were rejected. The embodiment of the data analysis results from the individual interviews and a focus group, which had a case study approach.

Conclusion

In media res, throughout the analysis of the factors that enable or inhibit communication strategy when introducing a disruptive innovation on the market, it can be seen that in general when one wishes to market science, it comes with numerous difficulties with the initial one of interacting with *the most skeptical audience.* Likewise, as was primarily assumed, the biggest obstacle in the external collaborations seen by the participants is focused on the IP and *know- how*. This leads to the fear that "a small biotech company" to be taken advantage of. Still, based on the data analysis of the development of innovation strategies, a conclusion can be made that *openness* is indispensable in order to stay competitive in the era of Open Innovation. Also, it is observed that *open innovation* has different meanings to different audience; numerous examples given at the beginning of this thesis report pinpoints that i.e. various pharmaceutical units perform open innovation in a different way.

The analysis also indicates that the R&D issue in the pharmaceutical companies may be improved, once the firms start incorporating an open innovation system, because as once said "wealth of knowledgeable people distributed around the globe with the potential expertise to address them is impossible for any individual company to hire", hence only by sharing companies internal capabilities with the external, the competitive gain may be assured.

This study research recognizes the appropriate marketing strategy to leverage technology and signal it to the specific audience. From the research it can be concluded that there are two segments, which undermined the initial hypothesis of customer segmentation identified by LEO Pharma. This results in two value propositions targeting academia and industry, which fulfill needs of five clusters with then assumed different priorities.

So far there has been no research on the interdependence of factors that influence the marketing strategy in order to leverage the communication of open innovation platform for drug discovery and the subsequent implication resulting from the disruptive innovation launch in combination with empirical data, which has made this research unique.

All in all, it seems a suitable approach to invest in resources concerning education and communication, which are directly linked to the so called market pro-activeness. That awareness building amongst both innovators and early adopters shall be predominantly highlighted in the market creation, as "If you give people good enough 'Why', they will always figure out 'How'" – Jordan Belfort. This will enhance the credibility and reputation of the LEO Pharma Open Innovation Platform. It is a key to underline that word-to-mouth cannot be underestimated, as the communication between potential stakeholders usually takes place on conferences, congresses or scientific poster presentations, so basically where science happens and scientific cluster gathers.

7.1. Future Outlook

It is recommended that based on the outcomes concerning the research proposals, further research into this area ought to be carried out to advance an interpretive framework on how open innovation should be

communicated strategically so as to increase awareness, promote and attract the potential participants from a holistic perspective.

As this paper examined limited number of customers, it would be advisory to investigate if this same occurrence takes place on a bigger scale. A consistent and a complete conclusion concerning the open innovation in the pharmaceutical sector in a generalized manner can then be drawn.

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Appendix

The email sent to the participants:

Copenhagen, 24/03/2015

Dear Sir or Madam,

We are Kaya and Hamza; we are MSc. students at Copenhagen Business School currently working on our master's project on an open innovation drug discovery aiming to improve collaboration.

We would like to get an interview with you for approximately 20 minutes.

I hope you can take a moment by reading the attached document, which will greatly help us in our research study development.

Kind Regards,

Kaya & Hamza

Attachment:

1. What kind of sources do you rely on when you look to conduct your business/ scientific information?

2. What kind of social media do you use privately?

3. What kind of social media do you use in business/ science?

4. What kind of digital info attracts you to dig deeper?

5. What digital community/ forum, do you consider it valuable?

6. What kind of information has to be provided, in order for you to conceder dealing with X company?

7. What form of online advertising do you prefer?

8. Which website's features grab the attention as a scientist?

9. Do you think it is an opportunity if there is such a system as Open Innovation for Drug Discovery, where you can test your compounds for free without the structure or the IP disclosure where you remain full ownership of the compound?

a) If "Yes"- what is the value you see in it?

b) If "No" - what is needed to see it is valuable?

10. Do you have compounds that you develop internally? How do you test those:

a) Internally?

b) Externally?

11. What are the main obstacles in such way of compound profiling?

12. Have you ever considered using a platform for compound testing by sending your compound outside your institution to a company with the aim for a potential collaboration?

a) If "Yes"- what have you done to investigate that? What kind of set-up (model) was it? What worked well and what didn't work? What is the value of doing that?

b) If "No"- what would you make it say YES? What would you like to see.

13. What advantages from collaborating externally with companies in order to focus on pre-clinical drug development do you see and which ones are important for you?

14. What would stand in a way between you and testing your compounds externally? What could be done better for external collaboration?

15. Would you have a trust issue using a digital platform for the OIDD? Why?

16. What kind of set-up for testing external compounds will make it attractive to you?

17. What kind of data would you need to obtain to move your research forward both scientifically and business- wise?

18. If you were about to enter a partnership with a pharmaceutical company, what would you like to expect back? (Benefits?)

19. What “costs” are you ready to “sacrifice” in order to enter into collaboration for the drug development?

Obtained data:

Dr A- Executive Vice President- Medicon Village; Sweden

1. Do you have compounds that you develop internally? How do you test those?
   a) internally- *In vitro screening assays, in vivo pharmacokinetic and efficacy models*
   b) externally- *In vitro screening assays, in vivo pharmacokinetic and efficacy models*

2. What are the main obstacles in such way of compound profiling?

   First you need to have a hypothesis why you would want to test that particular substance in this particular assay. Getting access to external platforms. IP issues, legal matters, amount of bureaucracy due to the fact that two companies need to deal with each other.

3. Have you ever considered using a platform for compound testing by sending your compound outside your institution to a company with the aim for a potential collaboration?
   Yes

   a) If "Yes"- what have you done to investigate that? How did you find out about it: social media/ what channels did you use? What kind of set-up (model) was it? What worked well and what didn't work? What is the value of doing that?

   We are in a planning stage for this. We need to select candidates for external testing. Direct contact with an open innovation manager at a company offering OI. Open platform model. Don't know yet about what will work and the value.

   b) If "No"- what would you make it say YES? What would you like to see?

4. What advantages from collaborating externally with companies in order to focus on pre-clinical drug development do you see and which ones are important for you?

   Intensifying relations with external companies, mutual benefit, and new business opportunities, all important.

5. What would stand in a way between you and testing your compounds externally? What could be done better for external collaboration?

   Not trusting the company that they would handle IP correctly. Personal relation to responsible persons such as OI manager a must.

6. What kind of set-up for testing external compounds will make it attractive to you?

   The data is of course the most important thing is if is reliable and robust, and that includes if it is scientifically sound models that are applied. The equipment is secondary.

7. What kind of data would you need to obtain to move your research forward both scientifically and business- wise?

Unequivocal effects (from robust and reliable data).

8. If you were about to enter a partnership with a pharmaceutical company, what would you like to expect back? (Benefits?)

   Interest to follow-up if data is showing effects. Resources to maintain a relationship and start business dealings.

9. What "costs" are you ready to "sacrifice" in order to enter into collaboration for the drug development?

   In-kind contribution in terms of time and some material cost- to generate a compound, costs have already occurred.

Dr B- Reader in Chemical and Structural Biology- University of Dundee; the UK

1. Do you have compounds that you develop internally? How do you test those?

a) internally- *In vitro screening assays.*

b) externally- *No, until the proof of concept is reached.*

2. What are the main obstacles in such way of compound profiling?

From the clinical trials on, not capable of financing them ourselves. Also, scientists want to go as far as possible on their own (if this is feasible).

3. Have you ever considered using a platform for compound testing by sending your compound outside your institution to a company with the aim for a potential collaboration?

Yes.

4. What advantages from collaborating externally with companies in order to focus on pre-clinical drug development do you see and which ones are important for you?

Fast-tracing and follow up.

5. What would stand in a way between you and testing your compounds externally? What could be done better for external collaboration?

Commitment is required, mutual collaboration, support and ensuring that the academia is not to be taken advantage of, but rather results in a reciprocal discussion with the aim for the clinical development and further product launch.

Transparency is very important so the company clearly states its intentions and the rules of collaborations are transparent, this will further result in raising trust between academia and the industry.

6. Would you have trust issues using a digital platform for OIDD?

No.

7. What kind of set-up for testing external compounds will make it attractive to you?

Reliable data, results back that can be published. Machinery unification also important.

8. What kind of data would you need to obtain to move your research forward both scientifically and business-wise?

First we do as much as possible on our own; usually it goes all the way until the proof of concept is reached. ADME, profiling, safety in relevant animal models- we are capable of achieving this on our own.

9. If you were about to enter a partnership with a pharmaceutical company, what would you like to expect back? (Benefits?)

Robust data, equal partnership, not treating us as a consulting institution.

It needs to be equally important to launch for both us and the company. Publishing is also very important for us.

10. What "costs" are you ready to "sacrifice" in order to enter into collaboration for the drug development?

To share with somebody else drug discovery product. Time is the most important cost for academia.

Dr C - Development Manager- University of Strathclyde; the UK

1. Do you have compounds that you develop internally?

Yes.

How do you test those?

Both internally and externally.

2. What are the main obstacles in such way of compound profiling?

Cost.

3. Have you ever considered using a platform for compound testing by sending your compound outside your institution to another company with the aim for a potential collaboration?

Yes. We do this fairly frequently.

a) If "Yes"- what have you done to investigate that? How did you find out about it: social media/ what channels did you use? What kind of set-up (model) was it? What worked well and what didn't work? What is the value of doing that?

Investigated by direct email enquiries, which is usually the way we've found out about it. Or at BioPartnering events.

It works well when we retain ownership of our IP and can subsequently negotiate rights to it, rather than giving up ownership in exchange for data.

b) If "No"- what would you make it say YES? What would you like to see?

4. What advantages from collaborating externally with companies in order to focus on clinical drug development do you see and which ones are important for you?

Company-generated data is considered more credible than academic data and we have no resource or capacity for clinical, rather than pre-clinical, drug development.

5. What would stand in a way between you and testing your compounds externally? What could be done better for external collaboration?

Sometimes companies follow a set procedure for testing compounds, rather than thinking about what is and isn't appropriate. It would be good to have a discussion of even negative data, after the testing, rather than have an immediate no-go decision relayed.

6. What kind of set-up for testing external compound will make it attractive to you (equipment, science, and data)?

All of the above.

7. What kind of data would you need to obtain to move your research forward both scientifically and business- wise?

All of the above.

8. If you were about to enter a partnership with a pharmaceutical company, what would you like to expect back? (Benefits?)

The opportunity to engage with the development and eventual return via royalties and milestone payments.

9. What "costs" are you ready to "sacrifice" in order to enter into collaboration for the drug development?

The University sacrifices costs all the time by doing under-cost work, particularly academic time.

Dr D- Evaluation Manager- Zealand Pharma; Denmark

1. Do you have compounds that you develop internally? *Yes.* How do you test those?

a) Internally*: Different assays depending on the stage of the project. In early projects, the compounds are always tested in different in vitro assays; they are evaluated for solubility and PK, different in in vivo models.*

b) Externally: *If the compounds need to be tested in assays we do not have established in house we perform these studies at a CRO or in the frame of a collaboration ex with University.*

2. What are the main obstacles in such way of compound profiling?

Cost.

a) Have you ever considered using a platform for compound testing by sending your compound outside your institution to another company with the aim for a potential collaboration? *Absolutely.*

If "Yes"- what have you done to investigate that? What kind of set-up (model) was it? What is the value of doing that?

In vitro assays that we do not have running in house. These activities have often ended in the start-up of collaboration.

3. What advantages from collaborating externally with companies in order to focus on pre-clinical drug development do you see and which ones are important for you?

We can learn from each other, both parties can contribute with expertise, the project will proceed faster. Win-win situation.

4. What would stand in a way between you and testing your compounds externally?

If it takes too long time to get a MTA in place.

What could be done better for external collaboration?

Use a MTA light version to easier get started.

5. Would you have a trust issue using a digital platform for the OIDD?

No.

6. What kind of set-up for testing external compound will make it attractive to you?

Easy to get to an agreement, easy to start up and to receive data within not too long time.

7. What kind of data would you need to obtain to move your research forward both scientifically and business-wise?

Convincing in vitro data/in vivo data/strong scientific rationale/good IP situation/positive business case.

8. If you were about to enter a partnership with a pharmaceutical company, what would you like to expect back? (Benefits?)

A mutual trust and commitment to the project plan in order to drive the project forward.

9. What "costs" are you ready to "sacrifice" in order to enter into collaboration for the drug development?

Our company values collaborations very high and we are ready to invest resources, expertise and money in right collaborations.

Professor E- Lecturer in Faculty of Chemistry; Technical Univeristy of Denmark

1. Do you have compounds that you develop internally?

Yes.

How do you test those?

a) Internally- *For PK parameters*

b) Externally- *For Biological properties.*

2. What are the main obstacles in such way of compound profiling?

Turnover time, you can miss the direct dialogue with the biologist. For example, we have collaboration with scientists from Germany and they are experts in what they are doing, but even though we have been collaborating together for ten years, we still lack that dialogue, we still have that barrier.

3. Have you ever considered using a platform for compound testing by sending your compound outside your institution to a company with the aim for a potential collaboration?

Yes. We are involved in a research proposal, for example EU Open Screen and European Lead Factory. But again, prize is an issue.

4. What advantages from collaborating externally with companies in order to focus on pre-clinical drug development do you see and which ones are important for you?

They know what they are doing; they are experts and we are not. And the disadvantage is cost. This type of partnerships are always very unilateral in a way they provide service we paid for and that's not really a partnership. It is rather a commercial service.

5. What would stand in a way between you and testing your compounds externally? What could be done better for external collaboration?

An obvious barrier is IP. It is because of the University's law: I am not allowed to disclose our structure at any way. So every time we approach a company, we ask them to basically profile in-blind compounds, so they don't know the quality of them and I can understand if they are not eager to do that. So IP management is probably the main barrier here.

6. Would you have trust issues using a digital platform for OIDD?

No.

7. What kind of set- up for testing external compound will make it attractive to you?

IP protection and confidentiality, so trust would be an issue. Also, the legal aspects; I am not allowed to do anything on my own, without contacting the University's lawyers, who are not the fastest. It would be very good if LEO could get upfront agreements, MTAs with our legal

department, then I wouldn't need to explain our lawyers the reason every time I would like to send a compound and also my colleagues wouldn't need to do that because it will be already there.
From the practicalities, all the data we could and would have anyways and we could use for publications.

The suggestion was also made to promote the platform via direct marketing so as to speak to scientists directly rather than promoting it on the website. *For example, I don't have time to check company's websites, not mentioning using social media.*

8. What kind of data would you need to obtain to move your research forward both scientifically and business- wise?

Depends on the project:
Scientifically: early PK, clearance (that would be very interesting), serum stability, solubility, simulated gastric fluid stability
Business-wise: fixed step- initial hit- kinase inhibitor, patentability and how to attract investors. It would be very beneficial to have somebody from LEO's Open Innovation environment to discuss about the investment opportunity.
Because basically what you try to do is to kill project as early as possible before I waste my time, LEO wastes its time, and we waste potential investor's time (perhaps also LEO's time). But the main criteria would be: investment and patentability opportunity.
I learnt one thing: Typically people, who know how to do chemistry, don't know how to do business. I mean it is a learning curve.

9. If you were about to enter a partnership with a pharmaceutical company, what would you like to expect back? (Benefits?)

Data and published opportunities, students need to publish their data and theses. I cannot wait 5 years to publish, I need to publish now. Spin-out would be nice, I am looking for my compounds to have a chance to eventually reach the market.

10. What "costs" are you ready to "sacrifice" in order to enter into collaboration for the drug development?

Exclusive rights to my compounds. I am willing to give it up. I would prefer to spin it out, or do join venture with LEO, but I am also willing to give it entirely up to LEO. (*But remember about the University's lawyers- they always tend to overvalue the early scientific discovery).*

Dr. F: Director; Open Innovation Drug Discovery- Eli Lilly; the USA

1. Introduction and the communication part of the OIDD to the stakeholders:

We are going to launch new website, so you may compare the old with the new one, because this was our main problem; to clearly explain and reach our participants in this program, so as to use a website as a tool for communication and avoiding the advertisement. The thing which is not well received by the scientists is advertising, they associate it with marketing and commercial aspects and hence it is received very pejoratively by this particular type of stakeholders.
To reach the crowd you need to make sure your crowd is identified and understands what you offer, so to spread word-of-mouth at conferences or congresses. What worked very well was to use our internal networking and leverage its contacts with the institutions they worked before or people they know, not to mention about the conferences, poster presentations and publications.
So the website is the basic remark for communication and our ability to reach the crowd, particularly all around the world; i.e. a lot of research centers that are not in Europe or in the US.
The website needs to fulfill couple of conditions: be attractive, easy to navigate, scientifically minded so it doesn't sound or look commercial and finally the material you provide to the participants needs to indicate it is a serious deal and legitimate from a scientific perspective.
Our team does benchmarking and looks at other companies that enter open innovation, so as to close the communication and R&D gap and to make sure the service offered is of clear scientific endeavor.
To meet our participants' needs and wishes, we conducted a survey regarding the feedback of the OIDD website and based on the results we updated our website, now you can see the difference between the one launched in 2009 and now. Our old website was overwhelmed with the information and was not clear enough. The new website is more transparent and easier to navigate and the additional information one wishes to find are found in the white papers, and not on the main website, which makes it clearer and transparent platform. In addition, to back up the fact that Eli Lilly strives on innovation and is research- driven, where the commitment to research and science is on the pedestal, part of our website is dedicated to publications, so it offers the participants a possibility to publish on Lilly's website themselves, so throughput this we are creating a community.
Other form of marketing is our involvement in the Ambassador Program, so thanks to this we maximize our marketing for the search engine. So this leverages the involvement of our colleagues with their host universities where they travel to and present or talk about OIDD. Therefore, the education of our colleagues is very important, to provide them the tools to talk about the program and use the website to support it, so they are able to reach out. This spreads the OIDD to our offices globally. We also work with trade organizations, which do the marketing for us (in the US).

2. How much time did it take to implement the platform before it was launched?

This is actually an ongoing process. In 2009 we did not have the website and platform yet. They were still under development. We had 4 different universities working on the development of the program: Pittsburgh, Notre Dame, Harvard and Princeton. I went to talk to them and gave presentations; we started our collaborations with organizations we worked before. The website was the last piece on the top of the other things, because you cannot market something that does not exist, so we had to have an understanding of how the program and the software are going to look like before we could market it. Once it was market, so the website was launched, the platform was ON and the participants had already the ability to log in.

We started with 4 institutions- but then it was spread to media- biotech industry- and then it went viral, so no active marketing was necessary in 2010. In 2011 we reached critical mass, our users were spreading word-of-mouth on conferences, within their communities and in the papers. So they were actually promoting us and selling ideas to others. This greatly helped us.

Also, you need to ensure a complete transparency and support participants for questions. For that reason I created a supporting team that is available on the phone and e-mail every day and they reply within hours, because you know you cannot market something and then go away. Once you are in, you are in for good.
We need to constantly take care of our network and it may be a surprise for you, but marketing is the least what we spent the money on. We sponsored one scientific conference and did one advertisement for the research institution, but this was the only thing we paid for when it comes to OIDD promotion. So in reality we never did any advertising in that sense.
But we grew through our user-base and filtering and we grew exponentially. And the Ambassador Program has continued to support all this, so it was a great progression.

3. What is the main differentiation factor between the platforms, ever since 2009?

So in 2009 the "PD^2" was released but it combined of only phenotypic properties, then "Target D^2", which comprised of biological properties and now any capabilities that Lilly has internally and can leverage externally.

4. What about any marketing strategy of OIDD using social media?

Social media in the pharmaceutical industry are highly regulated and we opt from social media.

5. How do you maintain the trust among the participants?

Scientists like to talk about data. They are special population and for that they need to be treated differently and fully supported throughout the whole process. Since the aim of the whole initiative targets very early discovery and research process, we need to communicate with the participants and establish a mutual understanding.
At the very beginning I had training with an MBA teacher about the basic commercial aspects, but other than that I am a PhD and my team consists of solely scientists, so we ensure we can offer our participants that support, understanding and communication. So we talk science, scientists do not want to talk about transactions.

6. Therefore there is a need to translate business opportunities into science, since you target a very sensitive crowd, is that right?

Yes, indeed!

7. What were the biggest challenges in the OIDD implementation?

From a technical and logistics perspectives: moving big samples across the geographical boundaries.
But the biggest issue was the legal aspect, as nobody in the industry has done that before. Since the participants have the first right to approach or refuse, there is a threat the participants can come & go. So what we did is we approached institutions with a legal document that doesn't look like the one they are used to, i.e. from companies that want to get license. We had to therefore find a legal language that would be acceptable by the institutions and since we collaborated with four at the beginning, we had talked to them and asked for advices. So once there is a legal agreement, there won't be too many questions since it will be clear enough and the decision will be: Take it or leave it.
We had to build this up so to gain institution's trust so they are not reluctant to the platform and afraid that we take their stuff and go forward without them.
We started with the institutions that are very prestigious; Harvard, Princeton, so once it is OK for them, it should be OK for the rest.
We were marketing the OIDD to the TTOs, not the users: tracking and speaking, and once legal agreement is acceptable, everything else is easier.

8. Talking about TTOs and users, what is your customer's segment?

We have Academia and Industry and in each we have administrators and scientists. Ideally you target scientists, but you must do it through the administrators; in small biotech company, an administrator is usually the scientist, so it is much easier to communicate with them.

At the beginning when you talk to scientists, the discussion is very formal and cold, but once you start talking about science, in vivo assays, they lose all the skepticism and get warmed up. They even make you call them by their first names…and the lack of trust just goes away.

9. How do you raise trust of the participants?

Patience! You need to listen to them, you need to be there and you need to be there for them. Scientists respect scientific excellence and you need to be present in the discussion all the time. Obviously there needs to be a transparency for the value of research we provide. The trust will grow, but it takes time, you cannot grow it over the night.
Even when there is discussion, which is not of Lilly's interest, I still need to devote my time and resources to answer that question. This is the prize we pay for that service. So if there is 1% of a

participant coming with a compound that may become next medicine, I need to treat the other 99% in the exact the same way. This is the only way to do it and I created a team- on call support team, who helps me in that. Our department is like a start-up company, which consists of scientists and one administrator with knowledge of science, who was working in the licensing department of Lilly before, so she has great experience in the negotiation. There are people responsible for benchmarking and informatics that helped develop the website. We have a very multidisciplinary environment and each of the team members has very rich personal networks. This helps in leveraging the internal and external networking via the informal linkages.

10. How does the community works, it seems to be a bit similar to the crowdsourcing platform that Eli Lilly launched in 2000- InnoCentive?

The way of thinking is similar, but in InnoCentive you have a problem to be solved and have a community of solvers and a community of seekers and are offered a monetary currency. We, on the other hand, leverage capabilities and capacities for free for the participants to come. They get a viable biological data that they can use, so it is in-kind transaction, no monetary included, so different currency- get data back. In this way you can leverage what you have and the talent you want to have and work with.

In addition, the follow up mail was sent with the following questions:

11. What made Eli Lilly to open?

Read this, to learn more about Lilly's long-standing tradition of openness and collaborative approaches (all the way back to the development of insulin in the 1920s, in collaboration w the Univ of Toronto http://www.lilly.com/about/heritage/Pages/heritage.aspx)

12. How do you decide when to continue the collaboration with the participants from a scientific perspective (what kind of results are the criteria for the further collaboration?)

Individual collaboration has a research plan with a set of explicit deliverables. At the conclusion of the research plan, the joint team evaluates the results and decides next steps. A new research plan or extension of the research is discussed between the two parties. If needed, a new contract is drafted, otherwise the collaboration is completed.

13. Does your collaboration in OIDD focus solely on pre-competitive stage?

No, the program focuses on pre-clinical science. The competitive vs. non-competitive nature of each collaboration agreement depends on the individual opportunities and the interest of the partners. In some cases, the results of the collaboration are published, which make them a public domain. Sometimes there is an interest in increasing the understanding of a particular biological mechanism; this could be both competitive and non-competitive, depending upon the partner's interest. In other cases, the results are interesting enough for both Lilly and the partner

to warrant further investigation for development potential. In those cases, the project is definitely competitive, and we protect the intellectual property of the partnership. In all cases, the individual results and findings drive the type of collaboration and how it is going to be executed.

14. Do/ how do you use the social media in order to communicate with the stakeholders about your initiative?

OIDD does not use social media; there are many complexities due to the highly regulated nature of our business and the need to monitor postings continuously. We have email and phone communication with our participants, individually. We have a mailbox that is available to interested parties. Lilly does use social media, and we are learning from our internal experts hoping to find a good way to utilize these tools in the service of our community without creating too big a burden on our team to provide continuous monitoring.

Dr. G, Dr. H and Dr. I- Principal Scientist and Scientists, rescpectively; New Molecular Entity Ideation Department- LEO Pharma; Denmark

1. General discussion about the usefulness or value of an Open Innovation Platform offered by LEO Pharma:

Everybody accordingly: *Yes- it is a huge value, very useful initiative.*
Dr. H: *In Academia even more cause their resources are much more limited.*
Dr. G and Dr. H: *And also it is a unique selling point, no strings attached! But you know there is always a trust issue between the company and an academia, so if you can make a clear statement: We test it for free without knowing what your compound is and you remain full ownership- it would be as clean as it gets!*

2. Were you familiar with the concept of OI before it was introduced at our company?

Everybody: *The concept yes, but not the place where I could do it.*
Dr. G: *I heard it thanks to Eli Lilly and the thing they did with the targets working on orphan diseases.*

3. Have you ever considered using a platform for compound testing by sending your compound outside your institution to a company with the aim for a potential collaboration?- question targets Dr. H specifically, since he spent most of his time working in academia before joining LEO Pharma.

Dr. H: *Yes. If I had a compound then I would join for sure.*

4. What about any collaboration before? Did you take part in any?

Dr. H: *I did collaboration with Novartis back when I worked in Boston, but it was with strings attached; they had first right, they paid and had things done by us. But still it was a very nice collaboration, very open collaboration, nice scientific discussion and flexibility. Back in Sweden it is very different; we had no communication with companies.*

5. What didn't go well?

Dr. H: *Nothing.*
Dr. G: *I also did collaboration with company-A*** Pharma, and there was no bureaucracy. They gave us reference compounds and we shared the results. But they used our results to publish it without talking to us, so you see they completely lost our trust and credibility. And therefore you need to make it clear that there is full confidentiality in such collaboration as LEO Pharma intends to do.*
Dr. I adds looking at Dr. H (both familiar with Swedish education system): *I think you are right; Swedish Academic Institutions are extremely suspicious against the industry. I remember my research group when I was doing my PhD, we just had little collaboration with industry and also academics tend to be a bit greedy and they think the industry should pay for everything.*

Dr. H: *You just need to remember that they give you something and you give them something. That's the deal.*

6. What advantages in the collaboration between LEO Pharma and SMEs or other companies (non-academia) do you see as LEO's scientists?

Dr. G*: Access to the platforms we don't have or would never even think of getting since we use them occasionally. Or it could also be too costly; medicinal chemistry or screening. You could hire people for single projects (outsiders).*
Dr. H: *Yes, agreed. Flexibility is also a big benefit.*

7. What advantages in the collaboration between LEO Pharma and academia do you see as LEO's scientists?

Everybody accordingly: *To get access to novel approaches, technologies and discoveries. To have access to very early testing that is only done by academia, because no company would invest in that. To have an access to some of the best science.*
Dr. G: *It also has to do with the political aspect; on the top of being it an explorative approach, tapping into the best science and if possible working with the best people would matter a lot. If you want to sell the technology, it will do a great difference to say that you work with this or that person, who is well-known in the scientific environment, so you know you gain your credibility and it is a selling point, so whatever you work on sounds sexy. It is much easier to sell something if you can tag it to the big name. Then LEO would say: Oh we worked with that guy or that institution.*

8. Would you have trust issues using a digital platform for OIDD?

Everybody accordingly: *No.*

9. What "costs" are you ready to "sacrifice" in order to enter into collaboration for the drug development if you were scientists from academia?

Dr. G: *Monetary costs=0, any fee takes away credibility.*
Dr. H: *You see the budget in academia is very tight, so any fee we would need to pay would not be an attractive point; in addition, shipping the compound needs to likewise be covered by the industry.*

- OK, what about the non-financial sacrifice?

Both Dr. G and Dr. H accordingly: *Time. And in return we would like to get high quality results and raw data so that we could use it for any funds' application and publication with no strings attached. We would like to receive information relevant for publication and have high fidelity assays. Basically you want to have raw data to know where you are and have IS50 value to plot graphs…*

10. What comments do you have to the whole point of marketing strategy of such initiative our company would like to launch?

Dr. H: *The worst thing you can do is to sell it. I hate when the companies call me and take my time by introducing some new technologies. I would rather have it as an e-mail, and then I could just block it.*
Dr. G: *You need to access the communication channels that science use and are present at, so i.e. what Niclass is doing in Lund now. But what is even of better transmitter would be to have a poster at conferences which scientists attend. So these conferences or congresses are scientific, about research, but do not need to be necessarily related to the concept of innovation in life-sciences. Also, the involvement of TTOs especially when it comes to the American (US) market could be of interest and what is the actual link between our company and TTOs. I would suggest you contacting Dr. K, who is responsible for the pipeline sourcing to get some more information of the connection between LEO and in-licensed projects.*
Dr. H: *Also, if you could relate relatively early publications to LEO, so that it would be your reference point and just to show that what LEO offers is actually a quality data, could perhaps help in this platform's branding. And foremost, this needs to be perceived as a scientific initiative. The worst that could happen is this to be perceived as a marketing initiative. I think then it would be dead before it even started.*
IF you can get some of the bigger players to try the platform, then they may invite others to try and say: Hey, We do that screening with LEO, join us! This would be even better if there was no prior connection between LEO and the players, so they are not paid to say that. It would be like spreading the word to your colleagues and this is in fact the best ads you can get.
Dr. G adds: *You need to build a critical mass. In the end, the platform is important, but the experience from using that platform is the most important, it always comes to the human interactions and relations, it is a people business after all.*
It is therefore important to be responsive to the inquiries, even if they are annoying and "stupid", there must be a quick reaction. It is considered to be unprofessional and rude if you don't reply to the e-mail within 72 working hours, so LEO must make sure to reply, the company must be ready to increase the resources when the need comes.
Dr. H agrees: *If there is no response on e-mail, LEO losses the whole professionalism and credibility. It would be good to create an automated e-mail with information that we received your inquiry and will get in touch with you within next 3 days. The company needs to be ready because bad rep spreads much quicker than a good one!*

Dr J: Director; Front End Innovation- LEO Pharma; Denmark

The session was devoted for the feedback from gathered data and focus group with scientists from NME Ideation Department of LEO Pharma.

Comments*: It would be interesting to make an analysis of what the obstacles in OI platform launch actually are and what/ where the twist is, where the compensation is. How the TTOs may leverage the marketing of our service. What are the steps and what is the pre-competitive stage, so you know where to anchor. Also, it would be beneficial to see the simple instruction on how to get the LEO platform started for our stakeholders because it may seem for them as too complex or they may not be willing to spend too much time on reading about it on-line.*

I would always suggest you to pinpoint that LEO is owned by the foundation- as one of the few pharmaceutical companies- LEO foundation and hence the capital is re-invested within the boundaries of the institution, so the equity stays inside our company, this is huge selling point as there are only few companies with such model (mainly Scandinavian model).

Another selling point is to highlight that we are focused and our core competency is the dermatology field, so you know, we are not all over the place, since otherwise it might seem to be blurry considering the size of our company. Our focus is put on the skin diseases; we cannot afford the possibility to engage in everything, LEO cannot cure the whole world.

As a reference point it is good to have an example of collaboration done in the past with a well-known and acknowledge institution or entity. This is a reference point showing that LEO did indeed engage with a big fish before, so if you can prove that, LEO gains sincerity in the science world. I have a good example of the collaboration with scientists from the Scripps Research Institute, La Jolla, California.

Finally, it needs to be clear to the audience to pinpoint that LEO is stiving on mainitnaing long-term, reciprocal relationship with the vital scientific discussion throughout the whole collaboration process.

Dr. K: Business Development Manager; R&D Pipeline Sourcing- LEO Pharma; Denmark

The session was devoted for the inquiry regarding the TTOs and how the transaction essentially happens in the licensing and pipeline sourcing.

Comments: *Business Development meets Tech Transfer Offices on the partnering meetings, i.e. Bio-Europe and Bio-International. It works through speed dating when two entities meet; they also meet on the training trips where they commence the conversation. The problem with the TTOs is that they don't really know what they offer, they tell you: This is what we have, if you are interested take it, if not then don't. To my knowledge, there haven't been a lot of collaborations between TTOs and LEO Pharma.*

When it comes to the communication, however, the TTOs can be used to access the channels that science use, so that they constitute an interface or a medium if you like, to send (spread) the message. This would be a big incentive for the LEO Pharma and will also constitute a channel to communicate with the research centres around the universities that are in contact with TTOs. Hence, it would work for LEO as advertisement and become LEO's interface by sending the signals to the research environment.

Basically, the relationship between the TTOs and LEO would be to provide the information about the Open Innovation platform, not necessarily collaboration. The value coming from this could be seen in the potential opportunities, both from a scientific and a business perspective.

Professor L: Professor at the Department of Chemistry; the Scripps Research Institute, Skaggs Institute for Chemical Biology, La Jolla, California

1. Do you think an Open Innovation Platform, which offers the compounds' screening for free, where your IP is secured and not known to the company providing service and where you remain full ownership of your molecule is useful and valuable? What can be a problem?

Sure, lots of opportunities exist like this now. The challenge for scientists now is WHICH place to send your compounds to! The value is clear – generating new knowledge about existing assets.

2. Do you have compounds that you develop internally? How do you test those?

Through collaboration/externally.

3. What are the main obstacles in such way of compound profiling?

The bottleneck is always the biological collaborator. Finding a fast-paced collaborator is the hardest part.

4. Have you ever considered using a platform for compound testing by sending your compound outside your institution to another company with the aim for a potential collaboration?

Yes we have done that.

a) If "Yes"- what have you done to investigate that? What kind of set-up (model) was it? What worked well and what didn't work? What is the value of doing that?

   An MTA was initiated and the compound was tested.

b) If "No"- what would you make it say YES? What would you like to see?

URLs:

[i] http://www.leo-pharma.com/Home/LEO-Pharma.aspx

[ii] http://openinnovation.leo-pharma.com/

[iii] https://openinnovation.lilly.com/dd/about-open-innovation/index.html

[iv] http://innovation.gsk.com/new-product-development-process.aspx

[v] https://www.takeda.com/research/organizations/shonan.html

[vi] http://www.ucb.com/magazine/article/New-bio-plant-on-the-horizon

[vii] http://www.pfizer.com/research/rd_partnering/centers_for_therapeutic_innovation

[viii] http://www.astrazeneca.com/Media/Press-releases/Article/20130321--astrazeneca-and-karolinska-institutet-create-Integrated-Translational-Research-Centre

[ix] http://www.merckserono.com/en/partners/open_innovation_portal/minilibrary/index.html

[x] http://www.astrazeneca.com/Media/Press-releases/Article/20140328--astrazeneca-and-mrc-collaboration-joint-research-facility

[xi] http://www.astrazeneca.com/Research/news/Article/02042013--astrazeneca-extends-drug-discovery-collaboration-with

[xii] http://www.imi.europa.eu/content/smes

[xiii] http://www.wipo.int/about-ip/en/

[xiv] http://www.phrma.org/research-development-process

[xv] https://strategyzer.com/academy/course/business-models-that-work-and-value-propositions-that-sell/1/1/2

[xvi] http://openinnovation.leo-pharma.com/The-process.aspx