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OPENING UP BOUNDARIES ASSESSMENT

THE CASE OF LOGOPLASTE GROUP

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ABSTRACT

Opening up boundaries assessment – the case of Logoplaste Group

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This study analyses the implementation stage of an open innovation initiative in the Portuguese rigid plastic manufacturing group, Logoplaste. It assesses whether the group has the needed structure to sustain the changes that come along with it, both in terms of organizational capabilities, project decisions and individual attitudes levels. It is a 360º degree judgment of the business unit Logoplaste Innovation Lab, in which the initiative will have its initial pilot testing, and in which success is dependent the expansion of the project to the whole group.

Based on the literature on the open innovation implementation topic, a survey tool was constructed, based on a structural framework with the main areas of concern in the implementation processes, developed by Lichtenthaler (2011) – the organization as a whole, the processes management of the projects and the company's employees, which contribute to the initiative. The survey was sent to Logoplaste Innovation Lab employees and their results served as a support for the conclusions achieved.

The results of this work indicate that Logoplaste is not internally prepared to adopt an open innovation business model in their structure: there are some improvements to be achieved, namely in the individual attitudes level, which is often mentioned in the literature as either a very important contributor or preventer to this type of projects' success. Based on this conclusion, a set of suggestions is put together being supported by the best market practices and the particular case of this company, so that the implementation of the open innovation model goes for the best.

Key words: open innovation model; implementation; value chain; pilot testing; attitudes; project; organization.

RESUMO

Opening up boundaries assessment – the case of Logoplaste Group

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Este estudo analisa a fase de implementação de uma iniciativa de *open innovation* no grupo Português de manufatura de plásticos rígidos, Logoplaste. Pretende-se perceber se o grupo tem a estrutura necessária para sustentar as alterações que virão como consequência desta implementação, quer em termos organizacionais, de projeto e individuais. Este estudo é um juízo de 360º sobre a unidade de negócio Logoplaste Innovation Lab, na qual vai ser feito o teste piloto à iniciativa, e sobre o qual o sucesso e expansão ao resto do grupo é dependente.

Tendo em consideração a literatura revista sobre o tópico da implementação de *open innovation*, foi desenvolvido um questionário *online* tendo por base a *framework* de Lichtenthaler (2011), que define as áreas de uma empresa sobre as quais deve incidir maior preocupação em termos de gestão da inovação – a organização como um todo, os processos de gestão dos projetos e os colaboradores da empresa, que contribuem para a iniciativa. O questionário foi enviado para todos os colaboradores da Logoplaste Innovation Lab e os respetivos resultados serviram de suporte às conclusões atingidas.

Os resultados alcançados nesta dissertação indicam que a Logoplaste não está internamente preparada para abrir o seu modelo de negócio: existem melhorias a ser feitas, nomeadamente ao nível das atitudes individuais dos colaboradores, que são frequentemente mencionados na literatura como um fator de contribuição ou impedimento para o sucesso deste tipo de iniciativas. Com base nestas conclusões, uma série de sugestões é elaboradora, suportada nas melhores práticas de mercado e no caso particular desta empresa, para que a implementação deste modelo de inovação seja o mais bem-sucedido possível.

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The new role of supplier is no longer a seller … but a consultant able to assist his customer…Therefore we are no longer speaking only about a combination of products and services to [address] the needs of the customer but also a consultancy and expertise implemented to redesign and reengineer the customer's process.

Cova and Salle (2007)

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I. INTRODUCTION

This study is about the implementation of an open innovation initiative and the contribution that this phase presents to the overall success of the initiative. This analysis is applied to the Portuguese leading group in the rigid plastic manufacturing industry, Logoplaste. The initiative being implemented by Logoplaste takes form as an open innovation online platform, *The Pollen Project*, with the goal of conjointly improving packaging solutions, as well as solving problems and challenges posed by the company and solved by the participants: suppliers, clients and, ultimately, the final consumer. This academic dissertation aims to analyze whether Logoplaste is prepared to adopt and successfully manage an open innovation tool in its own favour.

The rising adoption level of open innovation initiatives by several companies (Lichtenthaler, 2011) is transforming it into the ultimate innovation model, being many reasons pointed out for doing so (Chesbrough H. W., 2003b). Several studies were developed over the last years concerning the managerial implications for companies undergoing such initiatives (Lichtenthaler, Hoegl, & Muethel, 2011). Examples of these implications are at the level of management information systems (Gassmann, Enkel, & Chesbrough, 2010), intellectual property rights (Bonabeau, 2009; Chesbrough H. , 2003a) and the human resources management (Lichtenthaler, Hoegl, & Muethel, 2011). Among many others, these topics are a matter of concern when it comes to the success of open innovation projects (Bonabeau, 2009; du Chatenier, Verstegen, Biemans, Mulder, & Omta, 2010).

By adopting an open innovation initiative, Logoplaste is going alongside with the general tendency of several multinational companies, such as Dell (Di Gangi, Wasko, & Hooker, 2010), IBM and Siemens (Gassmann, Enkel, & Chesbrough, 2010), Procter & Gamble (Houston & Sakkab, 2006; Lichtenthaler, 2011) and Eli Lilly (Lichtenthaler, 2011). This tendency has been particularly remarkable in R&D companies (Gassmann, Enkel, & Chesbrough, 2010; Lichtenthaler, 2011; Chesbrough H. , 2003a), given its proven operational benefits, namely in reducing the risks associated with product development and speeding it up (Lichtenthaler, Hoegl, &

Muethel, 2011), as well as in being more efficient in the selection criteria on the ideas screening process (Chesbrough H. W., 2003b) and adopting a more consumer-oriented strategy (Lichtenthaler, 2011; Chesbrough H. , 2003a).

The scope of *The Pollen Project* is to "develop better packaging solution together" (Logoplaste Innovation Lab, 2012) with the help of the platform community. The overall goal of this platform is to achieve a more optimized resource allocation for the packaging development process, by accessing the knowledge base of the suppliers; it is also aimed at achieving a more consumer-oriented designing process, by taking in consideration the inputs from the platform participants, through inspiration, concept and prototype evaluation (Logoplaste Innovation Lab, 2012).

According to Lichtenthaler (2011), the successful implementation of an open innovation model depends on several drivers, such as the firm level capabilities, the project level decisions and the individual level attitudes (Lichtenthaler, 2011). Given that a big driver of open innovation success is defined by the human commitment and contributions (Lichtenthaler, Hoegl, & Muethel, 2011), it is important to guarantee that there is an internal corporate culture that is not only stated to the external media by the top managers board (Lichtenthaler, 2011), but is also felt and implemented by the individuals working within the company's boundaries (Lichtenthaler, Hoegl, & Muethel, 2011). By guarantying an initial strong contribution, commitment and devotion from the employees, companies are able to maximize the communities' participation outcome in their initiatives (Lichtenthaler, Hoegl, & Muethel, 2011). Knowing this, bringing the employees together into this initiative is a fundamental success factor towards the overall accomplishment of any open innovation project.

In this dissertation, the aim is to answer to the following research question: **"Is Logoplaste internally prepared to adopt an open innovation tool?".**

The methodology developed to address this question is mainly supported by means of primary data: (1) by attending informal meetings with Logoplaste's R&D Director, Eng. Paulo Correia and the Project Manager, Eng. Márcia Damas, in order to better assess the goals of executing this initiative and expected outcomes from it; and

(2) an online survey tool sent to the employees of Logoplaste Innovation Lab in Portugal, U.S.A. and Brazil, in order to evaluate their commitment, acceptance and perspectives over what their role and expectations will be in the platform's functioning and, consequently, on its success. Alongside with it, secondary data is also considered to complement the analysis, by reviewing previous academic works and papers about the open innovation implementation topic.

The structure of the dissertation is the following: it begins with the literature review of the open innovation topic, in chapter II – the theoretical concept, the challenges and concerns when implementing such innovation model. The group of Logoplaste, the business unit iLab and *The Pollen Project* are presented in chapter III. Then, the methodology is developed in chapter IV, explaining which is the method used to answer to the research question and how was the survey built in accordance to that. Finally, after the survey is conducted, the data is gathered and analyzed, in chapter V, serving as a basis for the final conclusions, in chapter VI.

II. LITERATURE REVIEW

Before entering in the analysis details of this dissertation, a review on the previous literature of Open Innovation is developed: firstly to have a better understanding on this concept and its managerial implications to modern corporations; and secondly, to recognize the importance of the implementation stage for assuring the success and efficient use of this type of initiatives.

2.1. Opening Up Innovation Boundaries

Open innovation was first labelled by Chesbrough as an innovation framework, which is the result of interactions and mutual knowledge exchanges between a firm's internal and external sources (Chesbrough H. , 2003a). According to Chesbrough et al. (2008), OI is the antithesis of the traditional method of firms developing their research and development (R&D) activities, in which the entire method of product and/or process innovation and technological evolution is internally developed, within the firm's boundaries (Chesbrough, West, & Vanhaverbeke, 2008).

Open innovation has been increasingly leveraged by the constant improvements in communication technologies (Gassmann, Enkel, & Chesbrough, 2010; Di Gangi, Wasko, & Hooker, 2010), which have allowed for the external knowledge sources to be spread out, across different geographic locations (Gassmann, Enkel, & Chesbrough, 2010). This way, the firm's boundaries are expanded and becoming a more porous (Chesbrough H. W., 2003b; Dodgson, Gann, & Salter, 2006) and semi-permeable membrane (Chiaroni, Chiesa, & Frattini, 2011), hence more able to freely let the flow of knowledge circulate, constantly adding value to the innovative process (Chesbrough H. W., 2003b; Chiaroni, Chiesa, & Frattini, 2011).

There are two major distinguish types of knowledge transfer flows when it comes to the open model of innovation: *inbound* and *outbound* (Enkel, Gassmann, & Chesbrough, 2009; Lichtenthaler, 2011; Lichtenthaler, Hoegl, & Muethel, 2011). *Inbound* open innovation, also called *outside-in* (Enkel, Gassmann, & Chesbrough,

2009; Chiaroni, Chiesa, & Frattini, 2011) or *external knowledge exploration* (Lichtenthaler, 2011), refers to the practice of opening up the internal innovation processes to the firm's external contributors' technical and scientific knowledge (Chiaroni, Chiesa, & Frattini, 2011), namely its suppliers, customers and business partners. It is a way of enhancing and enlarging the company's knowledge base (Enkel, Gassmann, & Chesbrough, 2009; Gassmann & Enkel, 2004), speeding up the internal innovative processes (Lichtenthaler, Hoegl, & Muethel, 2011; Gassmann & Enkel, 2004) and reducing the innovation related risk by investing in technologies that are already used and proven to be efficient by other entities or companies (Chiaroni, Chiesa, & Frattini, 2011), through the integration of all these external entities and individuals. Gassmann and Enkel (2004) concluded that this is not a new process and there are significant benefits in opening up the innovation boundaries to external suppliers. These benefits range from technical and operational improvements, to strategic resource optimization (Gassmann & Enkel, 2004). However, these authors also highlight the fact that, in order for this integration process to be successful, firms need to have the necessary competences and supplier management capabilities (Gassmann & Enkel, 2004).

The use of the *inbound* open innovation process is most relevant in companies that either: i) lack internal resources; ii) have a weaker technology position than its competitors; or iii) operate in a low barriers market, due to easily transferable technological knowledge (Gassmann & Enkel, 2004). More specifically, it is particularly applicable in mature and asset-intensive and high-tech industries (Chiaroni, Chiesa, & Frattini, 2011; Gassmann & Enkel, 2004). Overall, this type of knowledge transfer reflects what many companies have already concluded: the lack of knowledge creation ability does not imply a locus in innovation delivery (Gassmann & Enkel, 2004).

On the other hand, *outbound* open innovation, also called *inside-out* (Enkel, Gassmann, & Chesbrough, 2009; Chiaroni, Chiesa, & Frattini, 2011) or *external knowledge exploitation* (Lichtenthaler, 2011), implies putting the technological knowledge acquired and developed internally available to the external environment,

commercially exploiting innovation opportunities (Chiaroni, Chiesa, & Frattini, 2011). It allows the company to earn profits on their ideas and technological developments, by licensing the IP rights of the technology (Enkel, Gassmann, & Chesbrough, 2009), as well as to reduce the fixed costs related to R&D activities and development risks (Gassmann & Enkel, 2004). This brings ideas faster to the market than if the company was to be developing them fully internally and if it delivered it through their internal paths to market (Chiaroni, Chiesa, & Frattini, 2011; Enkel, Gassmann, & Chesbrough, 2009; Gassmann & Enkel, 2004). It is also a commercialization possibility for cross-industries companies (Gassmann & Enkel, 2004). Again, companies undergoing this type of knowledge transfer, acknowledge that the locus of innovation and invention does not directly imply the locus of exploitation (Gassmann & Enkel, 2004).

Contrarily to the inbound type, outbound open innovation is particularly present in low-tech industries (Chiaroni, Chiesa, & Frattini, 2011) and research-based industries (Gassmann & Enkel, 2004).

Despite representing contrary flows of knowledge transfer, firms may as well combine and manage both inbound and outbound open innovation processes – it is called the *coupled-process* (Enkel, Gassmann, & Chesbrough, 2009). This type of innovation can be achieved through strategic alliances with complementary business partners, suppliers, competitors, clients, universities and research institutes (Gassmann & Enkel, 2004). The inbound and outbound open innovation processes are complementary, since one does not prohibit the other, but they rather complement and improve each other (Gassmann, Enkel, & Chesbrough, 2010; Gassmann & Enkel, 2004). Companies that implement this coupled process in their innovation strategy aim at setting a standard in the industry, through a dominant design, although it does not imply a development time reduction (Gassmann & Enkel, 2004). Opposing to inbound and outbound in separate, the coupled process is a relatively recent process (Gassmann & Enkel, 2004).

To address and adopt OI is to accept the benefits of losing some of the control that closed innovation sustains (Bonabeau, 2009; Di Gangi, Wasko, & Hooker, 2010;

Enkel, Gassmann, & Chesbrough, 2009; Chiaroni, Chiesa, & Frattini, 2011), loss of core competences (Enkel, Gassmann, & Chesbrough, 2009), as well as potentially having to deal with intellectual property issues (Bonabeau, 2009). Nevertheless, many authors and companies have stressed out and proven the overall benefits of open innovation when comparing the new innovation model with the traditionally closed one (Di Gangi, Wasko, & Hooker, 2010; Bonabeau, 2009; Lichtenthaler, Hoegl, & Muethel, 2011; Lichtenthaler, 2011; Gassmann, Enkel, & Chesbrough, 2010). Examples of these managerial benefits are shorter innovation cycles and reduced time to market (Enkel, Gassmann, & Chesbrough, 2009), better screening ideas process (Chesbrough H. W., 2003b), minimization of individual biases in decision-making processes (Bonabeau, 2009), definition of a more consumer-oriented strategy (Enkel, Gassmann, & Chesbrough, 2009), among several other advantages.

Despite all the cited benefits in the literature and in practical case studies, open innovation also presents its own challenges, namely effectively managing the users' contributions, by assessing what is the most adequate type of solver for the posted problem (does the problem resolution profit more from users' expertise, and therefore a more strict selection criteria, or a more diversified overall contribution, with no specific expertise in the field) (Bonabeau, 2009), as well as controlling the knowledge exchanges (Bonabeau, 2009). It is also crucial to have a good understanding of the users' contributions and their expectations from the company – how do they expect the company to behave and act upon them and their inputs (Di Gangi, Wasko, & Hooker, 2010).

Nevertheless, the challenging issues when talking about open innovation arise mainly from within the company itself. The internal structure preparation in terms of tools and processes (Gassmann, Enkel, & Chesbrough, 2010), the incentive and internal communication systems (Lichtenthaler, Hoegl, & Muethel, 2011) and the higher coordination costs (Enkel, Gassmann, & Chesbrough, 2009), adding to the cultural preparation of the company's employees (Lichtenthaler, Hoegl, & Muethel, 2011; Gassmann, Enkel, & Chesbrough, 2010; Houston & Sakkab, 2006), are a few of

the most highlighted concerns companies take into account when opening up the innovation processes.

Therefore, taking into consideration the challenges and potential scenarios is an essential step towards building up a strong and effective open innovation initiative (Chiaroni, Chiesa, & Frattini, 2010; Chiaroni, Chiesa, & Frattini, 2011).

2.2. Implementing Open Innovation

The open innovation model is being implemented in a worldwide basis and by several major companies in many different sectors – information technologies (Gassmann & Enkel, 2004), computers (Di Gangi, Wasko, & Hooker, 2010; Gassmann & Enkel, 2004), fast moving consumer goods (Houston & Sakkab, 2006; Dodgson, Gann, & Salter, 2006), social-purpose businesses (Bonabeau, 2009), automotive and cement (Chiaroni, Chiesa, & Frattini, 2010), among others. This is inherently making some pressure in other companies to follow this new innovation paradigm (Gassmann, Enkel, & Chesbrough, 2010; Di Gangi, Wasko, & Hooker, 2010) as the market demands constantly innovative and fast time to market products (Dodgson, Gann, & Salter, 2006) and consumers are becoming more empowered (Gassmann & Enkel, 2004). This pressure also emerges from several other dimensions: the internet has changed the way, reach and speed of products delivery (Houston & Sakkab, 2006), leading to wider and stronger cross-borders competition; as companies begin to see their competitors, as well as other industries' players, adopting open innovation, they do not want to miss the pace of this new way of innovating (Houston & Sakkab, 2006) – according to Enkel et al. (2009), "once the notion of interorganizational innovation collaboration has entered an industry, everyone who does not participate will cope with serious competitive disadvantages"; innovation partnerships are more easily being held among individuals, universities and governmental labs and institutions (Houston & Sakkab, 2006). Dodgson et al. (2006) stress that opening up to external networks and relationships is nowadays becoming a "must-do" for companies that

want to maximize the potential of their innovation related investments and capabilities (Dodgson, Gann, & Salter, 2006).

As mentioned before, the benefits are several and are reflected not only in reducing the cost structure of the innovation related activities of the company (Dodgson, Gann, & Salter, 2006; Houston & Sakkab, 2006) but also in strengthening employees' relationships, engagement from the clients and other business partners towards the company (Bonabeau, 2009).

However, despite the growing adoption trends and potential pressures that may occur from the market (Gassmann, Enkel, & Chesbrough, 2010; Di Gangi, Wasko, & Hooker, 2010), it is important to recognize the need of a stable implementation period (Chiaroni, Chiesa, & Frattini, 2010; Lichtenthaler, 2011) and to assure the right tools and environment for the sustainable growth of open innovation (Lichtenthaler, 2011).

One company undergoing this innovative process is Procter & Gamble (P&G), with its program "Connect and Develop", implemented in the year of 2002. This program was the answer to the increasing difficulties in accompanying clients' needs, as well as the faster growth rate of R&D, technology and innovation comparing to the sales growth rate (Dodgson, Gann, & Salter, 2006). According to Houston and Sakkab (2006), since its inception, this program has enabled P&G to bring to market 35% of the actually marketed products; improve the R&D productivity rate of innovation by 60% (Enkel, Gassmann, & Chesbrough, 2009; Houston & Sakkab, 2006); double the innovation success rate (Enkel, Gassmann, & Chesbrough, 2009); as well as reduce the cost related to innovation (Houston & Sakkab, 2006). P&G reached these figures by expanding their knowledge base, consisting of 7500 in-house researchers, to approximately 1.5 million talented worldwide people, recognizing the potential benefits of this wider knowledge pool (Houston & Sakkab, 2006). Previously to Connect and Develop, P&G was considered a much closed firm that did not pay enough attention to the external world (Dodgson, Gann, & Salter, 2006). So far, "the model works", conclude Houston and Sakkab (Houston & Sakkab, 2006).

Another company that later implemented this model of innovation was Dell. IdeaStorm, "Where Your Ideas Reign" (Di Gangi, Wasko, & Hooker, 2010), implemented in January 2007, is an online platform where people can submit, vote and comment on ideas from within 30 categories previously provided by the company (e.g., Linux, Desktops, Sales, Strategies, etc) (Di Gangi, Wasko, & Hooker, 2010). One year after its launching, IdeaStorm had allowed Dell to start developing 35 submitted ideas (Di Gangi, Wasko, & Hooker, 2010). By August 2010, 417 ideas, roughly 3% of all the ideas submitted by that time, were implemented (Di Gangi, Wasko, & Hooker, 2010). These results led Dell and IdeaStorm to be recognized in multiple IT and crowdsourcing fields (Di Gangi, Wasko, & Hooker, 2010).

Looking at other multinational companies' open innovation implementation processes and, more specifically, to the strategy plans developed by them, can help prevent some of the potential setbacks that may occur and, therefore, allow companies to design execution plans accordingly. Taking the programs of Dell and P&G as an example, "IdeaStorm" and "Connect and Develop" respectively, some issues can be pointed out as expected open innovation implementation concerns and challenges.

Regarding IdeaStorm, Di Gangi et al. (2010) identified a set of challenges Dell should be aware of when managing its user innovation community. In this particular case, providing the right technology tools as a communication medium between the company and the platform users may affect its successful performance in both positive and negative ways (Di Gangi, Wasko, & Hooker, 2010). Di Gangi et al. (2010) also develop some suggestions concerning those challenges previously identified: ensure the existence of key personnel responsible for a constant accompaniment of the platform and its interactions for a better selection of ideas and to sustain the engagement of the users (Di Gangi, Wasko, & Hooker, 2010).

In relation to Connect and Develop, several implementation strategies were planned, in order to profit the most from the program. To begin with, the company thinks in three big "blocks" in managing Connect and Develop: where to play, how to

network and when to engage (Houston & Sakkab, 2006). First of all, P&G has very well defined targets – it only focuses in ideas that have some degree of success, that have already some working products or prototypes and that are able to respond to consumers' needs (Houston & Sakkab, 2006); it also centres its attention in ideas/products in which P&G's resources (whether technology, marketing or distribution-related resources) could have beneficial impacts (Houston & Sakkab, 2006). P&G also guides its idea screening process by considering: (1) an internally developed top ten consumers needs list, (2) product adjacencies that can help take advantage on the brand equity and (3) technology development possibilities (Houston & Sakkab, 2006).

Connect and Develop managers also acknowledged the importance of focusing in both the organizational and the individual-level determinants influencing the success of open innovation projects development (Lichtenthaler, 2011). This way, another issue that P&G approached carefully when transforming its innovation process was the employees' acceptance. According to Dodgson et al. (2006), this mind set shift was deep and did not happen by night; rather, it took decades. A vital move that lead to the trouble-free transaction between the traditional and the open innovation model was the early preparation, in the 1980's. By that time, P&G adopted a decentralized R&D department, in which the activities were developed around their key global markets (Dodgson, Gann, & Salter, 2006). Huston, the P&G Vice-President of the R&D department, admitted that, without this slow change, the impact of Connect and Develop would not have been that good as it is nowadays (Dodgson, Gann, & Salter, 2006).

Often mentioned in the literature as a very important inertial factor against open innovation implementation is the attitudes adopted by the company's employees toward implementation of open innovation initiatives and the changes it entails (Lichtenthaler, 2011; Gassmann, Enkel, & Chesbrough, 2010; Lichtenthaler, Hoegl, & Muethel, 2011; du Chatenier, Verstegen, Biemans, Mulder, & Omta, 2010). These attitudes have the power to either compromise the potential opportunities open innovation has to offer to the company or to be the success factor of the initiative

(Lichtenthaler, 2011; Lichtenthaler, Hoegl, & Muethel, 2011; du Chatenier, Verstegen, Biemans, Mulder, & Omta, 2010), having, thus, a crucial importance in the project's success. More specifically, an employee can have two broad types of attitudes: not-invented-here (NIH) and not-sold-here (NSH) (Lichtenthaler, 2011; Lichtenthaler, Hoegl, & Muethel, 2011).

Not-invented-here (NIH) attitudes are internal employees' reactions and positions towards the external innovation sources (Lichtenthaler, Hoegl, & Muethel, 2011). Behind these positions may be limited or negative experiences with knowledge transfer for outside of the firm's boundaries; plus, an appropriate incentives system is a great tool to manage and minimize these attitudes (Lichtenthaler, 2011). On the other hand, not-sold-here (NSH) attitudes are a reflection of a protective attitude employees demonstrate towards their internal technological developments (Lichtenthaler, 2011). The reason behind this position is the fear of strengthening competitors' position (Lichtenthaler, Hoegl, & Muethel, 2011; Lichtenthaler, 2011). Taking this in consideration, companies should manage to establish the employees' individual incentives for open innovation initiatives, reducing their adverse attitudes (Lichtenthaler, 2011; Lichtenthaler, Hoegl, & Muethel, 2011).

2.3. Michael Porter's value chain

The value chain is a strategic management tool used for businesses' competitive advantage assessment, applied to the strategic field for the first time by Michael Porter (Lynch, 2009). It consists of a graphical representation of a company's set of activities, being this representation divided into two types of activities: primary activities and support activities (Lynch, 2009). It is particularly relevant for mapping manufacturing industries' activities (Prajogo, McDermott, & Goh, 2008). This distinction represents the different types of contribution the activities provide for the overall value creation. On the one hand, the primary activities are a source of added value to the company by themselves and can symbolize a distinctive resource of the company (Prajogo, McDermott, & Goh, 2008). When maximized strategically, these

activities are a source of sustainable competitive advantage for the firm (Lynch, 2009; Prajogo, McDermott, & Goh, 2008).

Simultaneously, at the top of the graphical representation of the value chain, there are the support activities, which are transversal to all of the primary activities. These activities also add value, as well as the primary ones (Lynch, 2009) and their goal is to provide them efficiency and effectiveness in the product delivery (Johnson, Scholes, & Whittington, 2006). Although they are not the core activities of the company, they still provide the support needed for performing the primary activities**.** Figure 1 is a generic representation of the value chain design.

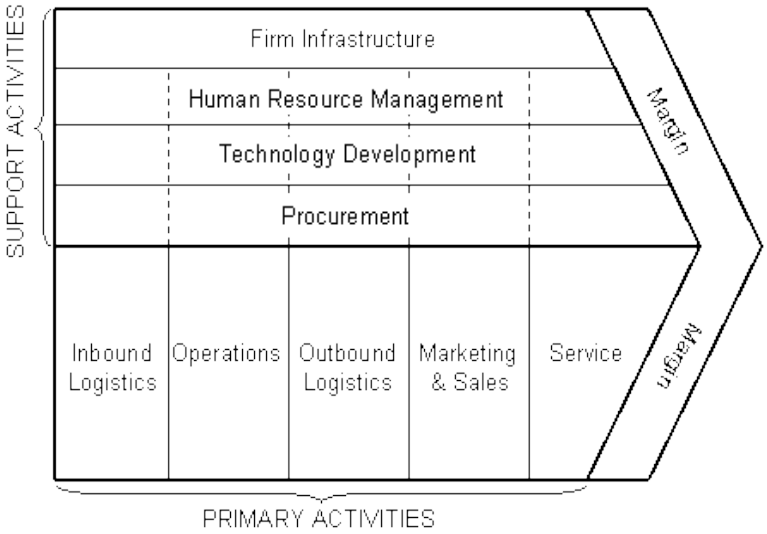

Figure 1 – Graphical representation of the value chain

The purpose of this strategic tool is to evaluate what is the contribution of these activities towards the overall value of the company (Schilling, 2008). Depending on the firm's operations, different activities of the value chain have higher or lower importance in the overall value assessment (Schilling, 2008).

This strategic framework is used under two reasoning: as a generic tool for describing and mapping a company's activities and, in a deeper analysis, as a tool for making a cost-value relationship assessment of these activities (Johnson, Scholes, &

Whittington, 2006). The action of mapping activities allows the company managers to distinguish which activities are being responsible for providing more value for the company and to raise questions on whether the company should more deeply concentrate over these (Johnson, Scholes, & Whittington, 2006). The second part of this value-chain analysis, the cost-value relation assessment, permits the company to make strategic decisions concerning their business, by making a comparative assessment on the cost structure and the value levels provided by a specific activity (Johnson, Scholes, & Whittington, 2006). As Prajogo et al. (2008) stated, there is no certainty whether all value chain activities are equally important drivers for achieving the strategic goal set by the company (Prajogo, McDermott, & Goh, 2008). This way, the company should make an internal critical evaluation, by drawing its own strengths and weaknesses in operational terms (Johnson, Scholes, & Whittington, 2006). The combination of these two analyses allows the company to identify new forms of performing their activities, creating value (Prajogo, McDermott, & Goh, 2008).

2.4. Chapter resume

The literature review of this dissertation starts by a conceptual resume of the open innovation paradigm: what is this new disruptive model, the different types of knowledge transfer and the implications companies should consider before opening up their boundaries.

It also analyzes the literature that touches upon the issues related to implementing open innovation and opening up the firms' R&D boundaries. By giving real examples of worldwide known companies that opened their innovation model, it is also possible to evidence some of the most common challenges, benefits and problems that occur along with the open innovation model. The challenges more often mentioned in these practical examples and in the theoretical literature are the ones related to the firms' individuals and the intrinsic cultural inertia, the intellectual property issues and the communication technologies used as a mean to innovate openly with other entities outside of the firm. Finally, the literature review ends up

mentioning the strategic framework of the value chain – what is it, which goals does it fulfil and how is it used in managerial terms.

The next chapter presents the Portuguese company, Logoplaste, to which this dissertation is applied, explaining how relevant the R&D department (Logoplaste Innovation Lab) is in the delivery of its final product.

III. LOGOPLASTE GROUP

The aim of this dissertation is to understand if there is a balance between the three main areas of a firm – organizational capabilities, project decisions and individual attitudes – and how deep the firm is aware of the challenges and prepared to implement an open innovation initiative in each of those individual areas. In particular, it is an analysis of the Portuguese group Logoplaste and open innovation initiative that is being developed, *The Pollen Project*.

Thus, this chapter aims to present the group, the importance its R&D department (Logoplaste Innovation Lab) has on the company's structure and *The Pollen Project*, the open innovation tool that is being implemented.

3.1. Logoplaste

Logoplaste is a Portuguese Group operating in the industry of rigid plastic manufacturing (Morgado, 2008; Logoplaste, 2012). This company works with some of the most reputable clients in the world, in several industries, such as the soft drinks, water, milk products and food, personal and home hygiene, oil and lubricant products (Morgado, 2008). This manufacturer is the European leading company in the industry of rigid plastic manufacturing (Morgado, 2008).

In the Portuguese market Logoplaste faces no direct competition, due to its unique business model (Morgado, 2008). This company presents a disruptive vertical integration model with the clients it works for. Through the concept *Hole in the Wall* (Logoplaste, 2012), Logoplaste has its own production facilities integrated within the clients' production facilities, in a close and long-term perspective of business partnership. This level of proximity has allowed Logoplaste to strategically reduce the time-to-market of their plastic packaging solutions, as well as the capital operational expenditures (Logoplaste, 2012), because "empty packages don't travel well" (Morgado, 2008).

Concerning Logoplaste's set of activities and taking as a source the work of Morgado (2008), Figure 2 describes the four main areas of activities held in the company's daily business. Logoplaste provides a 360º solutions development, creating complete packaging offers, in the following order: (1) *packaging engineering*, which involves all the strategic and marketing envisioning of the product, the market analysis and the three-dimensional prototyping to ensure the products' viability and usability; (2) *acquisitions*, representing all the relationships built with the raw materials suppliers; (3) *manufacturing*, enclosing the proximity relationship held with the clients in their factories' facilities; (4) concluding with the actions related to *recycling*, through the *Logocycle Project* (Morgado, 2008), as a way of promoting the use of recyclable plastic materials and adopting an environmental-friendly position.

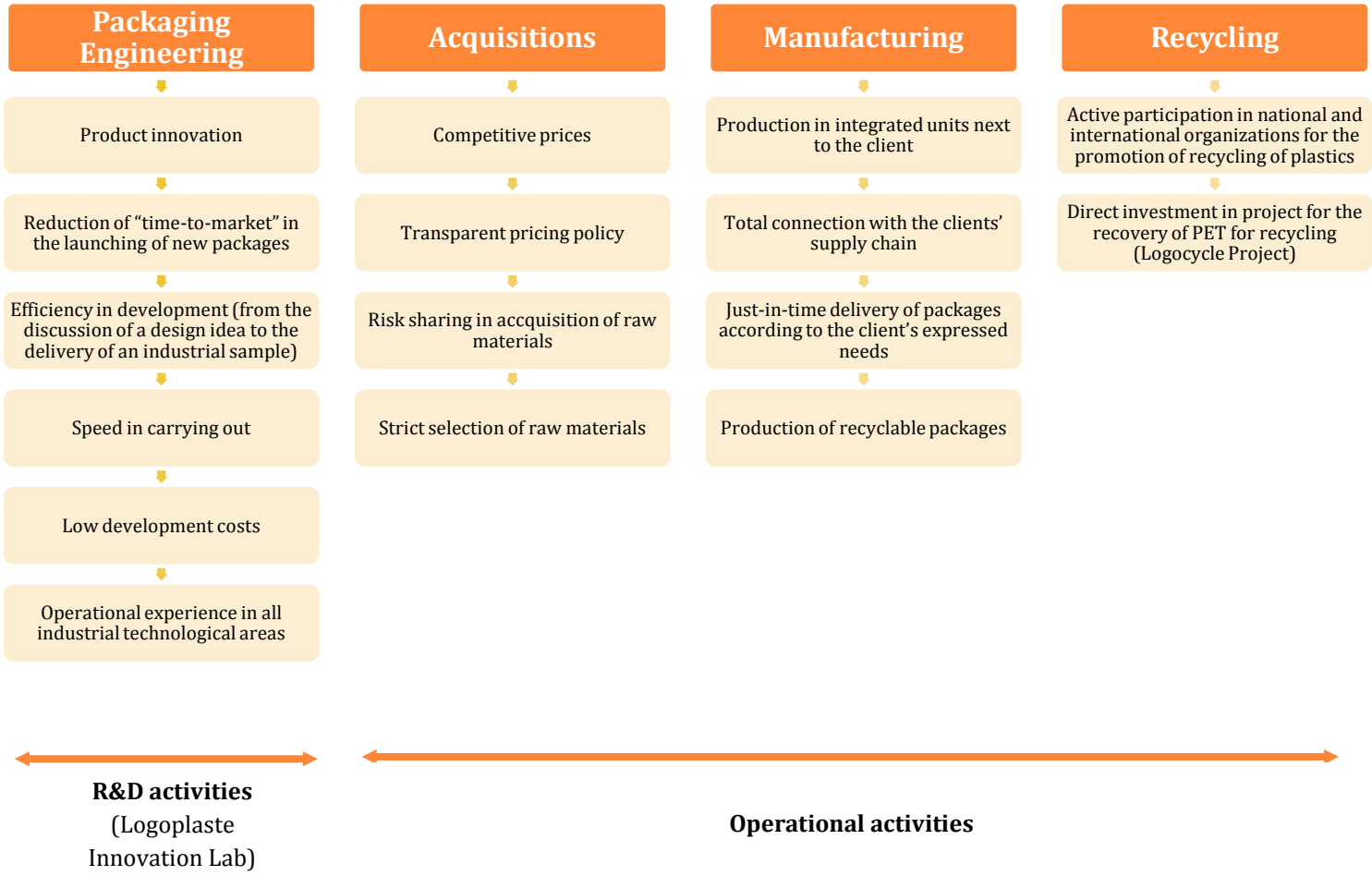

Figure 2: Logoplaste's value chain[1]

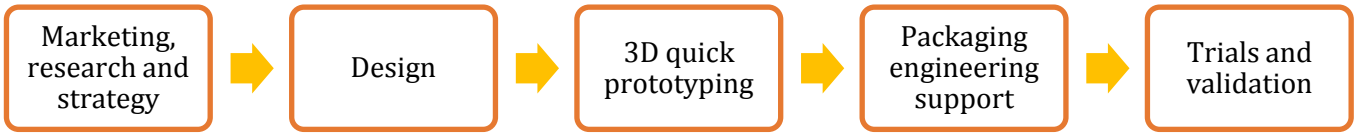

Figure 3: Logoplaste Innovation Lab's flow of activities[2]

[1] **Source:** Morgado (2008)
[2] **Source:** Adapted from Logoplaste's official website: www.logoplaste.com

3.2. Logoplaste Innovation Lab

Logoplaste Innovation Lab (iLab) is part of Logoplaste Group, yet an independent business unit. It is responsible for the research and development activities of high performances and innovative plastic packaging solutions (Logoplaste, 2012). It is placed in three geographic locations worldwide: U.S.A., Brazil and Portugal (Logoplaste Innovation Lab, 2011).

Logoplaste Innovation Lab puts forward a complete, personalized and combined packaging development solution, going from its early marketing and design market research studies, strategy and conceptualization, engineering, manufacturing and implementation support (Logoplaste Innovation Lab, 2011). The goal of iLab is to deliver to its clients packaging solutions that are desirable, feasible and viable (Logoplaste Innovation Lab, 2011). From the value chain mentioned in figure 2, iLab coordinates the first big area of Logoplaste's activities, the Packaging Engineering.

3.3. The Pollen Project

The initiative implemented by Logoplaste, called *The Pollen Project*, takes form as an open innovation online platform. This initiative has the goal of solving packaging problems and challenges, posed and solved by the participants: the company, its business partners, its clients and the final consumer. The overall information of the interviews held with the responsible pemployees of *The Pollen Project* can be found in exhibit 1.

According to the R&D Director, Eng. Paulo Correia, the main target of *The Pollen Project* is Logoplaste's suppliers, the firms who supply the machinery and technologies necessary for developing the packaging solutions. Since this is a manufacturing company, this type of technical knowledge innovation is more valued than the innovation in terms of packaging design, which the firm considers to be a marketing related concern (exhibit 1). Nevertheless, the platform is also open to this type of innovation from the individual users and the companies' clients, in an attempt of better understanding consumer's constantly evolving needs.

In fact, Logoplaste has already some products resulting from open collaboration with partners. According to the project manager, Eng. Márcia Damas, the most recent packaging of the French milk brand, Candia, is the result of a collaborative project between iLab and a machinery supplier. Further information concerning this development can be found in exhibit 1.

According to iLab's internal report of the platform's implementation, the rollout of the platform is divided into two time frames: the "internal knowledge interchange", followed by the "external knowledge interchange" (Logoplaste Innovation Lab, 2012). The first period intends to be a pilot testing within the company's boundaries. At this time, Logoplaste's employees are asked to explore, comment and suggest improvements for the platform to become functional, effective and user-friendly for its final users. They are also expected and encouraged to use the platform for its own purpose – for technical knowledge sharing. The official launching of the platform, when it will become available to the external users, will be after a period of the pilot internal testing, which is yet to be defined by the project managers. Nevertheless, the employees participation in the crowd will not be restricted to the initial phase, given there will be a specific section only for internal technical knowledge exchange.

Therefore, the success of *The Pollen Project* implementation will be dependent on iLab's overall preparedness to deeply implement and adapt the tools, culture and every other dimension that might be affected by this new process of innovating.

3.4. Chapter resume

This chapter presents the company at which the analysis of this dissertation is applied. It introduces the Portuguese rigid plastic manufacturing group Logoplaste, its research and development business unit, Logoplaste Innovation Lab and, finally, *The Pollen Project*, the open innovation tool that is being developed to be internally implemented and tested in iLab, before being made available to the rest of the group.

The next chapter refers to the method and data used in this dissertation. The model proposed covers all the topics mentioned in the literature review as being crucial for the initial stage of an open innovation initiative and intends to answer the proposed research question.

IV. METHODOLOGY AND RESEARCH MODEL

This chapter explains how the method is built in order to answer to the proposed research question, having as a basis the revised literature and the inputs provided by the Logoplaste Innovation Lab Director, Eng. Paulo Correia, and Project Manager, Eng. Márcia Damas. It presents the two intermediary hypotheses raised to help answer the research question. It also clarifies how this method leads to the research model construction.

4.1. Methodology

The implementation of an open innovation initiative represents big challenges (Lichtenthaler, Hoegl, & Muethel, 2011; Di Gangi, Wasko, & Hooker, 2010) and somehow forces companies to undergo changes in its set of resources and managerial approaches (Bonabeau, 2009; Gassmann, Enkel, & Chesbrough, 2010). In order to give an answer to the research question, intermediary hypotheses concerning iLab's current position towards open innovation are raised. Later on, with the results for these, the answer for the research question is elaborated.

Identifying in which of the company's areas the open innovation tool will have impact on is an important ability in order to better prepare the company in general and those areas in particular. More specifically, this need is also important when it comes to the company's employees, i.e., they should be aware of the scope and impacts of the open innovation project. Thus, hypothesis 1 (H_1) holds that:

H_1) "*Logoplaste Innovation Lab's employees recognize the scope and impact of the open innovation initiative and their contribution.*"

On the other hand, assuring the company is equally prepared in every level for opening up boundaries is also essential for the company to successfully sustain the initiative and profit from it; therefore hypothesis 2 (H_2) holds that:

H_2) *"There is a balance among the different areas of Logoplaste Innovation Lab, i.e., they are equally prepared for open innovation."*

The online survey that sustains this dissertation is an outcome of the hypotheses and consists in two parts, respectively: the value impacts assessment and iLab's three-dimensional assessment. In the first part of the survey, respondents are asked to identify what they believe will be the strategic impacts of the open innovation initiative bearing in mind (1) the company's areas of activity and (2) its value creation abilities. These questions help perceive if respondents are sensitive to this topic and if they fully understand the implications and scope the tool carries to the company; ultimately, it is also possible to see if there is a common understanding on the topic. A list of the company's operations is presented, with the help of the strategic framework of the value chain. The sources for these two questions are, respectively, (1) Morgado (2008), presented previously in figure 2 and (2) Logoplaste Innovation Lab's internal presentation (2011) and official website.

Morgado's work (2008), represented in figure 2, divides Logoplaste's activities in "Operational activities" and "R&D activities". The former represent the daily operations in the clients' factories, the processes of manufacturing plastic bottles, recycling, etc. The latter are the ones performed within iLab: planning, testing and developing high-performance bottling solutions and techniques. In the survey, only the list of the "R&D activities" is presented as response options. The rationale behind this selective filter is sustained by the initial reach the company wants to give to the Project, defined by Eng. Paulo Correia – in the initial phase the innovation manager defines the process as a strict R&D related business model. In a more advanced stage of the project, the company may open its reach further to other areas of its operations. In that case, the study will need to be realigned.

After extensive revision of the available literature on the open innovation implementation topic, the second part of the survey consists of the three big areas of a firm, identified by Lichtenthaler (2011): organizational capabilities, project decisions and individual attitudes. This multilevel framework identifies the core contributors of

open innovation processes (Lichtenthaler, 2011). This second part of the survey intends at analysing these three spheres of Logoplaste Innovation Lab and to conclude on the level of preparation of each.

Considering Lichtenthaler's work, firm level capabilities are related with internal processes, i.e., how able is the company to absorb, adopt, maintain and use the knowledge collected from its innovative partners in its own favour. It encloses the capacity that firms have to identify available market opportunities, learn from them and include that new knowledge in their knowledge base for business improvement. When it comes to the project level decisions, the concerns are the ones related to the company's relationship with its partners, in terms of decision criteria, networking capacity, among others. Finally, the individual level attitudes are also considered, encompassing all the attitudes, acceptation, incentives management, etc, that the firm should consider and wisely manage when assessing its preparedness level for the open innovation model, given its important contribute for the initiative's success.

Figure 4, below, explains the hypotheses raised, the connection between Lichtenthaler's conceptual framework dimensions and sub dimensions and the survey's questions, being a schematic resume of the methodology. The answers to the hypotheses will be the intermediary responses to the research question, *"Is Logoplaste internally prepared to adopt an open innovation tool?"*.

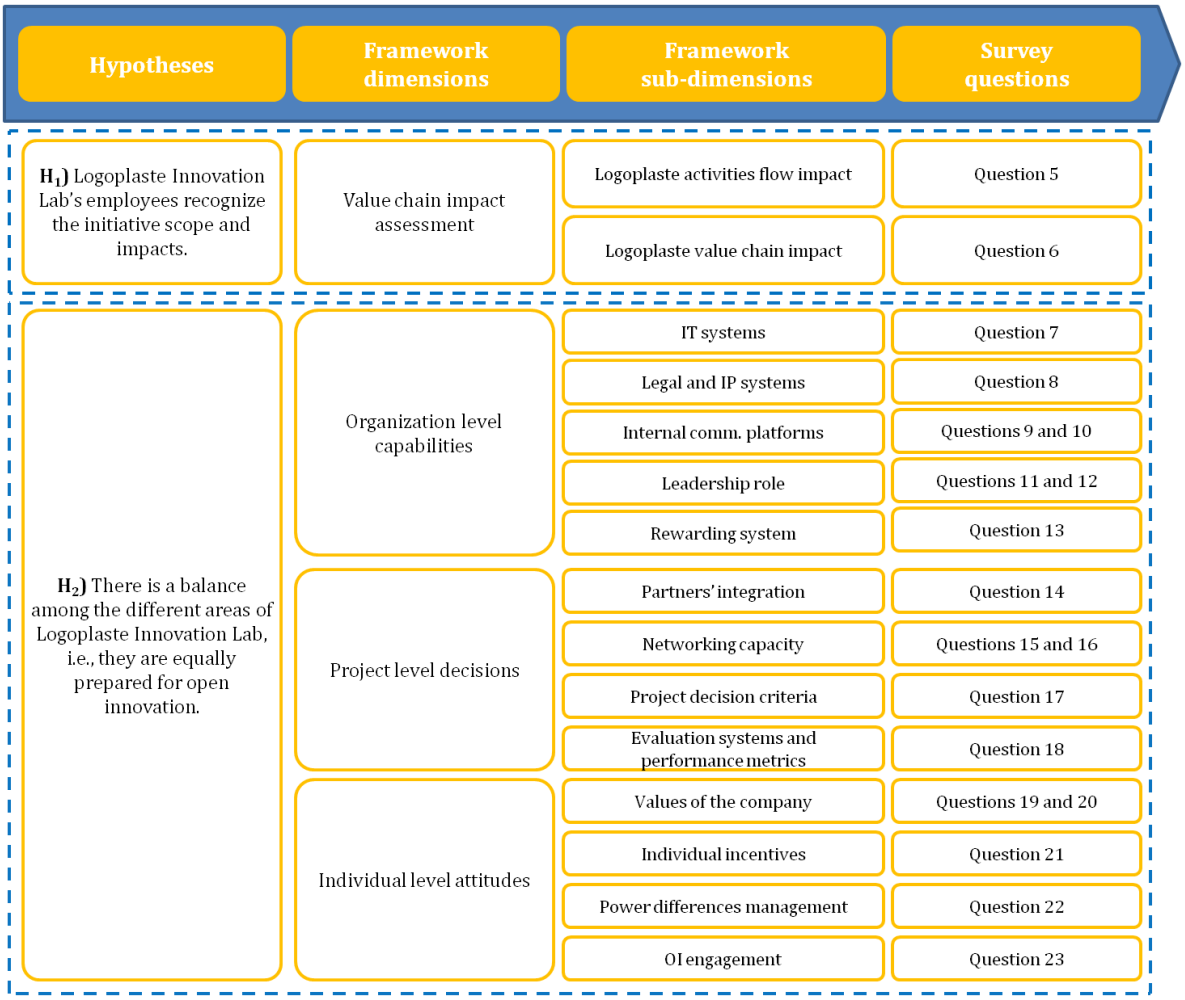

Figure 4: Methodology structure: from the hypotheses, to the survey tool

Hypotheses	Questions number	Questions
H_1) Logoplaste Innovation Lab's employees recognize the initiative scope and impacts.	5	Taking into account the previous description of the platform what is the level of relevance/impact of this tool in terms of results in each of the following areas of activity of iLab? In other words, in which of these areas do you consider the platform's results can be used?
	6	Having again in consideration the platform's description, indicate what is the relevance in terms of value creation in each of the value chain areas of iLab, i.e., what are iLab's value proposals that have the most to win from this open innovation tool?
H_2) There is a balance among the different areas of Logoplaste Innovation Lab, i.e., they are equally prepared for open innovation.	7	What is your level of domain when it comes to the information technologies that are made available to you in your day-to-day, as work tools? (ex. prototyping design programs)
	8	How are the intellectual property policies in iLab?
	9	How often do you use the internal communication platforms that are made available to you, to communicate with your work colleagues?
	10	Under which purpose do you use these communication platforms?
	11	How do you characterize the top management communication towards this platform?
	12	How important is it to you the incentives coming from the top management? I.e., would you accept better this tool if the top management were to be more assertive and insistent in promoting it?
	13	Which would be the most attractive incentives iLab could offer to your participation in this innovation platform?
	14	The following table is about the relationships iLab and its employees sustain with its business partners. Quantify the number of visits iLab's partners make and how often you relate with them.
	15	How often does iLab seek for new business partners and/or business technologies?
	16	Do you try knowing new business partners and/or technologies that you consider would add value to Logoplaste? I.e., do you have the interest in renewing your knowledge towards the tools that might be used in iLab?
	17	In your opinion, who should have the last say when it comes to the use of a certain technology or material resulting from the partnership with an external entity?
	18	How often are evaluated the partnerships and projects in which iLab is involved in?
	19	Which values do you identify in iLab as a company?
	20	Which values do you identify yourself with?
	21	What are your personal incentives/motivations towards the platform?
	22	How easily do you work… (In case you were never faced with these situations, indicate what would be your most probable reaction.)
	23	Generally speaking, what is your opinion towards the open innovation platform? Evaluate the project according to the following dimensions, in a growing scale from 1 to 4.

Table 1: Hypotheses and survey questions correlation

The questions of the survey are adapted to the particular case of Logoplaste Innovation Lab and *The Pollen Project*, given this is a very specific company with a very specific open innovation tool. Plus, it also considers the early stage in which this tool is still at.

Taking into account the statistical considerations and the data's subsequent analysis, the answers for the survey are presented in a four-item Likert scale (Trochim & Donnelly, 2008), i.e., respondents are asked to rate their answers in a scale going from 1 to 4. The number of items for this scale is defined this way because, by being an even number, it somehow obliges the respondents to answer either "positive" or "negative", i.e., to make a stand in that particular question or subject, which would be more difficult with a odd number scale (in an even scale there is no middle choice). This is particularly relevant for this dissertation and this assessment, given the fact that the open innovation platform is still being developed and iLab employees cannot predict what their reactions towards it will be like. This way, for these cases, the answers are either an assumption of how people think they would behave or the worst case scenario. Using this scale is a way of minimizing this weakness of the analysis.

The next chapter entails the statistical analysis of the results drawn by the survey and the interpretations of these results. It is divided in three big areas: the survey sample characterisation, the value chain assessment and the three-dimensional assessment, based on Lichtentaler's (2011) framework (being the latter divided into the analysis of the three clusters).

V. DISCUSSION

The survey that serves as a basis for this analysis is applied to Logoplaste Innovation Lab's employees, both in Portugal, the U.S.A. and Brazil, which allows having a wide response base and, consequently, less biased answers. The total number of iLab employees is 36 people. The total number of answers collected is 26, representing a 72,2% sample of the total population.

For the same survey, two versions are made available – a Portuguese version, for the Portuguese speaking employees and an English version (available in exhibit 3), for all the other cases, in a way of preventing potential misunderstandings arising from the survey being in a different language than the respondent's mother thong.

The post-survey study consists in analyzing some statistical tools, such as the average, the maximum, the minimum and the standard deviation of the responses, in order to understand how the general opinion of the respondents is over a certain question or topic and how similar are those opinions, i.e., what is the general level of accordance in that cluster of questions. Adding to this, there is the idea that is mentioned previously in the literature: the goals, vision and expectations of any open innovation initiative should be aligned between the company and its employees. Only this way the implementation efforts and investments will be successful.

As said previously, this analysis is composed of the three main parts of the survey: the sample characterisation, the value chain impacts assessment and the three-dimensional analysis of the company – the organizational level capabilities, the project level decision and the individual level attitudes assessments –, allowing to make a deeper analysis over Logoplaste Innovation Lab and how prepared are these areas for the open innovation challenge.

5.1. Survey sample

The survey was sent to every 36 employees of Logoplaste Innovation Lab, both in Portugal, U.S.A. and Brazil. From a total of 26 random respondents, approximately

85% are men (22 people), while the remaining 15% are women. The average age is approximately 35 years old, being the maximum 60 years old and the minimum 21 (corresponding to a 9,41 years old standard deviation). In terms of company longevity, nearly 70% of the respondents have been working in Logoplaste Innovation Lab for longer than 3 years, while only 30% work for a smaller period than that.

In order to make an introduction to the broad topic of the open innovation tool and to have a first impression of the employees' awareness, the question "Do you know what is this open innovation platform that is being developed nowadays?" is asked. A result of 73% shows that a great percentage of employees are aware of this project that will shape the company's business model.

5.2. Value chain impacts assessment

As mentioned in the previous subsections, the survey consists in two parts: the value chain impacts assessment (both in terms of activities areas and value creation ability) and the three-dimensional analysis assessment based on Lichtenthaler's conceptual framework. The first section intends to understand if Logoplaste Innovation Lab's employees recognize how will it affect their daily business and at which scope, i.e., in which activities will the initiative interfere (question 5) and what will be its contribution to the company's value creation capacity (question 6).

The managerial concept of the value chain is used to characterize the activities held at Logoplaste group. A brief description of the platform, its goals and target are also provided (Logoplaste Innovation Lab, 2012), in order for everyone to be equally aware of the survey's description and scope.

Considering Logoplaste's internal activities description (2012) provided in question 5, there is a big level of concordance in the responses: the activity area that is pointed to gain the most from *The Pollen Project* is the Design (average of 3,7 in a 1-4 Likert scale). However, according to Paulo Correia and Márcia Damas (see exhibit 1), despite being also a place for packaging design suggestions, the initial goal and scope

of the platform is to create partnerships with business suppliers, partners and internal employees, at a technical level, to improve techniques and materials, in an attempt to develop better and optimized manufacturing processes. Nevertheless, this exchange of knowledge may directly or indirectly contribute to also improve Logoplaste's product (rigid plastic bottles) in terms of design. This contribute will be further achieved when the platform is open to external communities, after the first internal pilot testing period.

On the other hand, the area that gathers the biggest agreement in being the least affected is the Packaging Engineering Support, followed closely by Trials and Validation. As said earlier in chapter III, when describing Logoplaste group and Logoplaste Innovation Lab business unit, these parts of the value chain are the most demanding in terms of specific technical knowledge and resources, reducing the ability of people from outside of the company's boundaries and knowledge base to contribute for this topic. The respondents understand quiet well these implications, given these are the areas with the lowest average rates (2,65 and 2,85, respectively).

Simultaneously to this, considering Logoplaste's value sources pointed out by Morgado's work (2008), in question 6, employees identify Product Innovation as the biggest advantage in terms of value creation of such initiatives, immediately followed by Efficiency in Development. Their opinion and vision is aligned with the initiative management's goals, which points out these advantages in their pursuit of an open innovation based business model**.** On the other hand, the Development Costs are the dimension that is expected to gain the least with the open innovation tool, according to the respondents (average of 2,85).

As a conclusion, considering the data analysed in this subsection, Logoplaste employees have identified with ranking measures the firms' areas of activity and value sources they believe *The Pollen Project* will affect and improve. According to the plotted average used as criteria, the less technical activities, such as Design and Marketing, Research and Strategy are the ones presenting the highest values. They believe these activities can be performed by people from outside of the company's

knowledge base. In terms of value creation, the top mentioned sources (using the same criteria as before) are product innovation and efficiency in development. These results go in line with both the expectations and goals of the project managers and the literature review on R&D companies' benefits in implementing open innovation.

5.3. Lichtenthaler's three-dimensional analysis

This subsection is an applied analysis of Lichtenthaler's conceptual framework (2011) on the three dimensions of a firm to Logoplaste Innovation Lab. It provides an assessment of each cluster defined by the framework, which are later compared among them and to consequently answer hypothesis 2, on whether there is a balance between them.

5.3.1. Organizational level capabilities assessment

The survey questions related to the organizational level capabilities cluster are designed to have a deeper understanding on the company's knowledge capacity and retention and how the respondents interact with these. As can be seen in exhibit 2, questions are at the level of information and communication technologies, intellectual property policies, communication and incentives management.

For question 7, concerning the knowledge and level of dominance the respondents have over their daily work information technology tools, the average response is 3 (out of a 4 scale), with a 0,85 standard deviation. Although being a result above the average, this result can be considered weak, due to the question to which it refers: daily working tools. However, this result can be explained by the multiple working functions the enquired employees perform internally, i.e., if there is some manager in the respondents' pool, he/she does not have the need to work with technical tools such as prototyping design programs.

The perception of iLab employees on their in-house intellectual property policies is analyzed in question 8. The results (average 2,45 and standard deviation

0,90) show there is a very strict policy on intellectual property rights in iLab's technologies and knowledge. This is even the question that presents the lowest average result in this cluster of organizational level capabilities.

Questions 9 and 10 analyze the relationship between the employees and the communication tools they are given to work with. In a 1 to 4 scale, employees use these tools with an average frequency of 3,42, 62% of the times in work-related issues and the remaining 38% in both work and leisure related issues.

By analysing question 11, the internal communication towards the open innovation platform is well rated by the respondents (in a 1-4 Likert scale, the average response is 3,2 and 2,6, respectively), presenting a slight difference between the independent business unit Innovation Lab and the group Logoplaste, i.e., the promotion within iLab boundaries show a higher average rate in terms of recognition and reach than at the level of the group Logoplaste as a whole. Adding to this, the responses concerning Logoplaste group are also more scattered, presenting a standard deviation of approximately 1,1, while the ones of iLab present a 0,8 standard deviation. According to Márcia Damas, this outcome was somehow expected, due to the fact that the platform is still in pilot testing within iLab and it is still not relevant for the general management to promote it at the group level. In future researches, and if the platform is actually extended, this difference is expected to decrease, for it will be accessible to every employee of the company.

In a complementary analysis to the previous question, bearing in mind question 12, in the matter of the importance given to the incentives from the two different management seats, iLab has again a grater average result – approximately 3,2 versus 3 for the Logoplaste group. However, this difference is smaller than the one verified previously. From this, one can conclude iLab has a strong team spirit, and the top management incentives have a high recognition effect from its employees.

When asked about what the company could provide as incentives for their participation (question 13), out of a total pool of 60 answers, the respondents mentioned 16 times the option of "Career evolution" (27%), showing commitment

and sense of belonging to the company. This option is, however, not very far from the top two, “Monetary rewards”, nor the top three, “Recognition by the company/director”, mentioned 15 (25%) and 14 times (23%), respectively. The less voted options are “Fringe benefits” and “Internationalization”, mentioned 9 and 6 times, respectively.

Finally, looking to the qualitative questions of this dimension, the only two questions that are answered on a multiple choice basis are “Under which purpose do you use these communication platforms?”, question 10) (complementing the previous question of “How often do you use the internal communication platforms that are made available to you, to communicate with your work colleagues?”). For the first one, the responses are not relevant to be mentioned and analyzed, since they represent no unusual data.

From what is possible to conclude in this subsection, considering the methodology’s sub dimensions (see exhibit 2), the weakest one of this cluster (i.e., lowest average ranking) is the ‘legal and IP systems’ perception: employees perceive this a closed and a tight internal matter of concern. This issue must be considered by the company’s innovation management: is it only a perception of the employees or the real situation? Should there be any position by the company to correct this perception, in case it is correct? On the other hand, the ‘internal communication platforms’ sub dimension is the biggest strength of the cluster, for it presents the highest average ranking. This represents a good advantage of the company in terms of communication ability, a highly valued capacity of open innovation teams.

5.3.2. Project level decisions assessment

Opening up the company's boundaries implies having to deal with external business entities, namely suppliers, customers, business partners, etc. In the particular case of this platform, the survey analyzes the relationships between the employees and the company's suppliers (the potential and the current relationships), which are the main target of the project.

Starting off with the number of times Logoplaste Innovation Lab employees physically (in a face to face situation) interact with external partners (question 14), in a 1-5 Likert scale (going from "Never" to "More than once per week"), the average of result is 3 ("Two to three times per month"). Despite being a quite acceptable result (3 is coincident with the given scale's average), this question presents a significant standard deviation, of approximately 1,2, meaning that the not all employees have the same perception on this issue – not all of them recognize and are aware of external partnerships. Another issue, in the same question, that is even more debatable is the number of times these same respondents interact with those same partners. Using the same scale, the average for this question is smaller: 2,8. Along with it, the standard deviation is higher, 1,4, revealing that there is still a big part of the respondents that do not have the habit of dealing with external people in a business context – half of the total respondents pool answered "Never" or "Less than once per month". These numbers can be related with the lack of awareness mentioned in the previous question.

The frequency of new partners' pursuit is also an indicator of how committed the company is toward the innovation culture. Therefore, the respondents answered question 15, "How often does iLab seek for new business partners and/or business technologies?". Using the same 1-4 Likert scale (being 1 "Never, 2 "One to four times per year", 3 "Five to ten times per year" and 4 "More than ten times per year"), the average response is 3,1 approximately, whit a standard deviation of nearly 1. Again, the average result can be considered positive (3,1 is higher than the scale's average), although the standard deviation denounces a lack of common opinion over this topic.

This means that not all respondents see Logoplaste as a company frequently looking for new partners – it gives, somehow, a sense of stability.

Because the search of new business partners should also come from the employees in a volunteer manner, question 16 asks whether respondents look for new partners/technologies that could help improve Logoplaste's business model. All of the 26 answers gathered for this question are "Yes".

Considering the question of who should have the last say in external partnerships, question 17, despite the big part (71%) of the respondents have answered the most "democratic" option, that this decision should be a mix of all the parties involved in the project, the remainder 29% answered it should be a decision on the Logoplaste's R&D Director – out of four options that were given, only two were selected, representing a great level of agreement and team spirit among the respondents.

The final question of this subsection is about the frequency of projects development evaluation in iLab, question 18. Opening up the innovation process means managing development projects with different teams (from within and outside Logoplaste) and having a greater level of control than if the process was developed only internally. For this question, again, a 1-4 Likert scale is used, being 1 "Never" and 4 "Every stage of the project is evaluated". The question's average is 2,9 with a standard deviation of nearly 1. Like in the previous question, the responses' average is reasonably good, despite the quite high standard deviation.

To wrap-up, based on the information gathered in this subsection one can take a few conclusions: in general, iLab employees do not recognize the interactions between the company and external entities (question 14). This may be a starting point for the company to show there is a real commitment and initiatives in the open innovation direction. Plus, the

5.3.3. Individual level attitudes assessment

As highlighted in this dissertation's literature review, the individual employees' attitudes towards any company's initiative are part of its success. This takes particular relevance when it comes to opening up the company's boundaries, acquired knowledge and corporate private information to external entities. This subsection intends to analyse the potential of adoption of this platform by Logoplaste Innovation Lab, more specifically looking into its employees' attitudes. This part of the analysis considers the relationship the employees maintain with the company, the opinions and perceptions of the employees towards the platform, as well as their intrinsic motivations and incentives for actively participating and contributing for it.

From a given list of values, the first two questions of this subsection ask what are the top three values that the employee identifies in the company and to which does he relate himself with the most. The match between these two values assessment is presented in exhibit 4.3.3, questions 19 and 20. For both questions, the value getting the highest absolute frequency is "Innovative" – 18 times mentioned as a value of the company and 16 mentioned as a value of the employees themselves. The second value having the closest coincidence is "Flexible", being placed at the second and third highest places for the company and the individuals, respectively. The third perfect match, which occupies the eighth place in the ranking, is "Goal focused". Exhibit 4.3.3 also presents this ranking. The most uneven frequency results are seen at the value "International", with a difference in the overall ranking of 8 (mentioned 11 times as a company value and 4 times as a personal value), followed by the value "Humble" at a 5 points ranking difference (mentioned 4 times as a company value and 8 times a personal value). These results represent a matching of the value assessments of approximately 30% (3 of the listed values have a difference of average close to zero).

When asked about the top three intrinsic motivations of participating in the platform, in question 21, the added-value mentioned the most is "New knowledge and competencies", mentioned by nearly 39% of the responses pool (chosen 24 times), being immediately followed by "Contribute for the company", with 34% relative frequency (21 times mentioned). However, no respondents answered their

participation would be motivated by their “Peers recognition”, while the “Top management or superior recognition” is valued by 7 people. On the other extreme, the most “counterproductive” motivations are the ones being less mentioned: “I will not gain anything”, “Peers recognition”, “I will have more work and obligations” and “It will enter in conflict with my work” were never chosen.

Question 22 intends to understand the likelihood of employees accepting to work with different people/hierarchical chiefs different than their regular ones (a typical scenario of an open innovation project). In a 1-4 scale, the average response of “How easily do you work with a team different from your regular one?” is 3 and a standard deviation of 0,49 (the smallest for this cluster), while “How easily do you work with a project manager different than your direct responsible or co-worker?” presents an average of 3,08 and a standard deviation of 0,39.

Finally, the last question of the survey, number 23, provides a list of adjectives, which the respondents are requested to classify in a 1-4 scale (being 1 “null”, 2 “reasonable”, 3 “very” and 4 “very much”). The highest average response is approximately 3,3, for the option “Aligned with Logoplaste's image of an innovative company”, followed by an average of 3,2 for “Relevance for the company”. Despite these quite good results, the option that presents the lowest average response is “Visible results” – although the respondents recognize the relevance and contribute of this platform to the company, they are aware that it will not have visible results. This result is somehow related to the next two least voted dimensions: “Explicit” (2,8) and “Practicability” (2,8).

As a conclusion, having in mind the results of the survey for this subsection and looking at this cluster for itself, the employees show the lowest average ranking in the ‘Power differences management’ related question, number 22, showing little inertia to external entities. However, on the other hand, the personal motivations identified (question 21), as well as the initiative’s evaluation (question 23), show some inconsistency in this cluster’s results. The next chapter draws the conclusions on the hypotheses, based on this outcome.

5.4. Hypotheses conclusions

In order to answer to the research question, the hypotheses previously raised as intermediary tools are answered in this subsection. Only then it is possible to give a response to the question *"Is Logoplaste internally prepared to adopt an open innovation tool?"*.

To conclude on hypothesis 1, *"Logoplaste Innovation Lab's employees recognize the initiative scope and impacts",* knowing the business of Logoplaste Innovation Lab and the initiative's goals and predefinitions is essential. Based on the information gathered on the internal presentations and informal meetings held with the Director and Project Manager about *The Pollen Project*, its goals and scope, and comparing this information with the results of the surveys, one can conclude iLab employees recognize the business specificities, what will be the space reserved for the open innovation initiative and in which areas it will have contributions to give. Employees recognize the strengths of their company and the specificities of the activities that can be improved (and those that cannot) by open innovation initiatives (for example, as mentioned in chapter 5.2., Packaging Engineering Support is identified as the least affected area due to its technical requisitions, while the activity of Design is the one considered the most accessible and improvable from an open innovation standpoint). This way, *hypothesis 1 is verified*.

For the analysis that is performed in this dissertation, it is not viable to withdraw conclusions on each of the three-dimensional framework clusters by itself, on its own. This way, the need of making a relative analysis of the three is essential to reach the conclusion of the research question. Hypothesis 2, *"There is a balance among the different areas of Logoplaste Innovation Lab to adopt open innovation in the daily business.*" takes that into account and analyses the relative position of the three clusters. To make that comparative analysis and to conclude which one is the strongest in terms of consistency and preparation, the ranking of every quantitative questions' standard deviation (previously calculated) is determined (see exhibit 6 for the global picture of the statistical analysis); subsequent to that, to make the three clusters comparable (since they all have different numbers of questions) the average

of this ranking for each dimension is plotted (i.e., every quantitative question of each cluster is plotted), serving as a comparison measure between them. Knowing this, the cluster with the lowest average (the project level decisions cluster) is the one that is the best prepared for *The Pollen Project*, while the one with the highest average (the individual level attitudes cluster) is the weakest and needing the biggest accompaniment from the company's innovation management. This result is somehow expected, for it is less demanding, in terms of workload, to change and adapt organizational systems and management policies than changing human behaviors (Dodgson, Gann, & Salter, 2006; Lichtenthaler, Hoegl, & Muethel, 2011). This way, it is possible to conclude that there is no balance between the three dimensions, since the individual level attitudes dimension is weaker than the other two clusters in terms of average ranking standard deviation. *Hypothesis 2 is not verified.*

These are the conclusions for the hypotheses. The following chapter draws a global conclusion to the dissertation, i.e., the answer to the research question. It is the result of the combination of the two intermediary conclusions presented in this chapter.

VI. CONCLUSIONS

In this chapter one can find the conclusion of the research question, i.e., the answer to "*Is Logoplaste internally prepared to adopt an open innovation tool?"*, by analysing the hypotheses' answers previously given in chapter 5.4. It also includes the managerial implications of the findings for the company, the limitations of the study and the room that is left for future research.

6.1. Research question conclusion

Through the literature revision, it is possible to see that open innovation is the new innovation management approach in the modern and multinational companies (Billington & Davidson, 2010; Lichtenthaler, 2011; Chiaroni, Chiesa, & Frattini, 2011; Boscherini, Chiaroni, Chiesa, & Frattini, 2010; Lichtenthaler, Hoegl, & Muethel, 2011; Chiaroni, Chiesa, & Frattini, 2011). It is being adopted at an increasing rate and at the most different and diverse industries, such as pharmaceutical, consumer goods, information technologies, etc. Its benefits are several and proven: reduced R&D cost structure (Enkel, Gassmann, & Chesbrough, 2009); strengthening of the consumer, employees and partners' relationship with the company (Lichtenthaler, 2011; Chesbrough H. , 2003a); time-to-market reduction and shorter innovation cycles (Enkel, Gassmann, & Chesbrough, 2009), among others. Having detected this, Logoplaste considered there could be space of improvement for its business model, highly based in R&D activities (see exhibit 1).

However, as mentioned in the literature, open innovation implies deep organizational changes (Chiaroni, Chiesa, & Frattini, 2011), thus the need of having a strong implementation strategy and support plan, due to its implications and dynamics (Chiaroni, Chiesa, & Frattini, 2011; Boscherini, Chiaroni, Chiesa, & Frattini, 2010). This way, this dissertation aims at understanding whether Logoplaste has an initial awareness and preparation for such project, being its research question *"Is Logoplaste internally prepared to adopt an open innovation tool?".* To answer this

question, two hypotheses were raised in the beginning, in order to reach two intermediate conclusions:

H_1) "*Logoplaste Innovation Lab's employees recognize the scope and impact of the open innovation initiative and their contribution.*"

H_2) *"There is a balance among the different areas of Logoplaste Innovation Lab, i.e., they are equally prepared for open innovation."*

The answers to the hypotheses are given having as a basis the analysis on the survey developed upon Morgado's case study on Logoplaste (2008) and Lichtenthaler's three-dimensional conceptual framework (2011); for each of the two hypotheses, a set of questions is raised (to see this correlation, consult figure 4 and table 1), allowing, thus, to sustain the conclusions.

The intermediate conclusions are highlighted in section 5.4.: H_1 is validated, for employees are able to identify what are the most affected/improved areas of such initiative. For this conclusion, the meetings held with the R&D Director and Project Manager serve as a decision criterion: the scope that is defined for the platform in this initial pilot testing period (the areas that will be susceptible to contributions). H_2, on the contrary, is not validated, due to the unbalance between the three dimensions: as seen previously, the individual level attitudes dimension is the weakest among the three in relative terms of consistency.

Recognizing the previously said – being H_1 validated and H_2 not –, one can say Logoplaste Innovation Lab is not internally prepared to receive *The Pollen Project* in their business model, being this the answer to the research question of this dissertation. This response is a combination of the two hypotheses results: from one side employees are aware and conscious of the impacts and scope of the initiative (H_1) but on the other, in order to be fully prepared, the company still needs to improve on their weaknesses (H_2).

Despite H_1 is validated, there are still some inconsistencies of perception in its answers that need to be corrected: for instance, Design is mentioned as the most

affected area of activity, while the project managers have predefined this to be the activities related with the technical specificities of the materials and manufacturing processes (see exhibit). This scope and initial goals have to be further defined and explained by the project managers in order to reduce this misunderstanding among the employees. On the other hand, H_2 is not validated according to the unbalance existent between the three clusters. This result is particularly relevant due to the importance of the weakest cluster: the individual employees' attitudes are the main concerns a firm's management bares in mind when taking forward organizational changes, because its support and collaboration can either be a boost or a setback for the initiative's success.

Taking into account the response of H_2, the suggestions presented in the next subsection are in line with this need of Logoplaste Innovation Lab. Some suggestions are also made for the other two dimensions of the conceptual framework, bearing in mind the questions in which the results are lower or less consistent.

6.2. Managerial implications

After having analyzed the survey in statistical terms, this subsection analyses what are the main implications for the management of those results in terms of innovation management. It also includes some practical suggestions for an optimal implementation process, based in real companies' case studies mentioned in the literature review and the particular case of Logoplaste.

As mentioned in the literature review, ensuring the correct communication strategy is essential to reach every employee and to gain their attention and positive feedback with respect to the open innovation platform (Almeida, Oliveira, & Cruz, 2009; Chiaroni, Chiesa, & Frattini, 2011). Having the employees motivated and interested is one of strongest long term sustainability pillars of the initiative (Lichtenthaler, Hoegl, & Muethel, 2011; Gassmann, Enkel, & Chesbrough, 2010; Lichtenthaler, 2011; du Chatenier, Verstegen, Biemans, Mulder, & Omta, 2010). This way, presenting the advantages and potential growth the company can potentially

achieve must be the core strategy to tout them to the initiative. The first suggestion is based on this – an initial and formal presentation should be made to the iLab employees, followed by a questions and answers session. It should be held in the day of the project's launch and a live explanation must be performed in this session: how to create an account, how to consult the challenges open for discussion, how to contribute to those, etc. Basically, all the functionalities of the platform must be covered in this session so that everyone will understand them. This initiative will show the company is committed to the investment made in this development, as well as in their employees' concerns. It is also a way of adopting a transparent and accessible communication of the platform.

Although the dimension of the individual attitudes is the one with the less consistent results (see subsection 5.4), a set of suggestions is made below to strengthen the steadiness of the other dimensions' results.

For a strong implementation in terms of organizational level capabilities, several aspects have to be considered in the overall strategy. The company must be able to provide the resources and knowledge needed to perform in such open environment. One of the main concerns that arise from this boundaries opening process is the incentives management, a topic raised in question 13 of the survey. As it is possible to see from the results graph in exhibit 4.3.1, two of the top three incentives mentioned are related with the employees' personal commitment with the company – career evolution and recognition by the company/director. Thus, the suggestion is that a recognition system is created to profit from this result. It can either be a period spent with the company's CEOs, the possibility to be manager on the project resulting from *The Pollen Project* to which the employee has contributed, an official thank you note written by the CEOs or the R&D Director, etc. It must also be the most transparent possible, ensuring there is no conflict of interests behind its management policies. A raking of the participants and their participations must be created, to boost the creativity and competition among the employees, as well as to keep it transparent.

Concerning the project level decisions, the business partners' relationships are the main concern. The search of new business partners and technologies must be accessible and encouraged to every employee, as a strategy for gathering their motivation and commitment. Every suggestion and contribution must be considered and feedback must be given to assure there is no loss of motivation from the participants if their suggestion is refused. Also related to this, there is the need of having a transparent accompaniment of the projects that are raised as a result of *The Pollen Project*. A frequent point of situation is a way of overcoming this drawback, by means of an internal newsletter, registering every remarkable evolution of the project.

Despite the suggestions made, as Chiaroni et al. (2010) highlight, open innovation requires constant experimentation and adaptation processes. In case of any less positive outcomes in this initial phase, Logoplaste management must always adopt a trial-and-error perspective and be constantly adapting the strategy of approach to the market needs and initiative players' requirements. Since *The Pollen Pro*ject is still at a very embryonic stage, the suggestions made in this chapter serve as prevention for potential weaknesses and drawbacks in the implementation process, having in consideration the literature review and the conclusions taken from the survey. They might have to be further developed, depending on the evolution of the implementation process – for example, given its importance to the initiative's success, the recognition system must be aligned with the employees' motivations, which are at constant change; thus, it may need adaptations as time goes by and requirements change. This rational is also applicable to every other strategy adopted by the company.

6.3. Limitations

The main limitation of this dissertation is the fact that *The Pollen Project* is still being developed by the time of its submission. The fact that none of the respondents has used yet the platform may have biased their answers, which were often a pessimistic perspective and expectation of the initiative, because of the unknown. This brings up

the implication of people answering according to the way they think they behave, instead of how they actually do behave.

Another limitation of this dissertation is the analysis that could have been deeper and more invasive if the assessment had not only been through an online survey but by randomly choosing some iLab employees and interviewing them, assessing their motivations and expectations toward the initiative. However, through the conducted online survey, it was possible to get more quantitative and standardized conclusions.

Finally, adding to this, these results could have been more reliable if the sample had been bigger – in terms of respondents (with 100% of the population) and the number of companies involved in the study – so a broader conclusion could have been drawn.

6.4. Future research

Despite the conclusions achieved in this study, there is still a lot to explore over the open innovation implementation topic.

In a future analysis, this assessment can be repeated within the same company. It will be possible to assess the evolution of Logoplaste Innovation Lab in terms of preparedness and willingness to adopt this tool. This way, it will be possible to conclude whether iLab is able to expand the access of the tool to the other business units of Logoplaste, if it will need further corrections and adaptations or if it will not be feasible at all at the group level.

Another application of this research is the use of the same framework of analysis for different companies in different industries and stages of implementation. Although the survey applied should have some industry or company-specific questions to make better and more suited conclusions, the dimensions that serve as a basis should be the same three. Nevertheless, other dimensions may also be added. Ultimately, this evolutionary analysis would allow companies to point out their

weaknesses and prepare those areas for the adoption of open innovation tools, as it is concluded in this dissertation for Logoplaste Innovation Lab.

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EXHIBITS

Exhibit 1 – Logoplaste Innovation Lab interviews

The information presented in this exhibit is the result of several informal meetings held along the process of writing this dissertation with the Logoplaste Innovation Lab Director, Eng. Paulo Correia and the Project Manager, Márcia Damas. It is a resume of the descriptions, expectations and planning of *The Pollen Project*, which were later complemented with the internal presentation documents on this project.

1. What is TPP?

The Pollen Project (TPP) is an open innovation platform that is being developed internally at Logoplaste Innovation Lab. Its goal is to improve and create new bottling solutions and processes. Being based in the rising concept of open innovation, it intends to be a place of knowledge sharing between several and different intervenients of the process of bottling with access to different resources and knowledge areas: Logoplaste employees, business partners, clients, etc.

2. Where did the need of this platform arise from?

We have recognized the importance and impact of the new innovation paradigm that is being quickly spread all over the world at very different industries. We considered there could be room for Logoplaste Innovation Lab to try it in its very particular and unique business model. Actually, we have proof of the potential of this type of collaborative initiatives. One of the products being internally produced is the result of a partnership, with a machinery supplier: the French milk brand *Candia*. This collaboration allowed the use of a PET structure in two layers (white outside and black inside) in milk packaging, which combines a specific brightness to the plastic, as well as light protection to the packed product. It also allowed for a more efficient resource allocation, permitting less plastic quantities used per bottle, comparing with the actual technology of HDPE extrusion. Although not visible or recognized by the final user, this was a major break-through in Logoplaste's knowledge, because it was the first time this technique was used in this type of product with such specific requirements.

3. What is the target of TPP? For whom is this platform directed to?

The target of *TPP* is everyone: from the Logoplaste Innovation Lab employee, to the top manager, the business partner (as an example, machinery providers), etc. In this first phase it is still closed at a pilot test for the Logoplaste Innovation Lab employees. However, the goal is to include external entities and people in this process of thinking optimized bottling solutions. We believe everyone can and should have a say on the optimization of this process – there is plenty of room to do so.

4. What is the scope? What will be its contribution to your business model?

The expected contribution of this model is to improve internal processes related to the plastic bottling manufacturing of Logoplaste Innovation Lab. It can either be improvements in terms of techniques, materials, new processes, etc.

5. What about the bottling design, is there room for that type of contribution?

Actually, no. The design of each particular bottle is both a marketing decision of each client and involves a very rigid intellectual property rights policy. Also, because we work with several players of the same industry (for example, in the butter business, we work with brands such as *Becel*, *Flora*, *Agros*, among others), we cannot develop a unique plastic packaging solution for all competitors.

6. What are the actual state and next steps?

Nowadays the platform is being planned and developed. The plan is to be tested internally by the Logoplaste Innovation Lab employees, both in terms of usability and knowledge sharing capacity. Afterwards, in a period that is still not defined (it depends on how the test pilot goes), the idea is to expand the platform (at the time, optimized and tested at its full potential) to every Logoplaste group employee and business partner entity.

Exhibit 2 – Survey dimensions

Dimensions	Authors
1. Organizational Level Capabilities	Lichtenthaler (2011)
IT systems	Gassmann, Enkel & Chesbrough (2010); Lichtenthaler (2011)
Legal and IP systems	Lichtenthaler (2011)
Internal communication platforms	Enkel, Bell & Hogenkamp (2011)
Leadership role	Enkel, Bell & Hogenkamp (2011)
Rewarding system	Chiaroni et al. (2010, 2011); Enkel, Bell & Hogenkamp (2011); Almeida et al. (2009)
2. Project Level Decisions	Lichtenthaler (2011)
Partners' integration	Gassmann, Enkel & Chesbrough (2010)
Networking capacity	Chiaroni et al. (2010)
Project decision criteria	Bonabeau (2009)
Evaluation systems and metrics of performance	Chiaroni et al. (2010)
3. Individual Level Attitudes	Lichtenthaler (2011)
Values of the company	Enkel, Bell & Hogenkamp (2011); Gassmann, Enkel & Chesbrough (2010); Dodgson et al. (2006)
Individual incentives	Chiaroni et al. (2010, 2011); Enkel, Bell & Hogenkamp (2011); Almeida et al. (2009)
Power differences management	du Chatenier et al. (2010)
Individual position towards OI (engagement)	Bonabeau (2009)

Exhibit 3 – Survey

My name is Constança Figueiredo. I am a finalist student of the Masters of Science degree in business management at Católica Lisbon School of Business and Economics. It is with great pleasure that I am currently writing my final master thesis with you, Logoplaste Innovation Lab.

In order to support the results of my thesis, I want to ask you to fulfil this survey, in the most honest manner possible, given the results are anonymous. The fulfilling time will not be greater than 15 minutes.

Relatively to my survey's purpose, I can only tell you it is related to the open innovation platform that is being implemented in iLab.

Thank you in advance.

1. **Age**
2. **Gender**
    - Masculine
    - Feminine
3. **How long have you been part of the iLab team?**
    - Less than a year
    - Between one and three years
    - Between three and five years
    - Longer than five years
4. **Do you know what is this open innovation platform that is being developed nowadays?**
    - Yes
    - No

Page Break

Be part of a global community and actively contribute to solve packaging problems by sharing and expanding your knowledge, post new ideas and propose new challenges and solutions.

The final goal is to approach new and old challenges from refreshing new perspectives, creating new packaging solutions that will enhance consumer experience, address his needs and improve his quality of life, supported by the best and most sustainable social, technical and business solutions.

This innovation platform is a place where people develop better packaging solutions together. It's an online platform for creative thinkers: from the veteran designer to a newbie, the critic

and the Manager, the active participant and the curious lurker. Together, this makes up the creative guts of this project.

To become a place where good ideas gain momentum, the project depends on participation — your inspirations, his comments, her concepts, our development process. It's these efforts, these big and small moments of sharing and collaboration, that make this platform a dynamic resource for tackling significant global Packaging challenges.

Source: Adapted from the platform's internal presentation document

5. Taking into account the previous description of the platform what is the level of relevance/impact of this tool in terms of results in each of the following areas of activity of iLab? In other words, in which of these areas do you consider the platform's results can be used??

Give your answer in a growing scale of relevance, from 1 to 4.

	1 – little relevant	2 – somehow relevant	3 - relevant	4 – very relevant
Marketing, Research and Strategy				
Design				
CAD/CAE/CAM				
Raw Materials, Sustainability and Legislation				
Trials and Validation				
Packaging Engineering Support				
Project Management				

Source: Logoplaste Innovation Lab internal presentation

6. Having again in consideration the platform's description, indicate what is the relevance in terms of value creation in each of the value chain areas of iLab, i.e., what are iLab's value proposals that have the most to win from this open innovation tool?

Give your answer in a growing scale of relevance, from 1 to 4.

	1 – little relevant	2 – somehow relevant	3 - relevant	4 – very relevant
Product innovation				
"Time-to-market" in launching new packages				
Efficiency in development				
Speed in carrying out				
Development costs				
Operational experience in all industrial technological areas				

Source: Morgado (2008)

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7. What is your level of domain when it comes to the information technologies that are made available to you in your day-to-day, as work tools? (ex. prototyping design programs)

Classify your answer in a growing scale, from 1 to 4.

	1	2	3	4	
I do not know any					I manage it perfectly

8. **How are the intellectual property policies in iLab?**
   Classify it in a growing "openness" scale, from 1 to 4.

	1	2	3	4	
Very closed (high control)					Very open (low control)

9. **How often do you use the internal communication platforms that are made available to you, to communicate with your work colleagues?**

	1	2	3	4	
Never					On a daily basis

10. **Under which purpose do you use these communication platforms?**
    If you answered "never" in the previous question, select again "never".
    - Never
    - For work-related issues
    - For playful issues
    - For both purposes
    - Other: _____

11. **How do you characterize the top management communication towards this platform?**
    Use a growing scale of 1 to 4.

	1 – there is no communication	2	3	4 – high incentives
…iLab management				
…Logoplaste top management				

12. **How important is it to you the incentives coming from the top management? I.e., would you accept better this tool if the top management were to be more assertive and insistent in promoting it?**

	1 – not at all important	2	3	4 – very important
…iLab management				
…Logoplaste top management				

13. Which would be the most attractive incentives iLab could offer to your participation in this innovation platform?

Identify as many options as the ones you consider relevant.

___ Monetary awards
___ Career progression
___ Internationalization possibility
___ "Fringe benefits" (ex. trips, discounts in products/services, etc)
___ Other: _____

Page break

14. The following table is about the relationships iLab and its employees sustain with its business partners. Quantify the number of visits iLab's partners make and how often you relate with them.

	1 – Never	2 – Less than once per month	3 – Two to three times per month	4 – Once a week	5 – More than once a week
Number of partners' visits to iLab's installations					
Number of times you interact with these partners					

15. How often does iLab seek for new business partners and/or business technologies?

	1 – Never	2 – One to four times per year	3 – Five to ten times per year	4 – More than ten times per year

16. Do you try knowing new business partners and/or technologies than you consider would add value to Logoplaste?

I.e., do you have the interest in renewing your knowledge towards the tools that might be used in iLab?

- Yes
- No

17. In your opinion, who should have the last say when it comes to the use of a certain technology or material resulting from the partnership with an external entity?

___ Logoplaste's R&D Director
___ Logoplaste's employees that are involved in the partnership
___ Project manager of the business partner
___ Conjoint decision between the three parties

18. How often are evaluated the partnerships and projects in which iLab is involved in?

	1	2	3	4	
Never					Every stage of the process is evaluated

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19. Which values do you identify in iLab as a company?

Select the 3 most relevant ones.

___ Young
___ Innovative
___ With attitude
___ International
___ Open to changes (open minded)
___ Curious
___ Strong team spirit
___ Goal focused
___ Humble
___ Flexible
___ Other

20. Which values do you identify yourself with?

Select the 3 most relevant ones.

___ Young
___ Innovative
___ With attitude
___ International
___ Open to changes (open minded)
___ Curious
___ Strong team spirit
___ Goal focused
___ Humble
___ Flexible
___ Other

21. Which are your personal incentives/motivations towards the platform?

Select a maximum of 3 options.

___ I will not gain anything with this platform (it is indifferent to me)
___ Recognition from the top management/direct superior
___ Peers recognition
___ New knowledge and competencies
___ Contribute to the company's processes improvement and respective success
___ Pure altruism
___ It will make my job easier
___ I will have more workload and obligations
___ It will get into conflict with my work
___ Other

22. How easily do you work…

In case you were never faced with these situations, indicate what would be your most probable reaction.

	1 – very difficult for me	2 – somehow difficult for me	3 – easy for me	4 – very easy for me
…with a team different from your regular one?				
…with a project manager different than your direct responsible or co-worker?				

23. Generally speaking, what is your opinion towards the open innovation platform?

Evaluate the project according to the following dimensions, in a growing scale from 1 to 4.

	1 – null	2 – reasonable	3 – very	4 – very much
Personal interest				
Relevance for the company				
Simplicity				
Practicability (doable)				
Visible results				
Aligned with Logoplaste's image of an innovative company				

24. Describe further your expectations and opinions towards the open innovation platform.

Page break

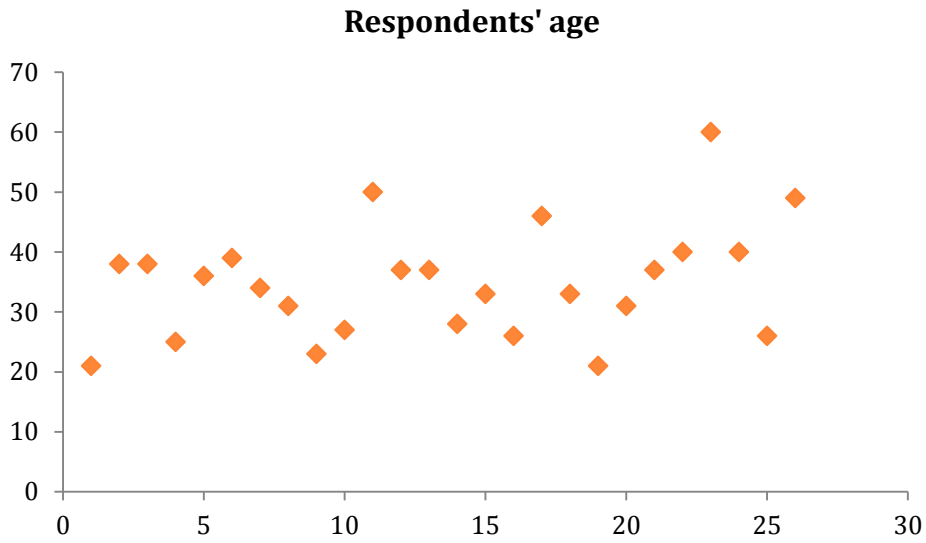
The survey ends here. Thank you once more for your collaboration. I kindly ask you to press "Submit" in order for the survey to be completed.

If you would like to know the results of my study, provide your e-mail so that I can send them to you.

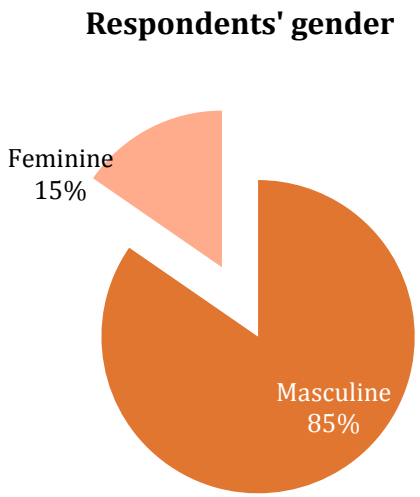
Exhibit 4 – Survey results

Exhibit 4.1. Survey sample demographics

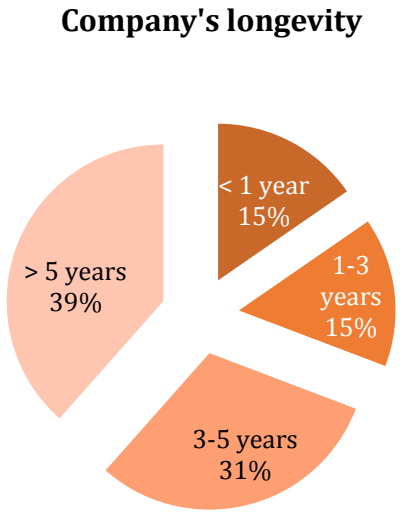
Question 1: Age



Question 2: Gender



Question 3: How long have you been part of the iLab team?



Question 4: Do you know what is this open innovation platform that is nowadays being developed?

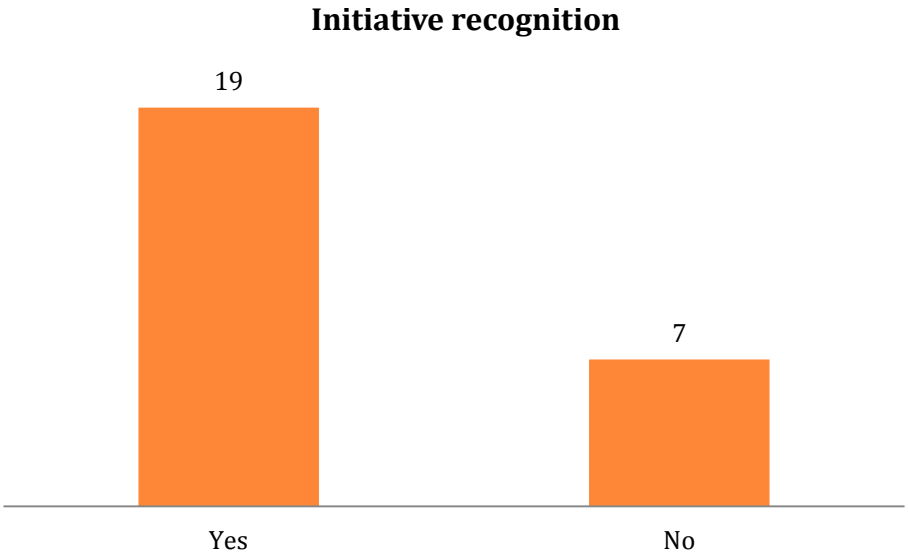
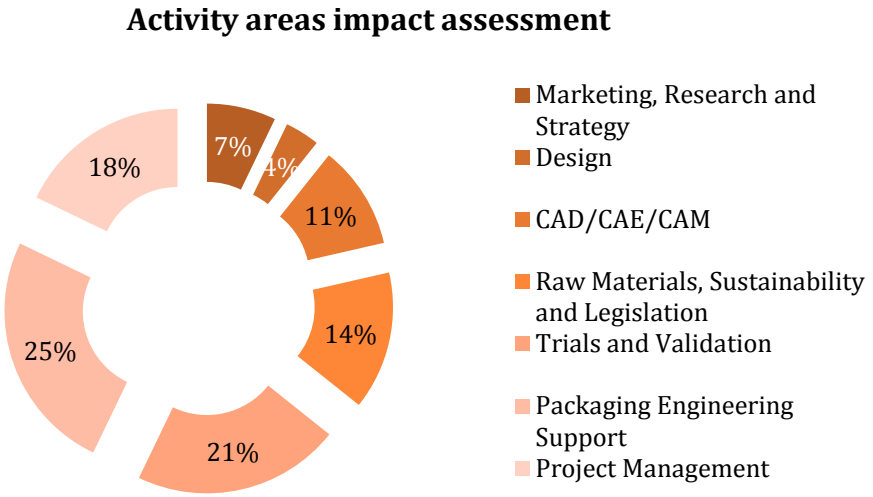


Exhibit 4.2. Value chain assessment

Question 5: Taking into account the previous description of the platform what is the level of relevance/impact of this tool in terms of results in each of the following areas of activity of iLab? In other words, in which of these areas do you consider the platform's results can be used?



Question 6: Having again in consideration the platform's description, indicate what is the relevance in terms of value creation in each of the value chain areas of iLab, i.e., what are iLab's value proposals that have the most to win from this open innovation tool?

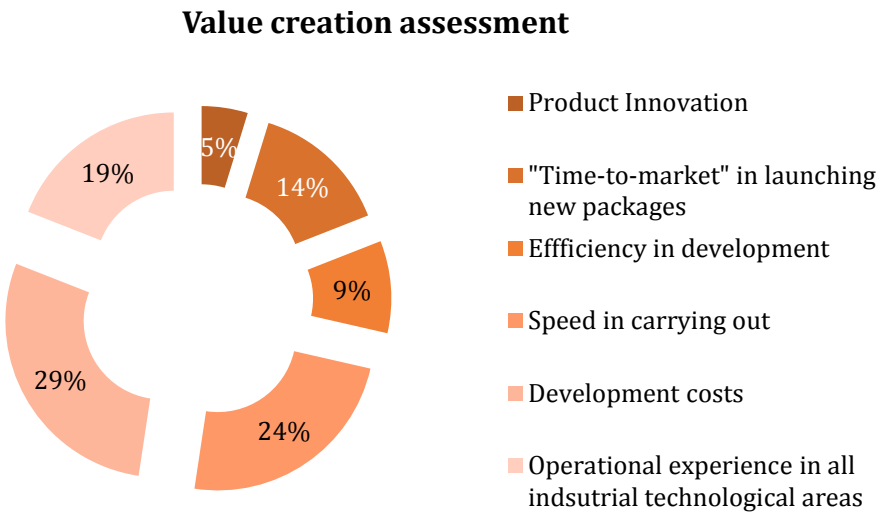
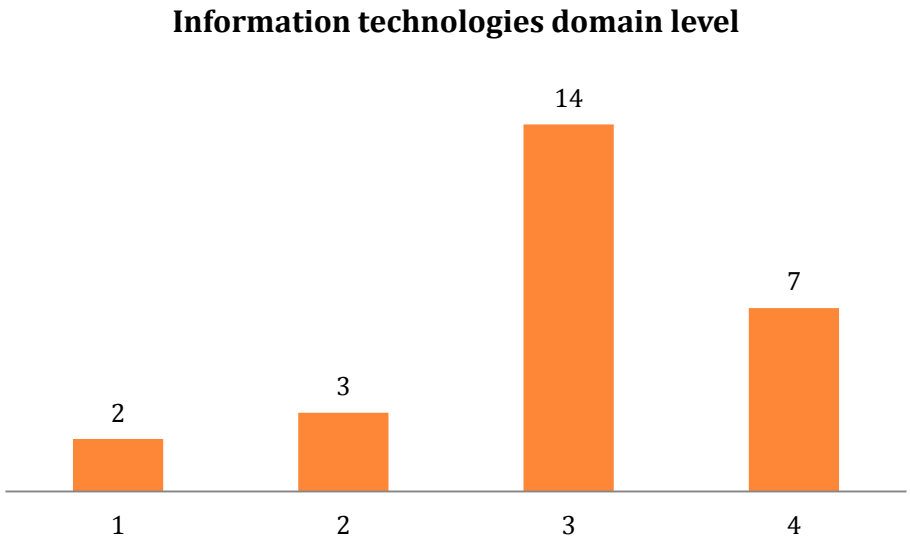


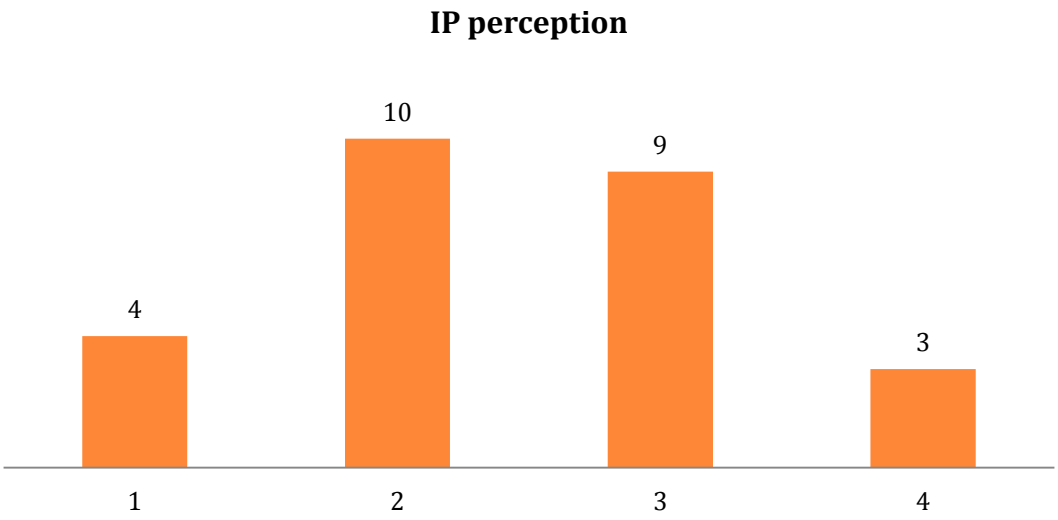
Exhibit 4.3. Three-dimensional analysis

4.3.1. Organizational level capabilities assessment

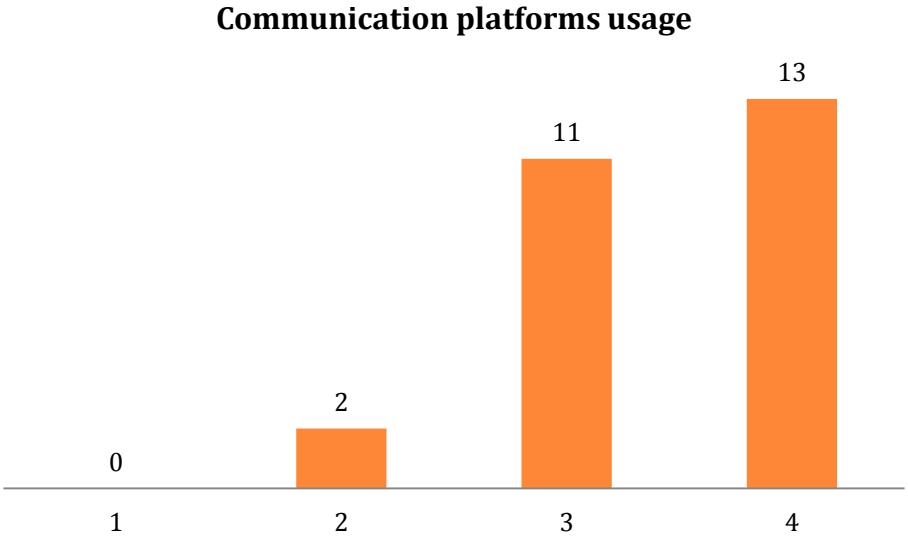
Question 7: What is your level of domain when it comes to the information technologies that are made available to you in your day-to-day, as work tools? (ex. prototyping design programs)



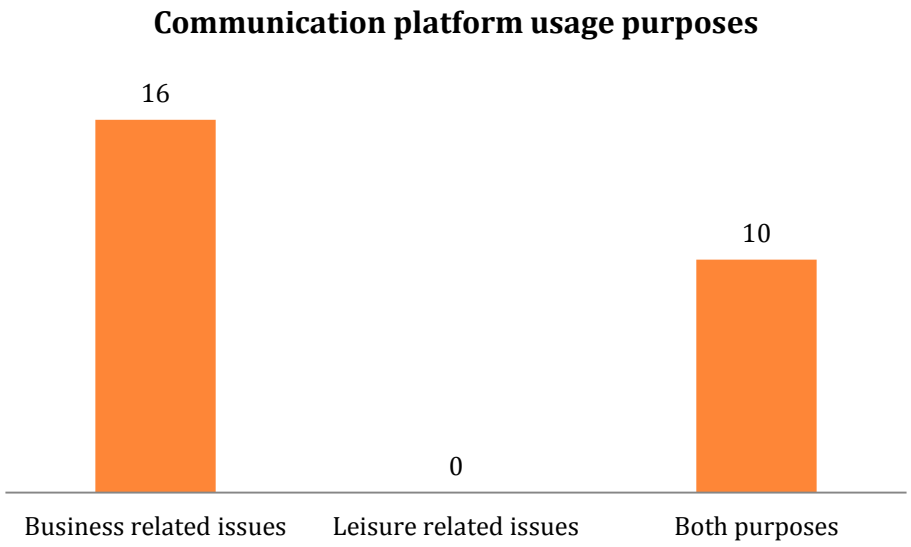
Question 8: How "closed" are the intellectual property policies in iLab?



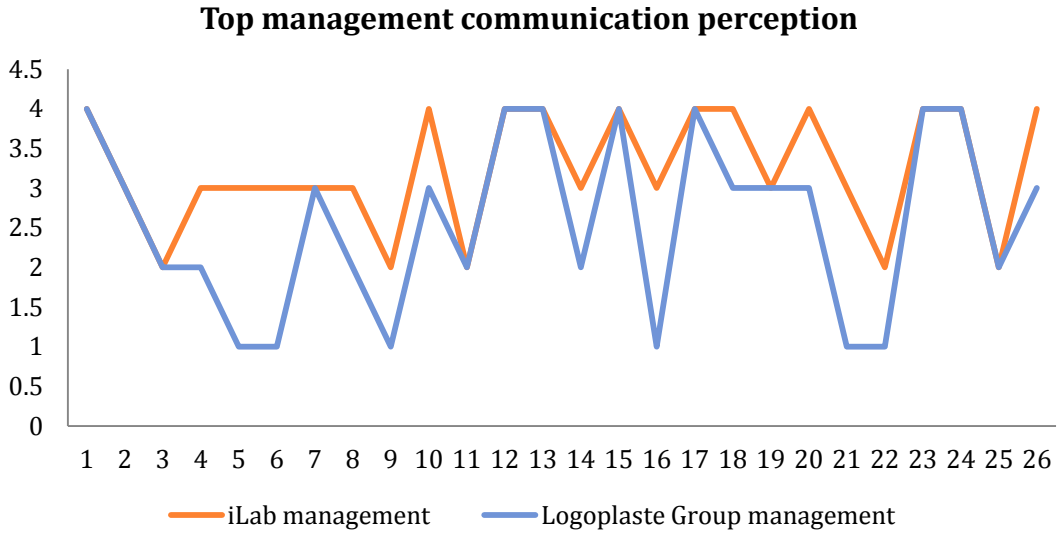
Question 9: How often do you use the internal communication platforms that are made available to you, to communicate with your work colleagues?



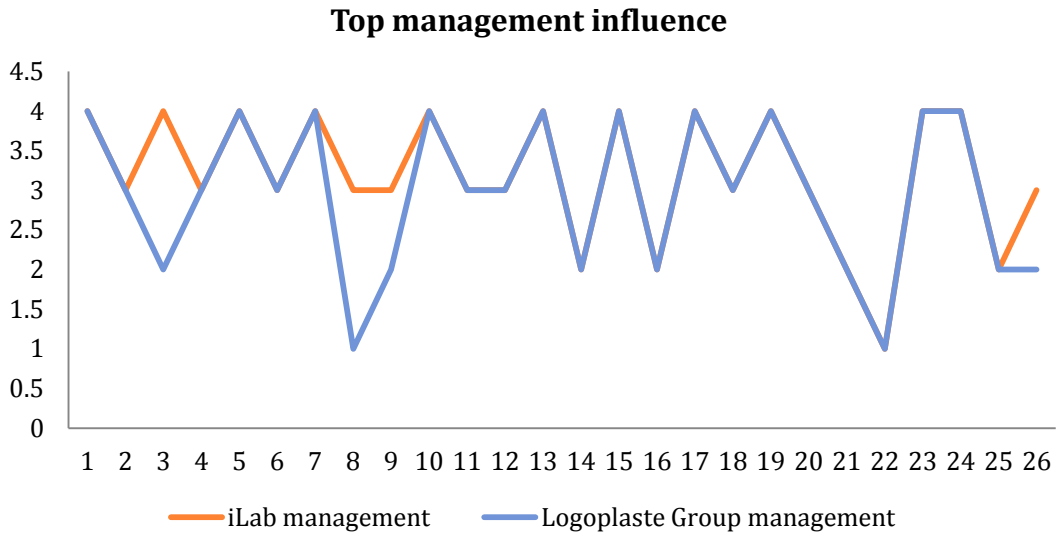
Question 10: Under which purpose do you use these communication platforms?



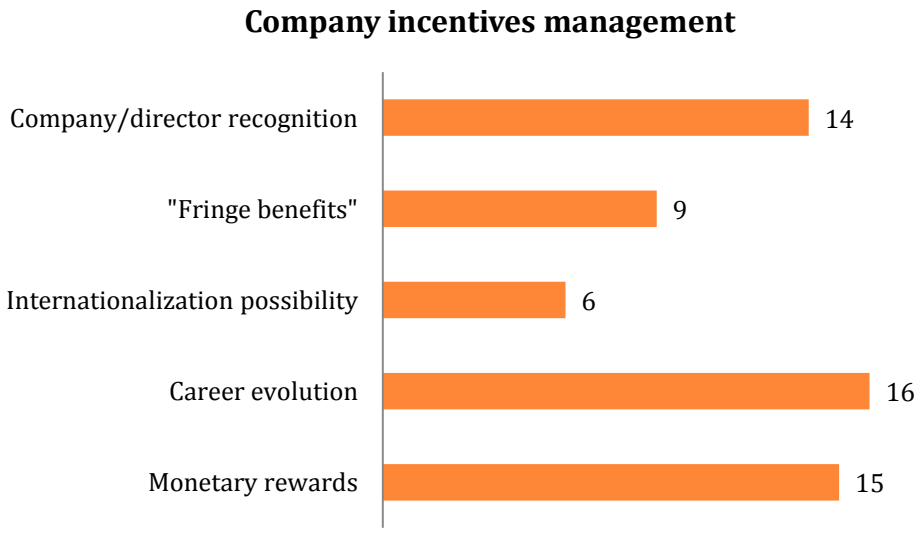
Question 11: How do you characterize the top management communication towards this platform?



Question 12: How important is it to you the incentives coming from the top management? I.e., would you accept better this tool if the top management were to be more assertive and insistent in promoting it?

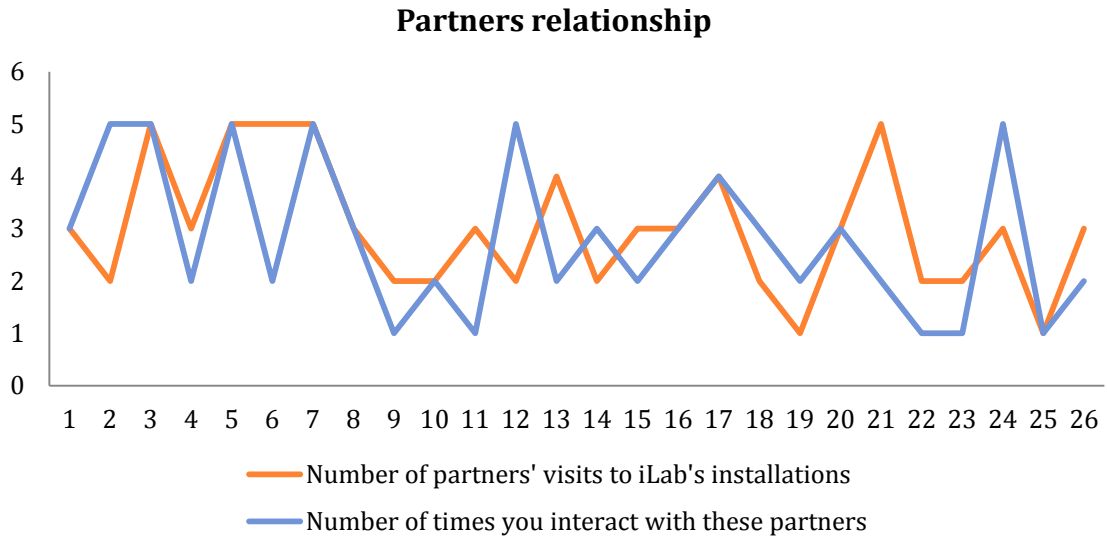


Question 13: Which would be the most attractive incentives iLab could offer to your participation in this innovation platform?

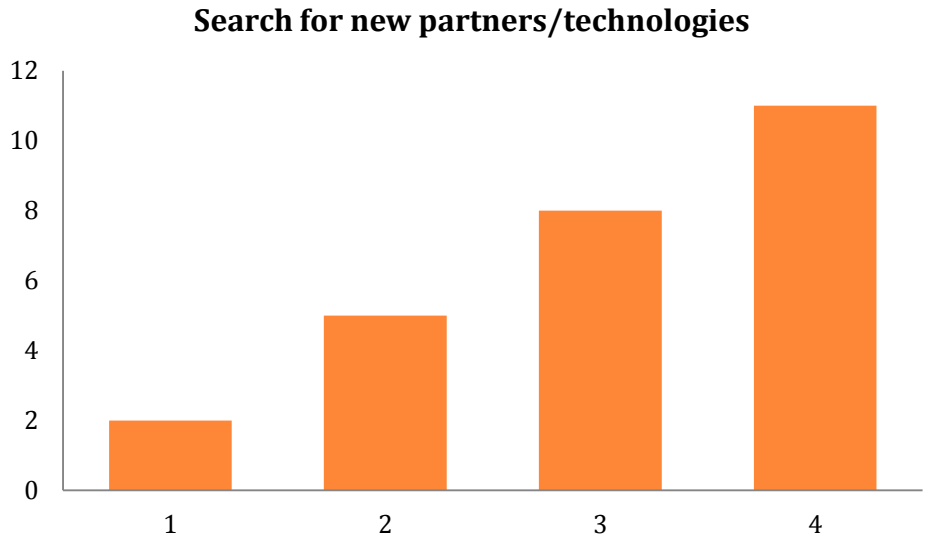


4.3.2 Project level decisions assessment

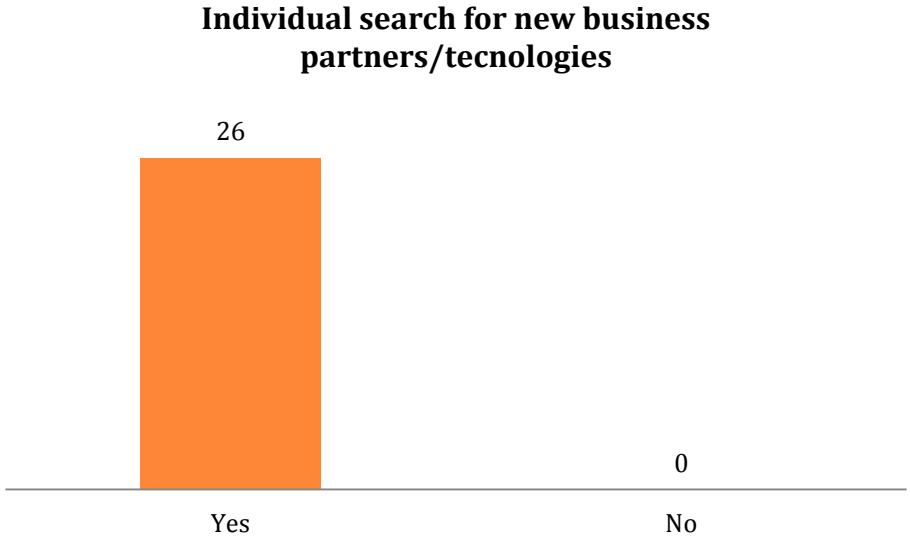
Question 14: The following table is about the relationships iLab and its employees sustain with its business partners. Quantify the number of visits iLab's partners make and how often you relate with them.



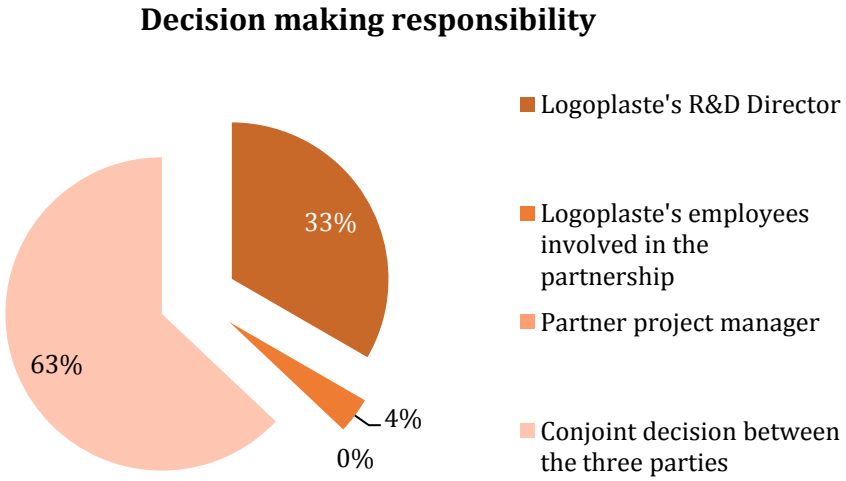
Question 15: How often does iLab seek for new business partners and/or business technologies?



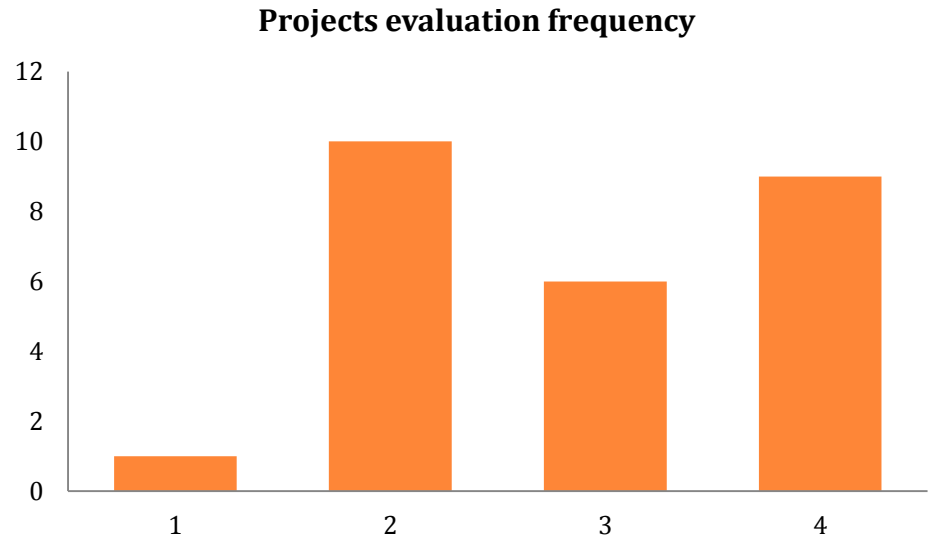
Question 16: Do you try knowing new business partners and/or technologies that you consider would add value to Logoplaste?



Question 17: In your opinion, who should have the last say when it comes to the use of a certain technology or material resulting from the partnership with an external entity?



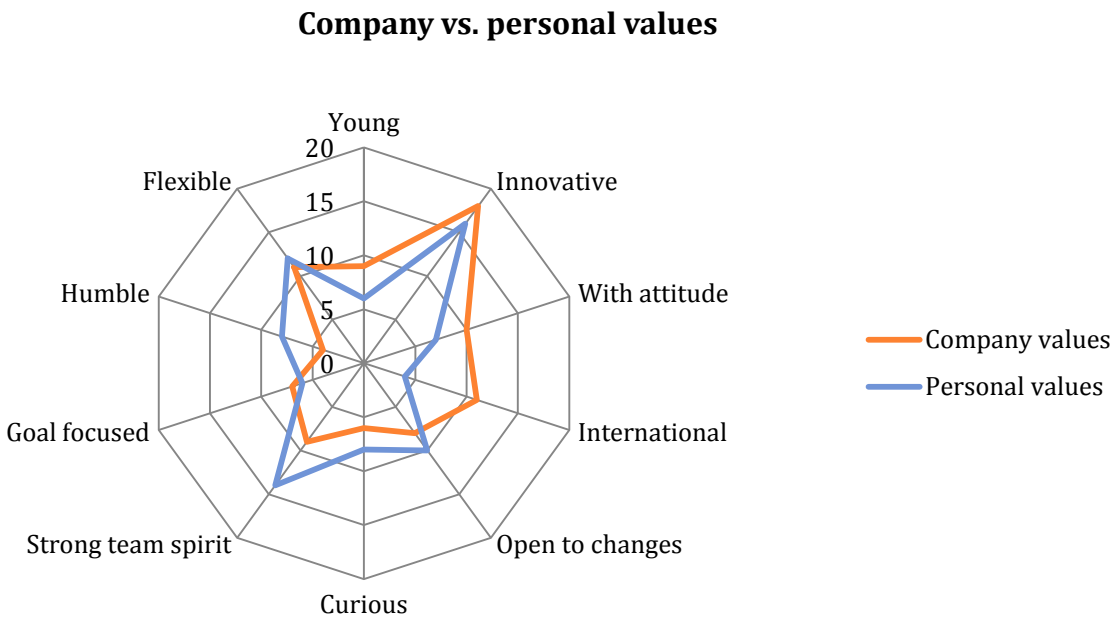
Question 18: How often are evaluated the partnerships and projects in which iLab is involved in?



4.3.3 Individual level attitudes assessment

Question 19: Which values do you identify in iLab as a company?

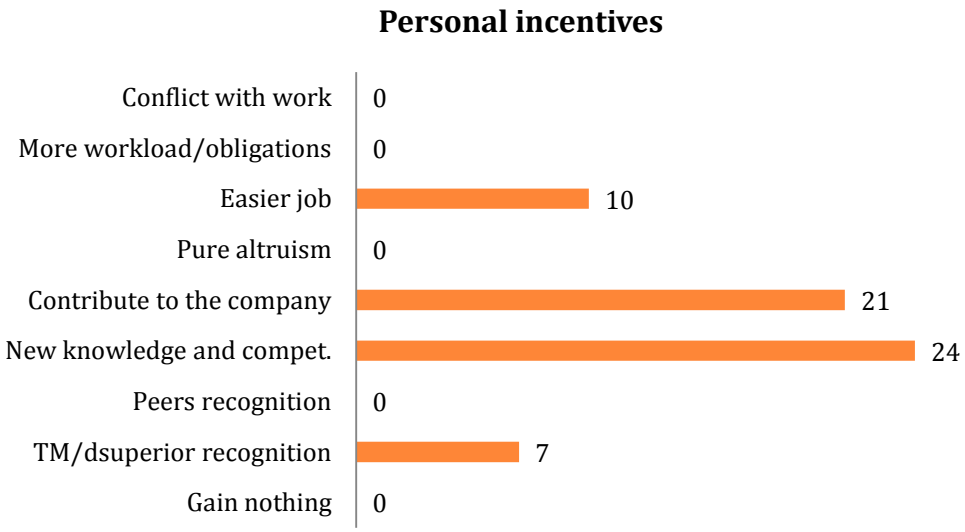
Question 20: Which values do you identify yourself with?



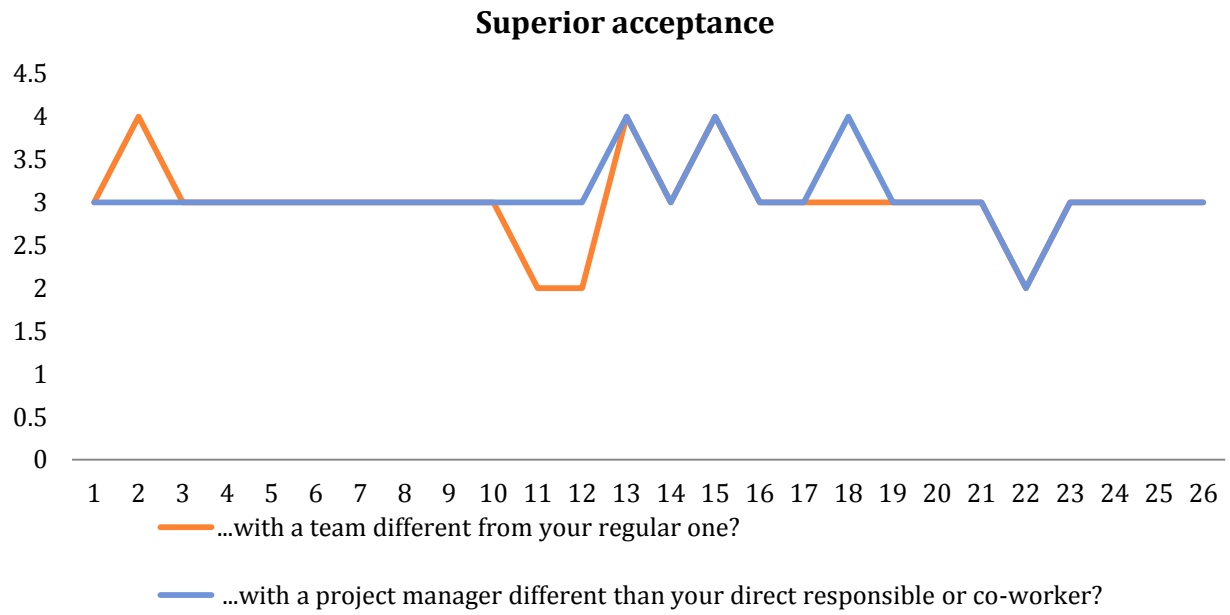
Absolute frequencies	Young	Innovative	With attitude	International	Open to changes	Curious	Strong team spirit	Goal focused	Humble	Flexible
Company values	9	18	10	11	8	6	9	7	4	11
Personal values	6	16	7	4	10	8	14	6	8	12

Rank - company values	5	1	4	2	7	9	5	8	10	2
Rank - personal values	8	1	7	10	4	5	2	8	5	3
Difference	-3	0	-3	-8	3	4	3	0	5	-1

Question 21: What are your personal incentives/motivations towards the platform?



Question 22: How easily do you work…



Question 23: Generally speaking, what is your opinion towards the open innovation platform?

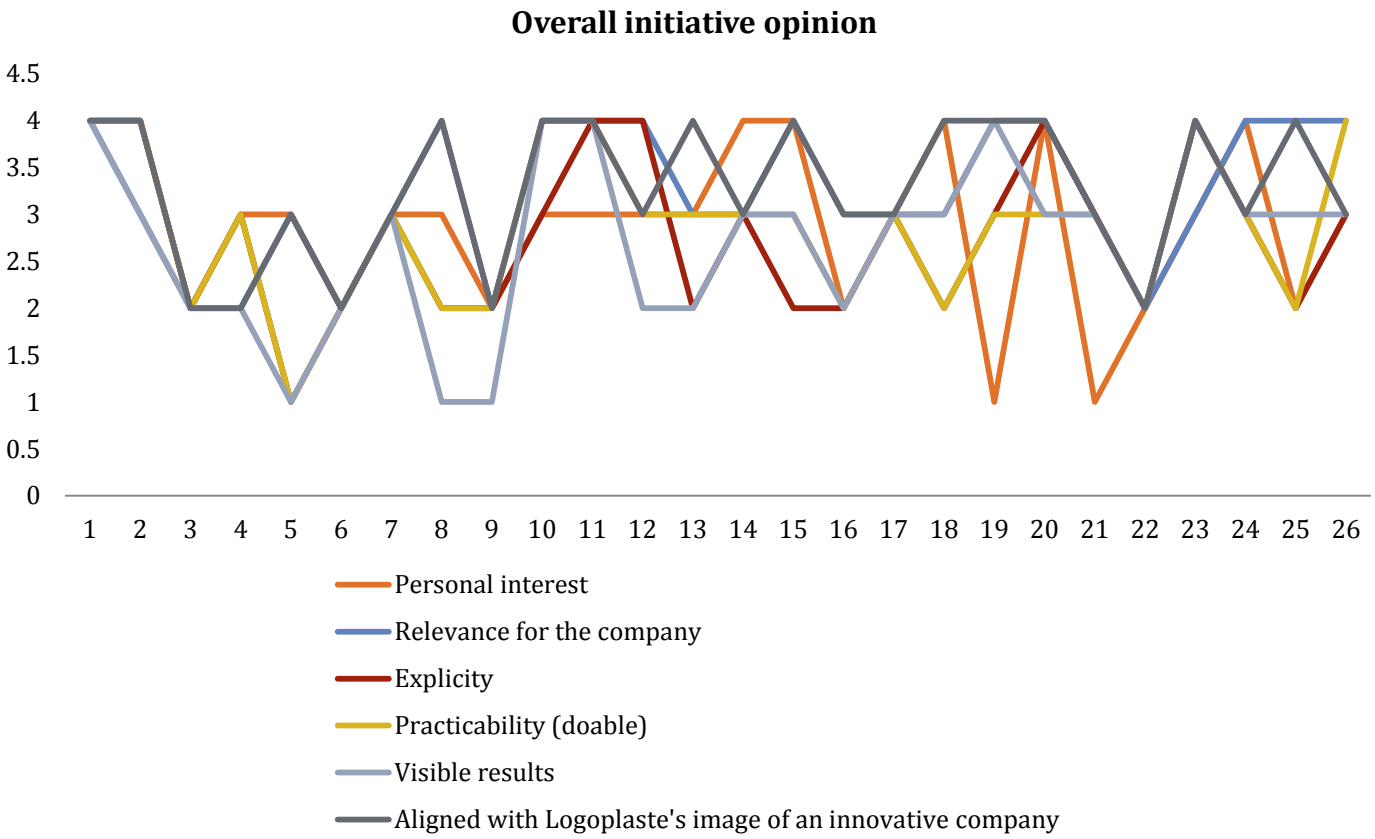


Exhibit 5 – Survey's statistical resume tables

	5. Taking into account the previous description of the platform what is the level of relevance/impact of this tool in terms of results in each of the following areas of activity of iLab? In other words, in which of these areas do you consider the platform's results can be used?						
	5.1. Marketing, Research and Strategy	**5.2. Design**	**5.3. CAD/CAE/CAM**	**5.4. Raw Materials, Sustainability and Legislation**	**5.5. Trials and Validation**	**5.6. Packaging Engineering Support**	**5.7. Project Management**
Average response	3,38	3,65	3,15	3,08	2,85	2,65	3,04
Maximum response	4	4	4	4	4	4	4
Minimum response	2	3	1	2	1	1	1
Standard deviation	0,64	0,49	0,73	0,80	0,78	0,80	0,77

	6. Having again in consideration the platform's description, indicate what is the relevance in terms of value creation in each of the value chain areas of iLab, i.e., what are iLab's value proposals that have the most to win from this open innovation tool?					
	6.1. Product Innovation	**6.2. "Time-to-market" in launching new packages**	**6.3. Effficiency in development**	**6.4. Speed in carrying out**	**6.5. Development costs**	**6.6. Operational experience in all industrial technological areas**
Average response	3,62	3,08	3,23	2,88	2,85	3,00
Maximum response	4	4	4	4	4	4
Minimum response	3	1	1	1	1	1
Standard deviation	0,50	0,89	0,71	0,86	0,83	0,80

	7. What is your level of domain when it comes to the information technologies that are made available to you in your day-to-day, as work tools? (ex. prototyping design programs)	8. How are the intellectual property policies in iLab?	9. How often do you use the internal communication platforms that are made available to you, to communicate with your work colleagues?	10. Under which purpose do you use these communication platforms?
Average response	3,00	2,42	3,42	
Maximum response	4	4	4	
Minimum response	1	1	2	
Standard deviation	0,85	0,90	0,64	

	11. How do you characterize the top management communication towards this platform?		12. How important is it to you the incentives coming from the top management? I.e., would you accept better this tool if the top management were to be more assertive and insistent in promoting it?		
	11.1. ...iLab management	**11.2. ...Logoplaste top management**	**12.1. ...iLab management**	**12.2. ...Logoplaste top management**	**13. Which would be the most attractive incentives iLab could offer to your participation in this innovation platform?**
Average response	3,23	2,58	3,19	2,96	
Maximum response	4	4	4	4	
Minimum response	2	1	1	1	
Standard deviation	0,76	1,14	0,85	1,00	

	14. The following table is about the relationships iLab and its employees sustain with its business partners. Quantify the number of visits iLab's partners make and how often you relate with them.					
	14.1. Number of partners' visits to iLab's installations	**14.2. Number of times you interact with these partners**	**15. How often does iLab seek for new business partners and/or business technologies?**	**16. Do you try knowing new business partners and/or technologies that you consider would add value to Logoplaste?**	**17. In your opinion, who should have the last say when it comes to the use of a certain technology or material resulting from the partnership with an external entity?**	**18. How often are evaluated the partnerships and projects in which iLab is involved in?**
Average response	3,00	2,81	3,08			2,88
Maximum response	5	5	4			4
Minimum response	1	1	1			1
Standard deviation	1,23	1,44	0,98			0,95

				22. How easily do you work...	
	19. Which values do you identify in iLab as a company?	**20. Which values do you identify yourself with?**	**21. What are your personal incentives/motivations towards the platform?**	**22.1. ...with a team different from your regular one?**	**22.2. ...with a project manager different than your direct responsible or co-worker?**
Average response				3,00	3,08
Maximum response				4	4
Minimum response				2	2
Standard deviation				0,49	0,39

	23. Generally speaking, what is your opinion towards the open innovation platform?					
	23.1. Personal interest	**23.2. Relevance for the company**	**23.3. Explicity**	**23.4. Practicability (doable)**	**23.5. Visible results**	**23.6. Aligned with Logoplaste's image of an innovative company**
Average response	2,88	3,23	2,77	2,85	2,69	3,27
Maximum response	4	4	4	4	4	4
Minimum response	1	2	1	1	1	2
Standard deviation	0,91	0,76	0,86	0,83	0,93	0,78

Exhibit 6 – Overall quantitative questions comparison

	ORGANIZATIONAL LEVEL CAPABILITIES									PROJECT LEVEL DECISIONS									INDIVIDUAL LEVEL ATTITUDES							
					11.		12.			14.									22.		23.					
	7.	8.	9.	10.	11.1.	11.2.	12.1.	12.2.	13.	14.1.	14.2.	15.	16.	17.	18.	19.	20.	21.	22.1.	22.2.	23.1.	23.2.	23.3.	23.4.	23.5.	23.6.
Average Response	3	2,42	3,42		3,23	2,58	3,19	2,96		3	2,81	3,08			2,88				3	3,08	2,88	3,23	2,77	2,85	2,69	3,27
Max Response	4	4	4		4	4	4	4		5	5	4			4				4	4	4	4	4	4	4	4
Min Response	1	1	2		2	1	1	1		1	1	1			1				2	2	1	2	1	1	1	2
Standar Deviation Response	0,85	0,9	0,64		0,76	1,14	0,85	1		1,23	1,44	0,98			0,95				0,49	0,39	0,91	0,76	0,86	0,83	0,93	0,78
Ranking Standar Deviation Responses	12	9	17		15	3	11	4		2	1	5			6				18	19	8	15	10	13	7	14
Average - decision criteria	10									4						13										