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**Programs of Open Innovation towards startups: a  
project with an Automotive services company**



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## Introduction

This thesis' idea was born in May 2020, while the author was attending his internship in I3P, Incubator of Polytechnic of Turin. In a general meeting with his colleagues, the writer came to know that the Incubator was in the process of starting an Open Innovation project with an Automotive Financial Services company.

Having discussed Open Innovation in one of his last exams and being the topic extremely contemporary and of his interest, the author decided to ask his inclusion in the project, support his colleagues in the analysis, and develop the thesis's work.

The goal was immediately to understand and apply the notions learned in university in a real project, not only understanding which are the primary means to perform Open Innovation, but rather analyzing projects and figuring out which are the "best practices" to design a project of this kind of Innovation. In parallel, the aim was to assist colleagues in performing and developing an analysis of the company involved.

Generally, the Incubator's role is to provide support to startups in many ways: providing a physical location for entrepreneurs, ensuring non-repayable funding, or integrating them into a fertile business network, as well as providing contact and advice. Therefore, Incubators manage business activities and assist entrepreneurs and companies from the financial, legal, corporate, and insurance points of view. It means that it is a capital provider and an important ally that guides the entrepreneur in the startup's delicate phase.

Instead, in the project concerned, I3P plays intermediary roles between the firm and startups that could have the technology of interest. Indeed, in the next years, the Incubator's part aims to be of an expert intermediary between corporate and startups and keep supporting startups in their development. Another element of interest is that both the company and the Incubator have never done this kind of collaboration, so it is a real case "0".

Regarding the structure of the thesis, the first chapter explains the concept of Internal Research and Development and the main ways through which companies can outsource the development of technology. Then, considering these concepts, a parallel with the Closed and Open Innovation has been performed.

The second chapter is meant to elaborate on these two strategies from a dynamic capabilities perspective. The focus is that companies should adapt assets and organizational construction as the firm grows and as markets and technologies change. This corporate procedure is possible by adjusting tangible and intangible assets by reallocating them to create more value. The conclusion of the chapter is dedicated to depicting the advantages and disadvantages of OI philosophy.

After a general explanation, the thesis starts focusing on the core of the topic: how big firms perform Innovation concerning startups and, mainly, which are the primary means through which companies collaborate with them. Moreover, the final description and analysis of case studies are meant to create a bridge with the last two chapters and help design OI projects in specific cases.

Chapter 4 introduces the collaboration plan between I3P and an Automotive Financial company. It depicts the phases of the project, the deliverables, the milestones, and, above all, the aim of it. The fifth chapter focuses on competitive analysis, in which the author of this thesis put a considerable effort. It is a complementary section that gives the company a "big picture" of its main competitors' current developments and moves. Moreover, it helps determine if the assessment requirements are in line with the current technologies and trends.

In conclusion, the writer decided to insert considerations about the current worldwide situation. The purpose is to figure out why Open Innovation practices are essential in a crisis and, on the other hand, why OI should also be adopted when the problem is over.

# 1. Management of competences

## 1.1 Organizational learning

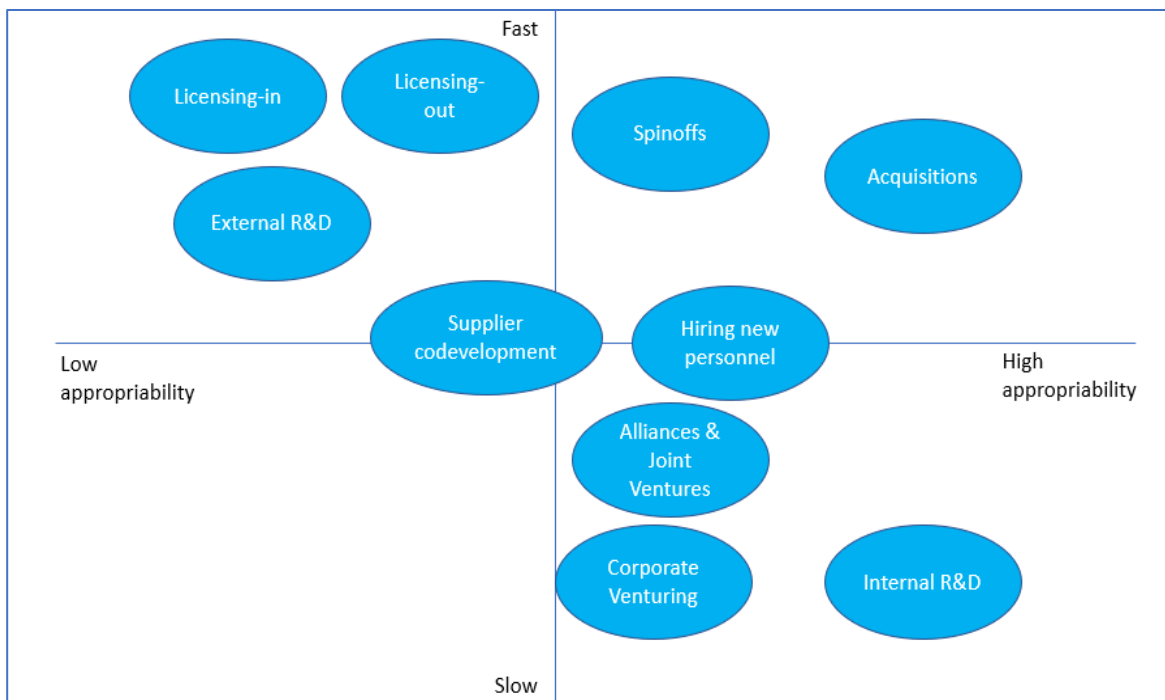
In 1991 Huber considered four structures as integrally linked to organizational learning: knowledge acquisition, information distribution, information interpretation, and organizational memory. He explains that understanding should not be conscious or intentional. Moreover, learning does not always increase the learner's effectiveness or even potential effectiveness. Taking a behavioral perspective, he notes: *"An entity learns if, through its processing of information, the range of its potential behaviors is changed"*. On the other hand, considering a corporate(managerial) perspective, Huber recognized four forms through which organizational learning takes place:

- **Innate learning:** it commences the initial knowledge base in a company at its foundation. There are no routines yet: therefore, this knowledge base will come from the involvement of its founders, tied together by a common purpose, such as the one that can be found in a business plan.
- **Experiential learning:** it is the method by which firms adjust their routines thanks to "learning by doing" and "learning by failing"; it is based on the concepts of "exploitation learning" and "exploration learning". (March 1991). The former happens when a firm works in a normal way and runs its routines as usual (i.e., it exploits its existing knowledge) and, in doing so, discovers improvement, thus creating new experience. Instead, exploration learning occurs when a company attempts something that is purposely new (e.g., it ventures in a new market or explores new technology) and, in doing so, it develops new experiences and routines.
- **Vicarious learning:** It comes about when the firm tries to reach an external source of knowledge, such as assistance provided by a consultant or a book. The first problem in this procedure is identifying the experience needed, which can happen through scanning (i.e., searching across a broad spectrum of possible sources) or focused search (i.e., searching in a specific direction). Once knowledge has been identified and acquired by firms, it should be diffused in an organization and used in its routines. It is quite evident that vicarious learning will be intensely reliant on the organization's absorptive capacity.
- **Learning by grafting:** it arises when the firm gains new knowledge by hiring a person, or by acquiring another organization, and incorporating them within its organization. This

method is faster than the others since the background does not need to be developed. Nevertheless, integrating the acquired resources is not costless and irrelevant since it needs to change existing routines and create new ones.

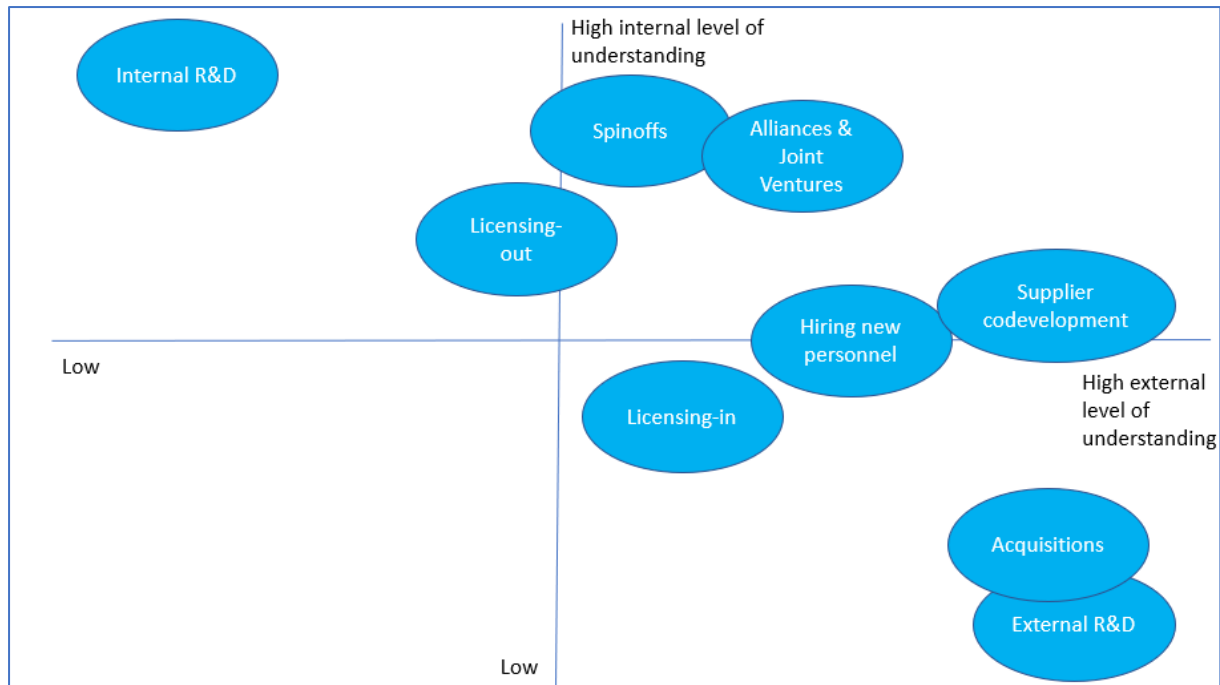
## 1.2 Developing technological competences

Firms' critical choice is between experiential, vicarious, and grafting learning to manage the development of competencies. When the desired competencies have been discovered, the firm must determine the best way to develop them. In general, firms may operate on two main trade-offs: the first one is between the time required to create the competencies versus the economic appropriability of the related benefits (Fig. 1); the second one is between the level of understanding that is possessed by the firm and by external parties (Fig. 2). Apart from these concerns, a last and critical part is the firm-specific capability of implementing a given strategy. Indeed, it is pointless for a company to pursue a most suitable strategy if the firm does not have the experience or the skills required to realize it.



*Figure 1: trade-off between economic appropriability and speed of integration in the process of competence development.*





*Figure 2: trade-off between internal and external level of understanding in the process of competence development*

To sum up, firms could decide to develop technological competences internally, or outsourcing their R&D activities in different ways. In the following paragraphs, it has been analyzed the contrasting situations.

### **1.2.1 Internal R&D**

Internal R&D used to be the mainstream approach to pursue innovation policies; though, a sort of ambiguity emerges in the casual linkage with performance. It is still customary to use R&D expenditures as a proxy for measuring the degree with which a specific firm or an entire economy dedicates itself to the growth of its knowledge base (  $R\&D/Sales$  and  $R\&D/GDP$ ). But these indicators of innovativeness could be misleading since input and output are different in terms of typology. Indeed, R&D is the basis as potential innovation, but if it is true that, on average, there could be a correlation between ROI and R&D, companies are interested in their specific relationship. In the following bulleted list, it has been discussed the advantages and disadvantages of developing R&D internally.

- In general, internal R&D takes time to be performed but allows a greater level of appropriability.
- It is constrained by path dependency, and it can suffer the ‘not-invented-here’ syndrome because it requires continuously different stimuli such as events and resources.
- It allows attraction of talents but requires incentive and retention strategies: to retain R&D personnel, it is likely to set adequate incentives and non-monetary prizes such as intellectual challenges and independence.
- The R&D department must be adequately placed within the organization (decentralized or centralized) to avoid the risk of duplication of effort

### **1.2.2 Outsourcing R&D**

Before describing how a firm can outsource R&D, the term “absorptive capacity” has to be explained.

The absorptive capacity of an organization is defined as its ability to put external knowledge into practical use. In the case of vicarious learning, which is the process of acquiring knowledge from the outside, a two-phase process must occur: the reception of knowledge and internal diffusion. In particular, the possibility to see an internal distribution of the knowledge externally acquired the absorptive capacity is fundamental. This concept is expressed in stock of related experience, gatekeepers, internal communication channels, and allows a trade-off between reception and diffusion. If a company decides to give up on developing R&D internally must be aware of consequences such as:

- Losing technical proficiency.
- Losing the possibility to create highly specific products.
- Appropriability of competencies.
- The transaction cost of scouting solution.

For these reasons, companies must always require necessary R&D activities to develop an adequate stock of knowledge that could gain a sufficient absorptive capacity even in outsourcing R&D activities and if focusing on vicarious learning mainly. This aspect will allow not to risk losing the capability to specify, buy and verify when dealing with suppliers. Everything developed in-house

enables the company to rely on a high level of appropriability. The following paragraphs are meant to describe the main procedures with which companies outsource R&D.

#### **1.2.2.1 Corporate venturing**

The company behaves as a venture capital investor and takes up stakes in startup firms made by spinoffs or not: what it is created is a hybrid between internal R&D, acquisition, and joint venture. Corporate venturing can have several purposes: innovation venturing, ecosystem venturing, harvest venturing, or merely private equity venturing. It “needs” complementary assets, and the venturing firm should have a high absorptive capacity concerning the target and increased cash flow, but under these conditions, the target might not accept in fear of imitation or rent extraction. For the firm itself is kind of risky investment that could be differentiated by investing in several of them; the synergy in theory between corporate and start up is good (for the firm, access to the startup knowledge; for the startup, to experience the proficiency of the corporate) but information asymmetry and unbalanced power could lead to a potential captive market which could not extract all the potential in the corporate venture. It could be a solution to invest in the startup staying in the background as a VC do, clearly separating the two entities.

#### **1.2.2.2 Co-development**

It happens when a company finances a supplier for developing R&D activities for some components. This situation would create a significant risk of post-contractual hold-up because of the project's specificity, while a risk faced by the commissioner is due to the information asymmetries that can arise (principal-agent problem). In general, the new competencies do not belong to the firm: the supplier gains higher bargaining power and reputation; therefore, competencies may be spilled over competitors' projects. The risk can be reduced by leveraging on specificity and including intellectual property clauses in contracts. This concept is why co-development can entail different arrangements like revenue-sharing( the supplier makes the R&D investment and shares the revenue) or investment sharing (the customer pays the supplier for the R&D work, and then the price at which the product is sold is only slightly over variable costs) or innovation sharing (the customer pays the supplier but also shares R&D work). The choice between

these different modalities depends on the type of uncertainty (related to the product or timing) and the innovation type if completely new or incremental.

#### **1.2.2.3 Total outsourcing**

Complete outsourcing is the equivalent of giving up the idea of developing competencies and allows the realization of “off the shelf” components. Outsourcing requires caution since the capability to specify, buy and verify is lost and suppliers may have little incentive to innovate further. In case of an emergence of a monopolistic supplier, if outsourcing is the main “trend” and all companies are referring to the same supplier, this situation will create a diffused stop in innovation among all competitors.

#### **1.2.2.4 Licensing**

Licensing is like the development process's abandonment, but it could be interpreted as the first step for developing competencies. Additionally, many patents are up for grabs like non-core inventions made by massive companies that cannot compete in the product market. In the case of grant-back clauses, their exploitation could be highly limited. This is usually the method used by countries passing through economic crises to come out of them and develop competencies out of the ones already developed elsewhere. Becoming a supplier of a big company is similar to acquire a license, and it could be highly beneficial if partnering with a technological leader and the nature of the relationship allows not only to engage in product manufacturing but also in product development since the competencies are usually related to the technology and very rarely to the market.

#### **1.2.2.5 Technology acquisition**

Technology acquisition allows to get results quickly and ensures a high level of appropriability. Value creation is due to the knowledge assets both in case they are similar (incremental innovation) and complementary (discontinuous innovation). In the case of intensive technology firms, IP portfolios grant monopolistic rights and freedom to operate. High transaction costs characterize it because of the whole process that needs to be undertaken scouting, due diligence, negotiation, and integration. This latter is mainly related to organizational routines and path dependency concerning prior exploration/exploitation orientations. Indeed, acquisitions are usually subject to the

integration paradox because integrating knowledge disrupts the acquired firm and reduces its autonomy and innovation capabilities; in fact, successful integrations depend on the degree of overlap between target and acquirer knowledge. Acquisitions are also subject to the winner's curse: acquirers evaluate targets assuming that the value post-integration would be greater than acquisition price and integration cost.

#### **1.2.2.6 Strategic alliance and joint venture**

Strategic alliances are a non-equity agreement that can create value when participating firms have complementary competencies and are competitors (leading to economies of scale, standard setting) and jointly pursue asset exploitation. The main feature of this type of alliance is that contractual links and not institutional bound firms. The contract is incomplete and difficult to enforce, and it creates a weak connection between the two entities. A trade-off between transaction costs associated with contracting and the ability to solve ambiguities is usually solved by relational governance mechanism. Moreover, there could be a risk of "free-riding" at corporate to provide adequate incentives and clarify organizational status. Besides, there are risks regarding IP leakage, which is more likely to occur if a firm has many IPs to lose, and partners have a significantly absorptive capacity.

Joint ventures are an equity agreement that can create value thanks to the size and complementarity. Concerning alliances, firms are bound by institutional links, allowing them to spread a sense of co-ownership in the common incentive to pursue success together, trusting on a governance structure as a behavior. The result is a lower degree of ambiguity since incentives are better aligned though these advantages w.r.t strategic alliance are not fully achieved if there is a significant difference in size between the companies and an intrusive role in the JV's governance. This aspect is particularly true in small JVs, which risk not providing sufficiently robust incentives to avoid opportunistic behavior. Setting a joint venture will require higher costs and separated from the parent organization that could be both an advantage and a risk.

#### **1.2.2.7 Hiring new personnel**

Companies could hire human resources in the field in which they have a scarcity of specific competencies. The hiring of many people has high transaction costs, which could be equivalent to

those necessary to acquire a firm of equal size. The following steps compose the hiring process: scouting candidates, acting due diligence, interviewing them, and negotiating employment contracts. Besides, the integration process must be performed, just like the case of the acquisition of a firm. But this is a more time-consuming path because an acquired company usually resumes its activities, as opposed to the new personnel that, in the beginning, have low productivity because of the process of integration/training. On the other hand, hiring has a smaller probability of the “winner’s curse” phenomena, given that job markets are generally more liquid than the need for firms, making it easier to find a going price for a professional with given skills. Nevertheless, this could be wrong in the case of emerging competencies. The lack of experts could permit them to ask for high wages until more individuals gain these skills and rebalance the job market. However, hiring is a risky process due to the employer’s lack of information regarding the new employee.

### **1.3 Taxonomy of innovation strategies**

The previous paragraphs described the primary means with which a company could acquire or develop its technological competences. The same notions could be explained through the introduction of the terms closed and open innovation. Put in another way, a company which develops its competences only throughout internal R&D is following a “closed innovation path”; on the other hand, a company which develops its competences both internally and externally (also internally with the input from the external environment) is following an “open innovation path.” A comparison between the two “paradigms” has been performed.

#### **1.3.1 Closed Innovation**

Before becoming open, Innovation occurred in closed settings often performed by individuals, scientists, or employees. Nevertheless, the expression *Closed Innovation* was coined later and not before the model of Open Innovation became popular by works of Henry Chesbrough, Don Tapscott, and Anthony D. Williams.

Mainly, the term Closed Innovation was defined in March 2003 by Henry Chesbrough, a professor and executive director at the Center for Open Innovation at UC Berkeley, in his book "Open Innovation: The new imperative for creating and profiting from technology."

According to the closed innovation model, successful Innovation needs control and ownership of the Intellectual Property (IP). A firm should monitor the construction and management of solutions. Origins of closed Innovation go back to the beginning of the twentieth century when universities and governments were not participating in science's commercial application. Some companies, therefore, decided to run their research and development units. The whole new product development (NPD) cycle was incorporated within the firm, in which Innovation was handled in a "closed" and self-sufficient way.

The closed innovation paradigm and its related mindset toward organizing industrial R&D have brought many significant achievements and commercial successes. As Chesbrough states in his work: «The past success of the Closed Innovation paradigm accounts for its persistence in the face of the changing landscape of knowledge. It is an approach that is fundamentally inwardly focused, which, as we shall see, fits well with the knowledge environment of the early twentieth century. However, the paradigm is increasingly at odds with the knowledge landscape at the beginning of the twenty-first century». (Henry W. Chesbrough, *Open Innovation: The New Imperative for Creating and Profiting from Technology*, HBS Press, 2003)

### **1.3.2 Open Innovation**

Open Innovation can be considered a general approach that encompasses several methodologies for accessing and developing competencies by looking outside the firm's boundaries. Thanks to Chesbrough's seminal work, the concept has become popular, identifying an emerging method by a few large companies. Big firms have usually performed their development activities as "closed funnels" (Fig.3), but only a minority of their R&D projects led to products with some market return. Early Open Innovation's followers understood that substantial resources were being spent on reproducing competencies, most of which already existed in the market and, at the same time, they were not able to find alternative applications for "lost" projects<sup>1</sup>. Hence, they figured out that a percentage of their R&D budgets had to be spent on projects with external entities or to acquire technology that had already been developed by other parties (Fig.3). The "open funnel" model entails appropriate business intelligence tools to scout for competencies and technologies, and

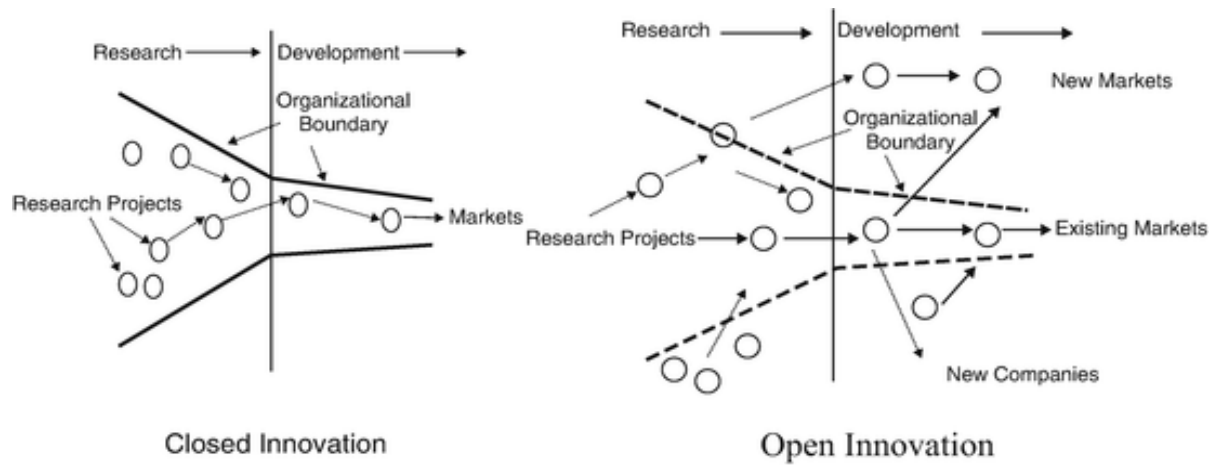
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<sup>1</sup> Projects with no apparent internal exploitation path in the firm's existing markets.

routines and processes, enabling an efficient engagement with external entities. Among the most common candidate entities, firms can consider:

- **Competitors' R&D units:** competitors might agree on an offer to collaborate on projects for two main reasons: to profit from temporarily unused capacity; to increase returns from competencies they have developed. While a competitor might be disposed to provide technical outcomes, it is highly improbable that it will accept transfer competencies and know-how.
- **For-profit R&D firms:** in several industries, some firms have primary businesses to carry out outsourced R&D activity by leveraging low cost or specific competencies. The business term for addressing these firms varies by industry. The pharmaceutical industry refers to Contract Research Organizations, while other industries may use the term Engineering Services Providers. In this case, it is unlikely that suppliers will allow an actual transfer of competencies and knowledge: thus, they will restrict themselves to delivering contractually specified achievements.
- **Universities and non-profit R&D organizations:** in several industries, some firms have primary businesses to carry out outsourced R&D activity by leveraging low cost or specific competencies. The business term for addressing these firms varies by industry. The pharmaceutical industry refers to Contract Research Organizations, while other industries may use the term Engineering Services Providers. In this case, it is unlikely that suppliers will allow an actual transfer of competencies and knowledge: thus, they will restrict themselves to delivering contractually specified achievements.
- **Small firms, individual inventors and startups:** in several industries, some firms have primary businesses to carry out outsourced R&D activity by leveraging low cost or specific competencies. The business term for addressing these firms varies by industry. The pharmaceutical industry refers to Contract Research Organizations, while other industries may use the term Engineering Services Providers. In this case, it is unlikely that suppliers will allow an actual transfer of competencies and knowledge: thus, they will restrict themselves to delivering contractually specified achievements.





*Figure 3: the main differences between “closed funnel” and “open funnel”.*

## **2. Strategic management of Open Innovation**

Nowadays, Open Innovation (OI) has taken an emergent role in the innovation context: it has increased its importance both in industry and academia. Nevertheless, it is still challenging to understand the advantages and disadvantages of this approach.

This chapter aims to describe some benefits and limits of the process, based on the strategic management theory, developing a dynamic capabilities framework.

### **2.1 The modern formulation of OI**

As described in the previous chapter, OI could be defined as how the firm could use external and internal ideas to improve their innovations. Chesbrough and Bogers have recently redefined Open Innovation as «a distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model.»(Chesbrough, Henry, and Bogers, Marcel, Explicating Open Innovation: Clarifying an Emerging Paradigm for Understanding Innovation (April 15, 2014))

Scholars have discussed this approach since it was introduced. Recent research has highlighted several issues such as:

- the "human side" of Open Innovation (i.e., knowledge difference of the company's employees is positively correlated with employees' capacity to detect and absorb external knowledge)
- the project level attributes (the fact that innovation projects generally have different features (i.e., complexity and uncertainty) but most studies on Open Innovation have only considered firm-level characteristics (i.e., firm size and firm openness))
- the role of public administration and societal issues.

### **2.2 OI as an imperative today**

While OI was originally established as a strong idea in 2003, it is seen as an imperative due to different kinds of developments in today's world. The first is that sources of knowledge spread across many locations, and the geographic footprint of Innovation is transforming significantly.

Indeed, the 2015 Global Innovation 1000 study stated that 94% of the world's biggest innovators perform some parts of their R&D activities abroad. Consequently, firms should not only use their personal opinions but also collaborate and cooperate with external sources. This definition is the "outside-in" branch of Open Innovation (also called inbound OI).

A second development is that Intellectual Property (IP) has permitted access to external concepts and allows others to utilize one's ideas. OI's growth does not imply that the role of IP rights (IPRs) is no more important. An interesting latest research demonstrated that solar photo-voltaic producers were more cooperative after they have got their first patent. Therefore, IP protection and cooperation are complements, not substitutes, in supporting the innovation development.

IP protection is also essential for the "inside-out branch" (also called outbound OI), the other OI branch. A method to promote the broader implementation of one's technology is to allow others to access via licenses with acceptable royalties. Emerging and scaling technologies necessitate a considerable portion of risk-taking and capital; inside-out approaches could, in several situations, expand the number of revenues to reach this. Licensing regimes have enough royalties to support the investment needed to make OI succeed.

A third development is strictly linked to the drop in the in-house R&D. Since the 1990s, firms have significantly decreased their investment in research. On the one hand, someone blames stockholders' activism and short-term focus; on the other hand, the reduction's responsibility is assigned to the rise of research-intensive startups funded by venture capitalists. Short-term investors might push firms to a shorter time horizon, and managers may decrease R&D expenses when shareholder activism emerges on the horizon, demanding cost-cutting. Since Innovation developed at corporate in-house labs becomes rare, it has become faster and cheaper for these labs to use external sources for R&D, such as local universities and suppliers.

A fourth development is a change in the composition of information flows due to digitalization: mainly, it seems that the phenomena make OI even more a priority. Digital platforms are everywhere: digital data, and signals provide a joint binary base to manage different kinds of information. The usage of these standards allows interoperability, and "multi-invention," and "co-innovation" contexts to be more common.

Regarding Internet of Things (IoT), industries such as automotive and Smart Cities have started adopting this kind of technology, but IoT business models require the creation of many partnerships to achieve results. On the other hand, systems integration is more accessible as well as more necessary with the implementation of OI. For instance, Toyota has created the e-Palette Alliance (with Uber, Amazon, Mazda, and Pizza Hut), an ecosystem of software and hardware support to develop a modular and driverless vehicle meant to many aims (i.e., logistics, delivery, and passengers travel). Toyota adopts a "plug-and-play" open platform for developing its mobility services. In this context, the management of ecosystems and access and control of complementary resources could be more critical to competitive advantage than installed base/switching cost concerns.

These developments have given good reasons why firms have to become exceptional in OI, even if companies have always included external ideas in their R&D activities. Just consider that already in 1714, the British government offered the Longitude Prize to determine a ship's longitude. Rewards valuing £20,000 were provided in the form of encouragement. In 1969, Allen and Cohen pointed out this view, too: «no research and development laboratory can be completely self-sustaining. To keep abreast of scientific and technological developments, every laboratory must necessarily import information from outside». (T. J. Allen and S. I. Cohen, "Information Flow in Research and Development Laboratories," *Administrative Science Quarterly*, (March 1969): 12-19, at p. 12.)

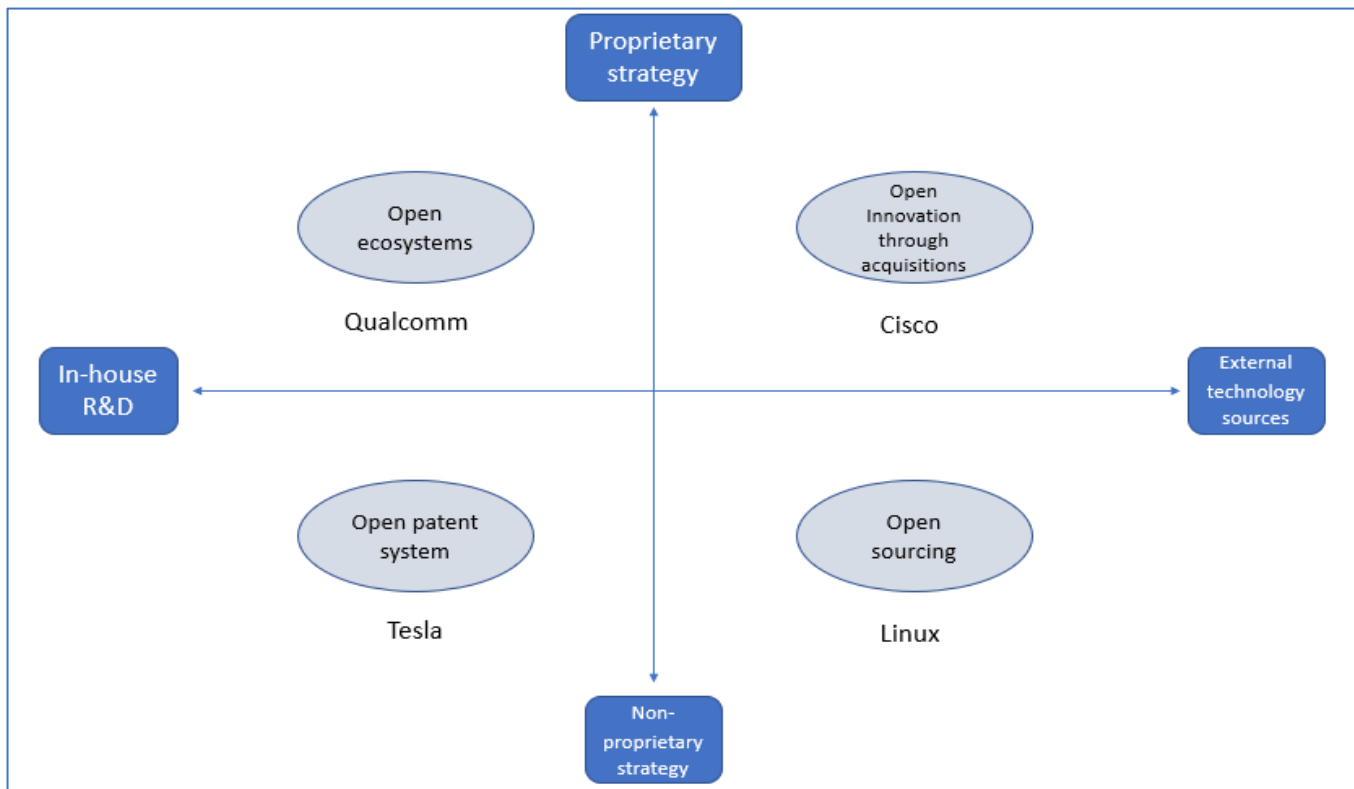
Even if Innovation's external taking is not a recent model, the contemporary OI approach is dissimilar from the prior ones. Nowadays, the best values and discoveries are in different places, thanks to the globalization and the ability of companies to connect with large and global technical societies. This is consistent with the dynamic capabilities<sup>2</sup> perspective: nowadays, effective engagement in outsourcing of technology, scouting tools and integration abilities are necessarily required by all companies. These are the reasons why OI approach is diverse from the pre-Internet era's ones.

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<sup>2</sup>Capabilities to integrate, develop and re-configure internal and external resources and competencies purposefully and dynamically.

### 2.3 Strategic choice variables of OI

OI's key strategic choice variables have been identified: the technology development business model (proportion of in-house versus contract R&D) and IP strategy (nonproprietary versus proprietary). Indeed, in the technology development context, firms are likely to wonder if they should source the technology internally or build a platform, or what IP strategy they should implement. These choices (Fig.4) happen both for value creation and value capture(separately).



*Figure 4: different typology of Open Innovation by technology development model and IP strategy.*

Looked from another perspective, OI involves business model choice and technology strategy issues. From a strategic point of view, the distinction between "open" and "closed" is only a matter of definition: companies could choose which part of their knowledge they could internalize or

outsourced. For instance, Apple uses both the two approaches, developing its iPhone software internally but using OI for the initial hardware design.

Analyzing the choices mentioned before, companies could perform OI in many ways (Fig.4). For example, Qualcomm develops proprietary technology, mainly using internal sources. However, it has embraced OI by building open ecosystems by licensing to its complementors, designing, and making final products for consumers. Players such as Motorola, IBM, and Nokia have developed several technology platforms under ETSI (European Telecommunications Standards Institute)/3GPP (Third Generation Partnership Project) that create an ecosystem that improved and shared proprietary core technologies. Therefore, the mobile phone industry gains value from the significant number of engineers hired by thousands of companies, who have collaborated and competed to provide consistent results across companies and continuously progress across time. This harmonization is a typical OI example. As Qualcomm notes: «Our business model is one of the greatest successes of open innovation in the world. Our business model has democratized access to mobile technology. We created mobile broad band [...] open innovation is the spirit of our licensing and chipset business. Our inventions span new marketplaces and vibrant ecosystems. More and more companies are mobile first. Look at Uber, Snapchat, Waze mobile banking [...] they sit on top of and are enabled by over 30 years of R&D in wireless [...] every time you touch your phone, you touch a Qualcomm invention. You may not realize it because it is being presented to you by our partners in open innovation<sup>3</sup>».

Tesla has developed most of its proprietary technology internally too, but its IP strategy is different from Qualcomm because it has been shifted to nonproprietary strategy. Elon Musk stated that: «we felt compelled to create patents out of concern that the big car companies would copy our technology and then use their massive manufacturing, sales and marketing power to overwhelm Tesla [...] the unfortunate reality is the opposite: electric car programs (or programs for any vehicle that doesn't burn hydrocarbons) at the major manufacturers are small to non-existent, constituting an average of far less than 1% of their total vehicle sales» (E. Musk, "All Our Patent Are Belong to You", June 12, 2014, <https://www.tesla.com/blog/all-our-patent-are-belong-to-you>.). Tesla, having limited competition and sales in the electric vehicle industry, used the open patent system,

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<sup>3</sup> <https://www.cnbc.com/2017/07/31/qualcomm-ceo-our-business-model-is-unique-so-its-easy-to-attack.html>

because it cannot produce enough electric cars to solve the carbon crisis by itself. Moreover, Musk believes that the position of Tesla is enhanced and not diminished by applying “open” approaches to its patents.

Another methodology is making OI through acquisitions. Cisco applies this kind of approach, both partnering and investing in promising startups. Doing so minimizes the own research but remains at the same level as other global R&D entities. Put in another way, the company believes that the best ideas could be external from the company: indeed, John Chambers, chairman emeritus of Cisco, who completed 180 mergers and acquisitions, stated that tech M&As are the future in the context of technology development. The topic will be discussed in a in-depth way in the following chapter.

Lastly, open-sourcing is another way to follow the "open" philosophy. For instance, Linux is an open-source operating system, which has been developed by programmers from all over the world. The Linux Foundation operates with government and academic entities, explaining to them how to use open source. It also collaborates with the upstream side and individual contributors to promote the use of the open-source solution. (i.e., studios started sharing software as open-source through Linux in animation and visual effects and used Linux for blockbuster films).

## **2.4 Manage Open Innovation: a dynamic capabilities approach**

In the past, it has been shown that successful firms have organizational flexibility as their most important feature in the context of Open Innovation. Indeed, this characteristic is necessary to reorganize their existing business model and familiarize them with OI strategies. Put in another way, to make OI works, it is required to align the current business model of the company with the external source of Innovation. Nowadays, when there is much information and useful knowledge everywhere, it is fundamental to create systems that combine different knowledge (to gain much of the real value), instead of developing another piece of it. This "systems integration" capability is a value-added concept in the framework of OI.

Hence, co-invention/co-innovation chances become more comprehensible if OI philosophy is integrated into the dynamic capabilities framework. As mentioned before, dynamic capabilities are the «firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments in which there is deep uncertainty»(DJ Teece, G.Pisano, and

A.Shuen, "Dynamic Capabilities and Strategic Management," *Strategic Management Journal*, 18/7(August 1997): 509-533). In this sense, to grow, companies should adapt assets and organizational construction when the firm expands, and markets and technologies evolve. The adjustment and alignment make this organizational procedure of tangible and intangible assets. Consequently, it is needed to reallocate assets (such as talent and money) to distribute the most benefit.

Three sets of organizational procedures support dynamic capabilities: sensing, seizing, and transforming capabilities. Thanks to these three elements, companies could exploit all the advantages of Open Innovation.

"External-to-internal" (Outside-In) OI needs sensing, sense-making, and the technical analysis coming from an external context. The sensing capability allows companies to recognize significant knowledge and to make the relationship with the outside easier: indeed, it is tough to reach lots of ideas and then review them, choosing the best one.

Open Innovation is not just outsourcing R&D to somebody else: the process allows to improve internal capabilities, enrich one's business model (Outside-In OI), or explore a new business model (Inside-Out OI). Though, ideas require the right execution to have good performance.

For this reason, extensive delegation, intensive lateral<sup>4</sup> and vertical<sup>5</sup> communication and rewards for knowledge sharing are critical elements to use in a successful way external knowledge. Also, significant adaption and integration are required to take internal technologies to market: for all these reasons, Open Innovation also needs the seizing capabilities.

Furthermore, firms need to restructure their businesses to integrate external knowledge, which frequently needs to transform capability successfully. In case of integration of external competences, there could be a possibility of "damages" to the organization: for this reason, a cultural shift is necessary. Indeed, it is required to successfully integrate external elements, to create a "mind-set" that is open to collaboration and overcomes the "not-invented-here" syndrome. Many

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<sup>4</sup> **Lateral communication** is the exchange, imparting or sharing of information, ideas or feelings between people within departments or units of an organization who are at or about the same hierarchical level as each other for the purpose of coordinating activities, efforts or fulfilling a common purpose or goal.

<sup>5</sup> **Vertical communication** is the communication where information or messages flows between or among the subordinates and superiors of the organizational.



firms are aware of the importance of having a collaborating culture, but it is not easy to understand how to do it (Table 1).

Sets of dynamic capabilities	Sensing	Seizing	Transforming
Related Open Innovation strategy	Find licensing out chances	Invest in internal R&D	Do not allow R&D cost reduction
Examples of related activities	Discover and assess significant external knowledge	Activate processes to commercialize ideas	Adjust the mix of internally and externally developed technologies to reflect changing needs and opportunities

*Table 1: strategies and examples related to sensing, seizing, and transforming capabilities*

## 2.5 Advantages of OI approaches

There are both pros and cons to this type of innovation. When deciding if a company will choose closed or Open Innovation, it is essential to weigh each's advantages and disadvantages.

Thanks to empirical study, various reasons for embracing the Open Innovation method have been identified; afterward, four essential purposes have been selected: cost reduction, knowledge gain, sharing risks, and diversification of resources. Knowledge acquisition is recognized both as the most crucial motive for performing external partnerships and as the key benefit of Open Innovation, as a critical element for organizational learning. Figure 5 indicates the key four reasons for firms to undertake open partnerships: cost reduction, knowledge gain, risk-sharing, and resource accessibility.



*Figure 5: general advantages to adopt Open Innovation approaches*

If a firm "removes the barriers" by integrating knowledge created by customers, suppliers, education organizations, consulting societies, the result is the development of intellectual capital through knowledge sharing. By establishing partnerships in the market, companies could gain access to a higher number and a different composition of resources that would be scarce if only developed internally. Open Innovation expands the knowledge pool of a firm and increases the possibility of achieving a superior position in the market. Given that competitiveness is an essential factor in the innovation development, companies made their business model more flexible, enlarging their investment in outdoor R&D to be aware of new ideas present in the market, rather than investing just in internal resources. Knowledge acquisition allows boosting a company's organizational learning, too, as a portion of its strategic methods to create internal capabilities and integrate external knowledge. Hence, the innovation rate is improved with external collaborations because OI decreases the time-to-market for new products and services, thanks to shorter development time.

Co-innovation is pursued cost alleviation too. The increase of technology development costs, associated with reducing product lives on the market, suggests companies manage expenses better, seeking effective relationships.

Given that innovating means generally more significant risks, establishing external partnerships is a way to share the chances of the company's projects. Though, as later mentioned, OI schemes may involve many kinds of risks, too which need attention. Internal resources are usually a constraint: frequently, they are not enough for big innovation projects. Open Innovation increases the possibility for internal resources to be employed in other projects and guarantees access to resources otherwise unavailable in the company.

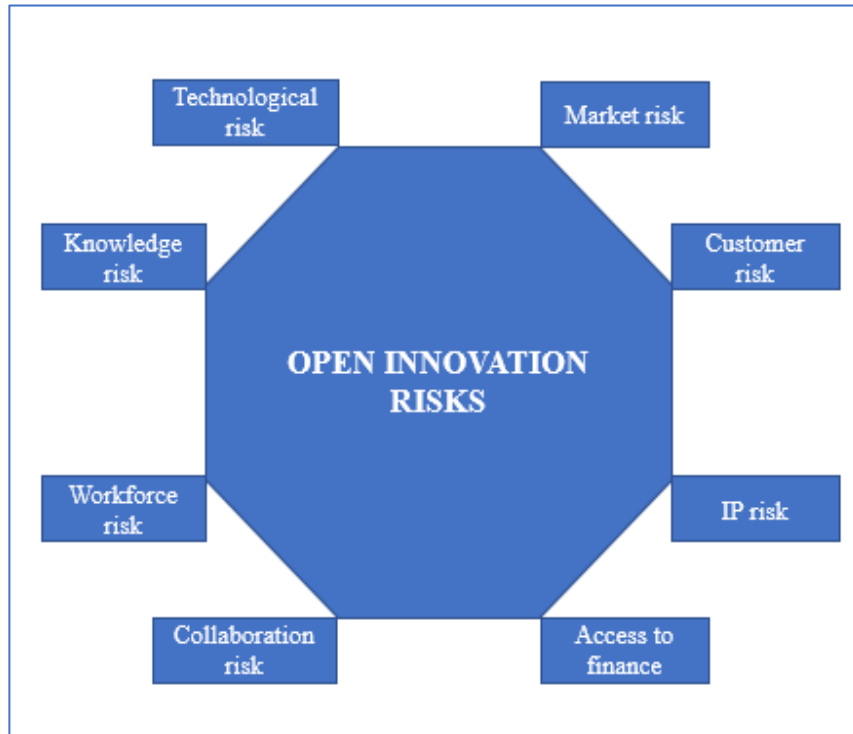
Moreover, financial restrictions are difficult to manage in the current economic environment: with the OI approach, the capital position of companies is strengthened, and cash infusion becomes easier.

## **2.6 Disadvantages of OI approaches**

If, on the one hand, an OI plan seeks to reduce the risk associated with developing innovative solutions, it could also lead to an increase of risk that concerns the cooperation of different partners. Nevertheless, there is a lack of research about the costs and barriers of OI.

There are internal factors (within individual firms or single sectors) and external factors (associated mostly to the marketplace and the quality of collaborations) that act as barriers to this kind of project. About these factors, Open Innovation literature reveals that the most important benefit for companies (which cooperate in projects with innovative objectives) is risk-sharing. Simultaneously, cooperation intrinsically is risky and costly. For this reason, a paradox comes out: even if the primary purpose for companies that apply OI approaches is risk-sharing, in these partnerships could occur threats that alter the original aim of performing innovations and competitive advantage too.

OI generally has constraints linked to technology, marketplace, collaboration among partners, financial sources availability, client's needs, workforce, knowledge, and intellectual property rights, as graphically described in Figure 6.



*Figure 6: Main risks in approaching OI strategies*

Given that cooperating in joint projects is one of the most cost-effective methods to get knowledge from outside, it could be considered the principal asset that is exchanged in OI. Nevertheless, partners' scarcity of experience in these relationships could lead to costs and barriers to the determined result.

Furthermore, a firm's knowledge sharing could lead to the disclosure of internal competencies to its rival businesses, which could bring to lose competitive advantage over the rivals that, on the other hand, achieve considerable market share or market visibility. Knowledge loss or unintentional knowledge spillover is strongly associated with open collaborations. The loss of crucial internal assets and the release of core competencies to collaborators could change the OI procedure's objectives and principles.

The possibility of losing knowledge is closely linked to the little faith in the collaborator and ineffective communication among partners about aims and tactics, which, in the end, slow down the innovation development and the results of the partnership.

Besides, a possible threat is the opportunism. In open alliances, companies pursue skilled and capable external partners that operate for the organization. Nevertheless, there are geographical, cultural, or merely strategic discrepancies in the global market: consequently, the labor offered quality could not be excellent for the company. Retention risk could be the essential limit due to turnover among the workforce that could modify the partnerships' performance and become a critical knowledge loss.

Indeed, risks linked to individuals are considered the most significant issues because they are the most important players and assets in this kind of partnership. The workforce safety mindset, averse to alterations and Innovation, could be a crucial risk. Its effect is even more significant when it is a translation of the top management's philosophy, which does not assist the innovation process. Not training enough personnel is a problem for a small company because it creates a knowledge barrier.

Moreover, Open Innovation shows intellectual property rights protection. Since there are a possibility of knowledge spillover or knowledge theft, pre-emptive actions are required to avoid the risk of information disclosures concerning precious technologies, mainly when dealing with competitors. It essentially defends internal knowledge from spilling over to the collaborator.

The ongoing changeover of customers' needs is a big test for companies that seek to customize their products and services. By pursuing short-term competitive advantage, by moving the attention on utilizing resources outside the company's own market, it could mitigate its customers' emphasis. The rising of interest in outbound OI could have a significant impact on short term gains and a bad influence on long term benefits. Outbound OI pursues the meeting of the goal, rather than client approval.

Collaborations, the essential practice of OI, involves several risks that change the objective. Firms could have less control over their internal procedures, not monitoring external resources as internal ones strictly. Open Innovation collaborations requires competences of managing complicated projects, since there is the persistent necessity to think about external relationship management, intellectual property, confidentiality. Cooperation risks are significantly associated with knowledge loss and opportunistic conduct. Collaborators let each other develop skills in an area critical to their strategy and then sell their know-how to the competitors.

Collaborators that have not the same incentives or expectations could reduce their effort in the partnership. The OI plan dimension is a parameter that strongly influences the results: the more significant the project, the more combined resources are required (financial, labor and knowledge), given that a higher complexity needs solid management and control skills and abilities to manage the uncertainties that arise. Opportunity risk is an additional element of cooperation barriers because it is difficult to scout the best collaborator to innovate. Although once discovered that affiliate, it is required to maintain equilibrium between OI activities and daily, routinely business.

Accessibility of a larger number of resources is one of the key reasons companies join OI projects. Nevertheless, obtain the possibility to use such a diversity of new resources or using too many resources at the same time creates a maintenance issue. Coordination costs could grow and make access to external assets less desirable since understanding other associate's competitive advantages result in additional charges. Generally, openness needs higher management, coordination, and control skills, which means increased costs.

Finally, the market environment impacts the realization of OI projects. Globalization has brought firms to concentrate on short term outcomes, reducing long-term research towards radical Innovation. Moreover, the market needs transparency about information flows, customer requirements and expectations, and cost structures, which influences the collaboration with other organizations. Unsatisfactory marketplace data or knowledge could create an excessive risk to the company. The worldwide economic climate and its uncertainty necessitate companies to search appropriately before adopting outsourcing practices to prevent potential outsourcing consequences. Especially for emergent states, immoral behavior is widespread and is the most potential business risk. Open Innovation is hampered by the bureaucracy barrier, too, and companies find increasingly more rigid paying administrative costs required in the external collaborations.

Below, the table (Table 2) describes other aspects of the principal risk drivers (splitting them in internal and external).

<b>Risk</b>	<b>Typology</b>	<b>Explanation</b>
Workforce	Internal	Personnel opposition to innovation and change
	External	Lacking technical capability or training of personnel
Knowledge sharing	Internal	Ethical barriers due to disclosure of the core competences
	External	Inadequate knowhow of collaborators
Cooperation	Internal	Complexity in matching innovation with daily assignments
	External	Absence of faith and interaction among collaborators
Market	External	Unpredictable and uncertain industry policies
	External	Unavailability of market information and transparency
Customers	External	Continuously transforming requirements of the consumers
Finance	External	Unavailability of financial capital to backing OI, elevated commercialization costs
Technology	External	Technology outflow to competitors, risk from technology uncertainty, incapacity to adapt to technology innovations
IP	External	Knowledge spillover to rivals

*Table 2: description of the major risks in OI process, comparing internal and external forces.*

### **3. Big companies OI programs towards startups**

Until now, it has been described OI in general terms. Now the focus will be moved on OI programs towards startups, a key topic in this work of the thesis.

Nowadays, businesses suffer a market of continuous instability and disruption due to significant variations in consumer behavior, technology, regulation, and demographics. This requires an innovative answer from business otherwise they risk losing revenue and market share to more forward-thinking, innovative and active competitors. The matter is not anymore, why businesses have to innovate, but rather, what methods they should utilize to innovate.

Positive innovation lies not only in generating ideas, but in recognizing the disruptions of today and tomorrow, in developing an innovative knowledge and, most crucially, ineffective and efficient implementation. This, in turn, needs to be sustained by a well-designed system to ensure the right ideas are uncovered and efficiently delivered to the market.

For many firms, innovation is tough to learn and perform. A great difference persists between how big businesses and startups surround it. Consequently, large companies are looking to startups and entrepreneurs to find disruptive concepts and opportunities for their business and to open innovation through the core of entrepreneurship.

#### **3.1 The necessity to innovate**

The industrial advantages of innovating are perfectly known. Today, though, there is an extra pressure in businesses' efforts to create and implement new ideas. Indeed, the risk of disruption is increasing over the years. How companies react is essential to their continued success and, eventually, their survival.

The fall of Kodak is a clear case. As the digital camera's initial developer, Kodak is the most cited model of how a company can fail to innovate and react to disruptive technology efficiently.

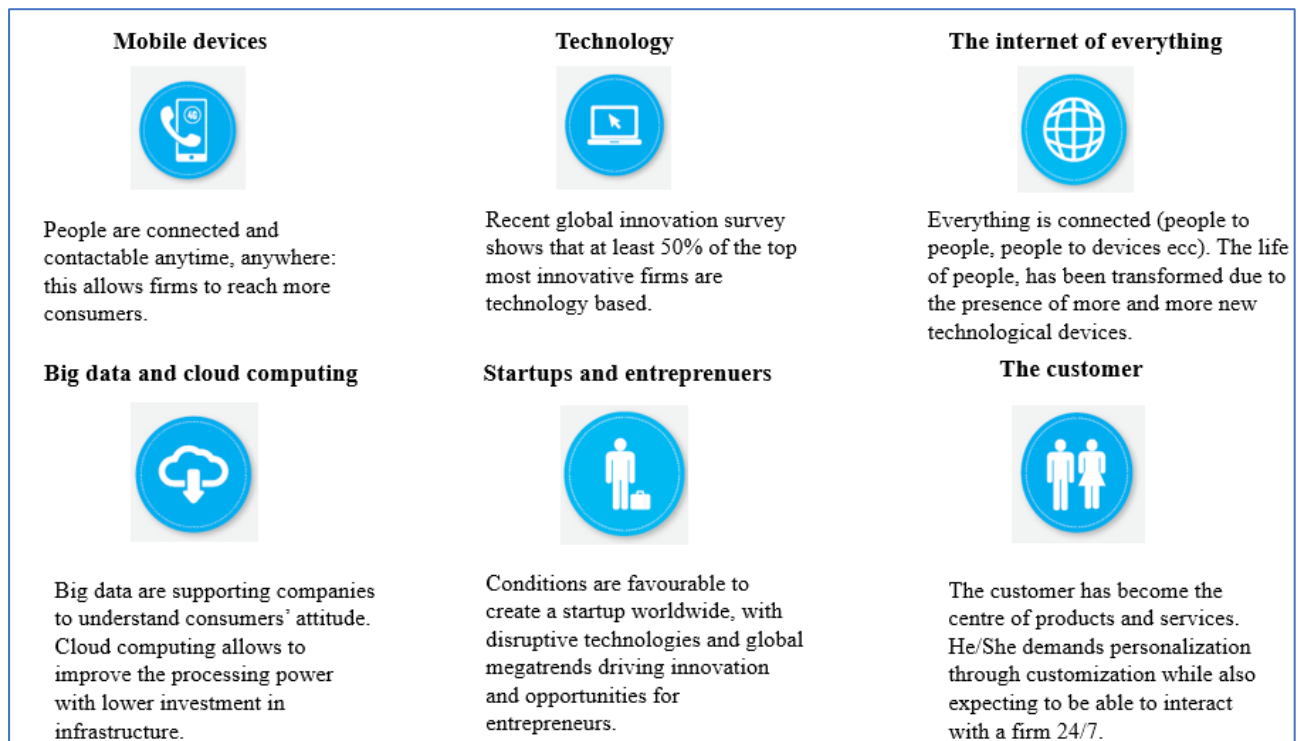
Worldwide, innovation is a fundamental strategic aim for chief executives of small, medium, and large companies. In a 2017 global innovation survey, 91% of senior leaders said that innovation was a strategic priority and would be the most significant revenue growth provider over the coming years. Moreover, large firm frequently struggle to innovate; many fail to turn concepts



into significant business propositions. Therefore, many are starting learning from startups, frequently through strategic alliances, with some notable success.

Innovation is not recent in the business context. However, businesses' attitude to innovation has progressed significantly in the years. Today's significant diversity is the pace to market, essentially because of the development of a strongly connected global market and the high connectivity of businesses and people thanks to Internet.

These trends (Fig 7) have enabled skilled people (or entrepreneurs) and built circumstances for the fast increase of disruptive business models such as Uber, Salesforce, and Netflix. Many companies have now shifted their emphasis from investment in core research and development to investment in various sources of innovation, concentrating on the position of the consumer, digital technology, startups, and entrepreneurs.



*Figure 7: global trends driving changes in innovation.*

### 3.2 Big companies: Open “for” Innovation

The changing nature of innovation has considerably challenged large firms. Many companies establish corporate innovation groups to overcome this situation and look for new approaches to innovate, both internally and in the market. More organizations are considering startups and entrepreneurs for suggestions and resolutions, bringing fresh thinking into their companies, and challenging the status quo. Innovation, by its nature, is risky and means failure. This condition often does not fit with the approach of many large businesses. As businesses get more significant, their capacity to innovate is generally restricted by their dimension and the processes developed to support them to achieve their purposes and moderate risks.

Therefore, how could firms get out of their usual procedures to reach innovation? Internal corporate innovation teams have started looking for external (to the business) ideas for innovation purposes. Nevertheless, internal innovation could still be delayed by problems essential in an organization: the risks linked to supporting new ideas, connection to the status quo, and a lack of access to competent people to build new ideas into workable products. Furthermore, given significant firms aversion to risk, many will wait until markets are developed before investing in restricted resources. Though, this procedure could limit an organization's ability to create disruptive innovation internally.

Many corporate innovation systems have moved towards startups and entrepreneurs to overcome these challenges. In this way, they have effectively used them and their techniques to improve their innovation (Open Innovation). They perform it through several means, including some of the following:

1. **Accelerators and incubator programs:** it typically lasts for up to 6 months giving mentoring, business coaching, and a co-working room to startups chosen to be included. Seed funding could be offered to startups for an equity of around 6 to 30%. This investment gives the business immediate contact to the startup ecosystem, potentially becoming a customer or a supplier.

Moreover, in recent times, companies are starting to work with entrepreneurs through actual Incubators/ Accelerators to assist more effective entrepreneurs and startups. The following chapter will illustrate an example of this kind of collaboration.

2. **Corporate venture capital:** having great revenues and assets and a necessity to keep up with technological trends, big firms are progressively performing corporate venture capital for strategic improvement and financial profit. While traditionally large companies have invested just for economic return, today the tendency is to invest tactically in startups whose objectives are in line with a business' goals. The intent is to buy ability and innovative products and services at a lower cost than through R&D.
3. **Startup acquisitions and partnerships:** large firms think making disruptive innovation internally is difficult. Consequently, many are considering of purchasing the IP, the product or service, the team, or the whole business of startups. This condition allows the company to quickly build innovation expertise while enabling the company to concentrate on its core competencies without changing the current business model.
4. **Call for startups/ideas:** companies, after a preliminary assessment of their needs, decide to organize a call (through a third party or on their own), in which startups can apply and be selected by firms. There are different kinds of Call:
  - some have the purpose of solving a particular issue, and early-stage startup is called upon to solve it (with a possible partnership at the end)
  - others aim to collect mature solutions to the company's lack of infrastructure/software.

Therefore, it is a sort of competition among startups to convince its senior leader to choose them.

Until now, general concepts have been given to readers to have the "big picture" of the context of innovation development. Thanks to them, it will be easier to understand the following references to large companies' case studies.

### **3.3 Useful references to design specific cases**

After introducing the topic with a general approach, the following paragraphs show useful and specific elements of Open Innovation's large companies' experiences.

This approach introduces and creates a "bridge" with the parts of the following chapters, regarding the OI program that the author of this work of thesis has participated and collaborated to develop.

#### **3.3.1 Reasons for the choices**

The primary approach used has been the flexibility to meet the cases selected' adequacy, creating an interdependency between the case studies, even if a determined sampling strategy has been chosen. Put differently, attempts have been made to describe specific experiences, giving an example of each "theoretical mean" related to Open Innovation.

Only cases based on large enterprises (companies with 250 or more persons employed, according to Eurostat) have been considered. Then, the sampling strategy to select case studies has followed three parameters:

- successful OI model: cases that describe positive results derived by the collaboration between the corporate and the startup
- stratified purposeful cases: cases illustrate characteristics of a particular subgroup to facilitate comparison and not for generalization or representation
- theoretical cases: cases are the manifestation of a theoretical construct and are used to examine and elaborate on it.

#### **3.3.2 The “Call for ideas” of Siemens**

Siemens is a multinational company established in 1847 that, with its technologies, supports the digital transformation of energy, industry, infrastructures, and mobilities. From the very beginning of its history, Siemens was characterized by its capability to come up with and to develop new products and solutions.

IOOOTA is an innovative B2B startup dealing with the IoT environment. It provides Jarvis, a Paas ( Platform as a service) solution of Smart Building that allows the communication between the

different objects and the HVAC facilities in civil buildings, creating energy efficiency, comfort, automation, and control mobile app, web, and voice.

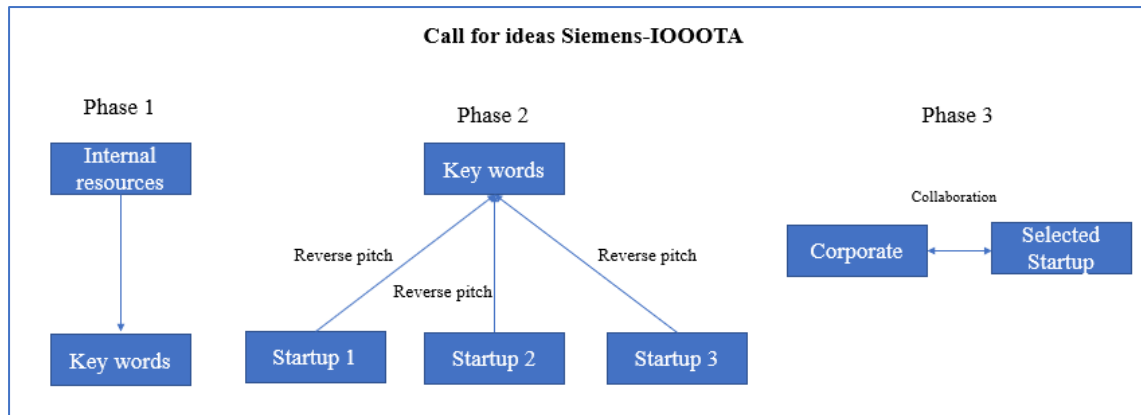
According to many scholars, voice systems consolidation is the next step in evolving the interfaces that will improve the communication between the user and the machine. In 2019, 60% of smartphone users used voice tools to search for something on the Internet.

These data have a significant impact on how humans deal with technology and, therefore, also on the Smart Building market, where both Siemens and IOOOTA work. Roberto Pagani, Head of Business Development of Siemens, states: «The voice phenomenon - and more generally that of the smart building - represents a fundamental change in the digital economy. It will probably repeat a pattern already seen: the companies that soon embraced the digital revolution are now well ahead of their competitors. Similarly, companies prepared to invest immediately in voice technology, they will gain an interesting market share».

The path of the collaboration started in 2017 in the Call for Ideas organized by Siemens. In the beginning, indeed, the company has invested in its internal resources, asking its employee to propose ideas for new products and services: in this phase, the ideas were only "keywords," and they have not been translated into a complete business model yet.

The company then showed interest in one of these "key words" (smart home, smart building) in a Reverse Pitch, an event where Siemens proposed a collaboration plan to more than 100 promising startups. IOOOTA was selected for the final competition in 2018; meanwhile, the startup had already developed Jarvis, an IoT platform. It also won an international contest and the prize for the "Integrated system for Smart Home." The first outcome of this collaboration was a smart thermostat, able to execute voice commands and communicate with the company's data management system.

Therefore, Siemens has decided to oversee this market segment and perform it as quickly as possible by cooperating with the startup (Fig.8).



*Figure 8: OI system in the case Siemens-IOOTA.*

### 3.3.3 Enel Innovation Hubs Global Network

Enel is an Italian multinational energy firm involved in electricity production and distribution and the delivery of natural gas. Enel was primarily created as a public entity at the end of 1962 and turned into a limited firm in 1992. In 1999, with the liberalization of the electricity business in Italy, Enel was privatized. Italy is still the main shareholder through the Ministry of Economic and Finance, with 23.6% of the share capital.

To guarantee the OI methodology's success, Enel required fast access to new ideas, technologies, and business models from startups, SMEs, universities, and researchers around the world. To create bridges to this ecosystem of potential partners globally, in 2016, Enel launched its first Innovation Hub in Tel Aviv.

The Innovation Hub created a network of relationships within each ecosystem to help Enel find the best solutions to its requirements and find new unexploited opportunities for development. To increase the success stories, the company reproduced the model every time an attractive site was presented, leveraging each ecosystem's specific features. Enel opened three other global hubs in San Francisco, Madrid, and Boston. As one of the critical startup centers globally, San Francisco brought together startups, talent, venture capital investors, and high-tech corporations in a single location.

In Boston, home to several world-class universities, the ecosystem included many startups in the energy sector. Enel located its Innovation Hub at Greentown Labs, the largest cleantech incubator in the US.

Moreover, Enel deployed Innovation Hubs within its current labs to pursue innovation through coworking, leveraging the expertise of Enel' engineers in Catania (Sicily), in Milan where Enel had a lab about the development of its future distribution network, and in Pisa, which hosted the lab of the thermal generation business. Furthermore, Enel deployed local innovation hubs also in countries where it had full industrial authority, Chile (Santiago), Brazil (Rio de Janeiro together with Sao Paulo), and Russia (Moscow), to be close to the people who applied the technology.

At the Innovation Hubs, Enel helps startups and SMEs by opening its laboratories' doors and allocating resources to create solutions. Nevertheless, the main benefit came from the expertise it provided to scale up a solution to an industrial level, as Robert Denda, Innovation Manager Infrastructure & Network, explained: «We have our engineers in a coworking environment to work together with those startups. The startup might have the creativity, the idea, but maybe they do not have the skill to scale up fast or there are other things missing. We try to bring those things together with our engineers who are really trained in industrialization».

If a solution is effective, Enel started a commercial partnership with the startup and could scale up (via Enel' businesses) to a global level. (Fig.10)

Enel tended to avoid taking equity. Having tried in the past with the corporate venture capital attitude, it felt that this was not the right strategy. Fabio Tentori, Head of Enel Innovation Hubs, stated: «The management of a large corporation like Enel does not apply to a small company that needs to grow and experiment freely at a fast pace. We were sabotaging our acquisitions with our heavy governance; we were putting a brake on initiatives that made us acquire the company in the first place. We rather support them from a technology and development perspective and let them free to innovate, without necessarily imposing our ideas».

Associating with Enel, as its first big client, let the startup growing and discover other partners. Tentori added: «We ourselves connect the startup with the capita/ market, if they need to raise equity, we can introduce them to a wide range of institutional investors who are able to support them. In addition we give startups the opportunity to connect also to some of our suppliers if they

need a boost in the industrialization phase or we help them to find additional customers for their solutions to grow faster and more reliably». Enel implements direct investment (M&A) in startups or SMEs that have a competitive advantage in a strategic area that Enel wants to join (yet lacked the technology to do so). For example, in 2017, the San Francisco Innovation hub scouted eMotorWerks, a startup that had developed a charging platform for electric cars and a platform to optimize the charging of vehicles and enable vehicle-to-grid technology. After a period of cooperation, Enel opted to acquire the startup to fill a technological gap in that field. The acquisition of eMotorWerks allowed it to enhance its electric mobility offering and move into the North American market. Recently, it is revolutionizing the electric vehicle (EV) charging market with its JuiceNet-enabled smart grid



*Figure 9: Juice box charging station. (<https://evcharging.enelx.com/products/juicebox>)*

EV charging solutions. JuiceNet enabled devices (Fig.9) maximize charging efficiency and speed while providing EV owners intuitive control and visibility. By collecting electricity from the grid, eMotorWerks helps utilities and grid operators cut electricity costs, ease grid congestion, and maximize solar and wind power use.

By 2019, four years after the opening of the first innovation hub in Tel Aviv, Enel's team had scouted more than 6,000 startups worldwide and had done a preliminary assessment on over 1,000 of them. The couple had about 250 projects in progress, and it had dedicated more than €30 million in commercial relations (mostly POC), and more than 50 projects had been scaled up worldwide.

One of the achievements was Nozomi Networks, a startup offering a cybersecurity answer for critical infrastructure. Nozomi analyzed its technology on Enel's infrastructure, and Enel gave it resources to develop the sensors, systems, and algorithms that Nozomi had conceived. After a year of testing, Enel chose to implement the plan. By 2019, Nozomi had raised more than US\$50 million in capital from VCs and had become a leader in this field. Cybersecurity was a significant issue for Enel but not its core business. By helping Nozomi Networks, Enel overcame its lack of technology and expertise in that zone.



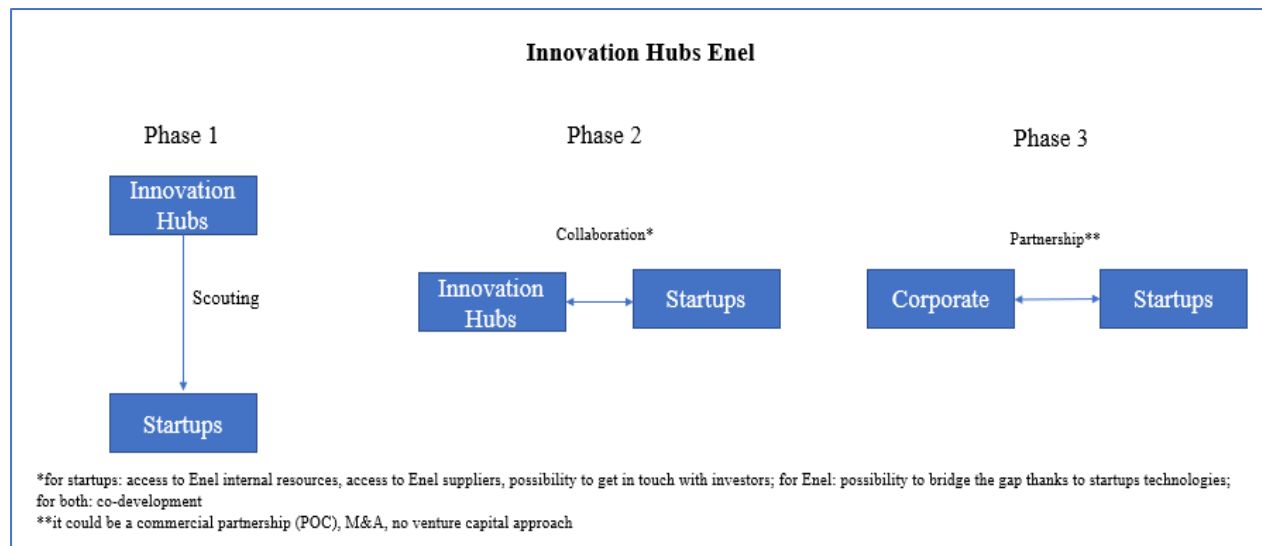


Figure 4: Enel approach to Open Innovation.

### 3.3.4 Internal Innovation unit: BMW Startup Garage

BMW is a German multinational firm which manufactures cars and motorcycles. It is headquartered in Munich and produces motor vehicles in Germany, Brazil, China, India, South Africa, the United Kingdom, the United States, and Mexico. The Quandt family are long-term shareholders of the firm. Vehicles are marketed under BMW, Mini, Rolls-Royce, and motorcycles sold under the brand BMW Motorrad. In 2015, BMW was the world's twelfth-largest maker of motor vehicles.

The BMW Startup Garage is section of BMW's Research, New Technologies, and Innovations unit. It has been scouting several innovative startups in the business, permitting the BMW Group to exploit their potential quickly. Until now, more than 50 coming technology firms have finalized its startup system. Startups support BMW to gain an even better knowledge of what personal, connected, and sustainable mobility will look like in tomorrow's world and come up with the necessary solutions.

The BMW Startup Garage deals with over 1,500 startups from all over the world every year. If the first reactions advise that a startup innovation is reasonable for the BMW Group, it is examined more comprehensively. Among 600 and 800 startups are evaluated every year, and a decision is taken on their appropriateness for enclosure in the BMW Startup Garage's plan.

The BMW Startup Garage runs small, agile units placed at international technology hotspots. It now has agents working at the BMW Group Technology Offices in Silicon Valley, Shanghai, Seoul, and Tokyo.

At the beginning, the BMW Startup Garage was concerned primarily with innovations for the BMW Group's products and services; later, after 2018, its plan has been enlarged to startup innovations for all business units.

The support to the startups during the program is based on four pillars:

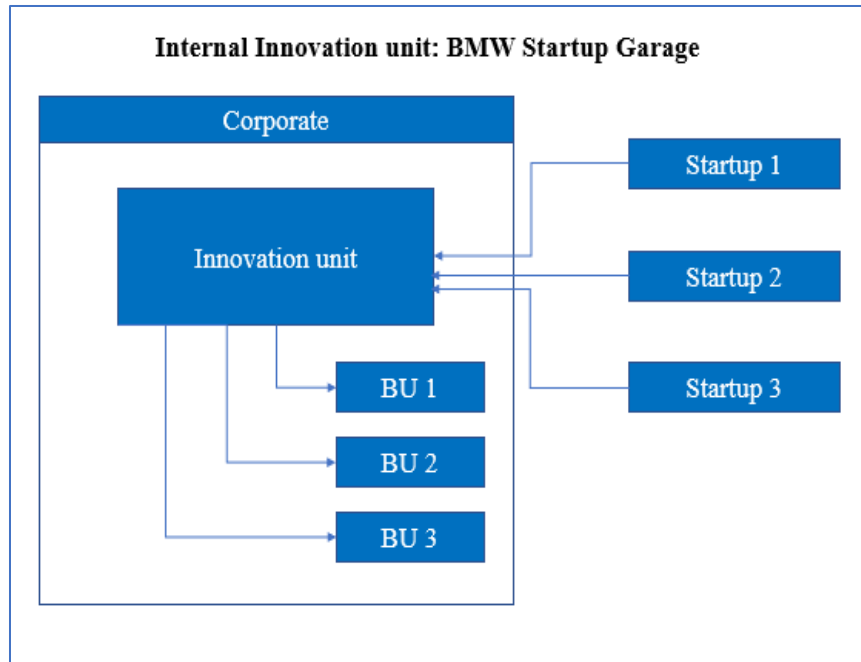
- **Build:** conduction of a Proof of Concept (POC) project, like building a prototype with BMW vehicles, piloting a mobility service, or a system in the firm's factories
- **Learn:** focus on the comprehension of the automotive world. Startups will discover industry dynamics and how development, production, and purchasing works.
- **Network:** possibility to get in touch with key people who grow the BMW business and the global automotive industry.
- **Sell:** help startups promote their solution by building an effective automotive use and business case.

For example, the "Build" step includes performing the pilot project and creating a business plan. On the other hand, one of the elements of the "Network" and "Learn" pillars is the "Deep Drive Days" event, in which workshops and keynote speeches provide startups the chance to share concepts and network with operators from several BMW Group offices. All four of the program's pillars are intended to help long-term business relations with the BMW Group.

For instance, Lunewave and QC Ware are two startups who have operated on additional projects as BMW Group associates following their participation in the program.

In its project started as part of the BMW Startup Garage 2018 program, Lunewave distinguished itself with its new sensor technology. Technicians at the Autonomous Driving Campus operated together with Lunewave on a pre-development project to improve the innovative sensor concept.

About the second, quantum computers can be used to work out the type of complex problems that today's supercomputers would need years to tackle: in this sense, BMW Group was quick to recognize the potential of this technology. The BMW Startup Garage teamed up with QC Ware to conduct various feasibility studies focusing on the application of quantum computing for specific issues, such as optimizing the jobs presented by robots on the production line.



*Figure 12: Co-innovation model of BMW*

### 3.3.5 Shell Ventures: Shell VC arm

Shell is a Netherlands multinational firm. In 2019, Shell was classified as the ninth-greatest firm globally and the biggest energy firm. It is active in each part of the oil and gas business. It has renewable energy activities, too, including biofuels, wind, energy-kite systems, and hydrogen.

Shell Ventures was established in 1996 as one of the first corporate venture funds in the oil and gas business, and it acts as an investor and a partner to support the commercialization of innovative solutions. Shell Ventures works with startups and SMEs for their entire life cycle. It does small investments that help improve new tools and disruptive business models in strategic interest parts to Shell's businesses.

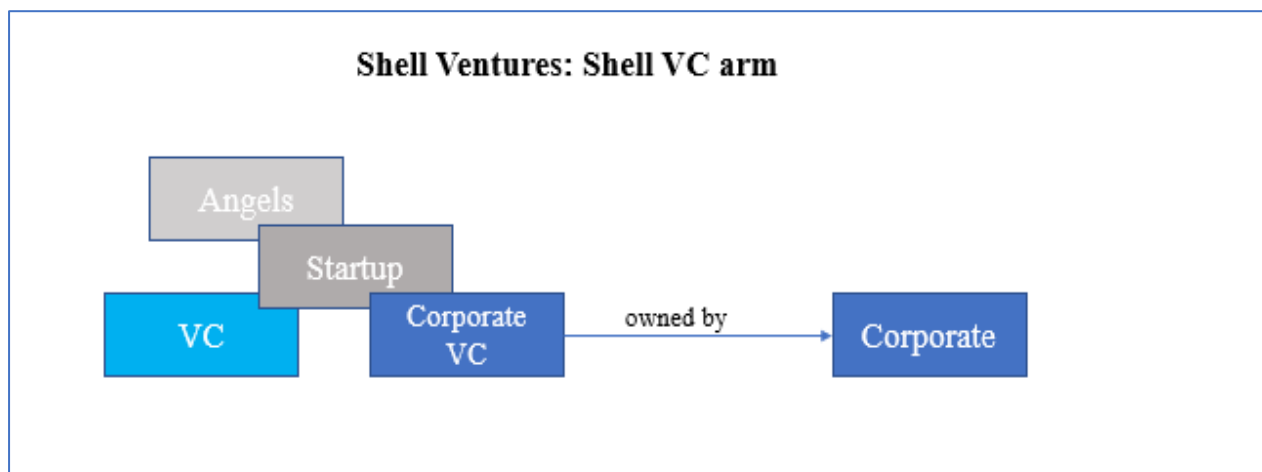
Investments' focus is a combination of oil and gas, renewable energy and cleantech, new fuels for transport, smart mobility, and digital (Power, Resources, Fuels and mobility, multi-industry solution).

Shell Ventures is expert in deployment and scaling-up and has several teams designed to the implementation. It offers companies access to technical and scientific expertise, research and development facilities, and can help field trial pilots further develop and demonstrate concepts. It

also provides unique access to a global customer base and an extensive supplier and contractor network.

Shell Ventures' investment strategy is to be a significant minority investor with a typical initial investment is \$2-5 million, with a total of \$15-22 million over the lifecycle of an investment. Keeping exceptional relations with top venture capital firms is essential to success, as they are an important source of high-quality deals. Shell persistently develop and initiate network to build the best prospects for portfolio firms.

In 2017, Shell Ventures invested in the Norwegian startup Halfwave to scale up its pipeline inspection technology deployment and accelerate further product development. Ever since Shell has used Halfwave's technology to inspect hundreds of miles of pipelines in multiple geographies and get integrity data for previously considered 'un-inspectable' lines, this had taught Shell that accommodating startups' needs and making sure the corporate systems are flexible enough to do so, is crucial for a successful collaboration. Consequently, they added a dedicated supply chain manager to the Shell Ventures team. By working together with Shell and other industry partners, Halfwave's annual revenue has doubled repeatedly in the last three years and should continue a strong growth trajectory beyond 2019.



*Figure 13: Corporate Venture Capital to perform Open Innovation.*

### **3.3.6 “Bold ideas challenge”: Schneider Electric and Greentown Labs**

Schneider Electric is a European multinational company supplying energy and digital automation solutions for efficiency and sustainability. It furnishes homes, buildings, data centers, infrastructure, and industries, by combining energy technologies, real-time automation, software, and services. The firm operates in more than 100 states and employs more than 135,000 people.

Greentown Labs is a clean technology incubator. It aims to be a supportive, collaborative, and inspiring community for early-stage entrepreneurs to grow their businesses. Considering that mission, it does not take any equity in its member companies. Instead, members pay monthly fees based on their lab and office space.

In these years, the electric sector is transforming quickly, giving new possibilities to innovate. With an estimated 80% of extra global electricity capacity becoming accessible over the next 25 years and 70% of the new formation being renewables, the world is experiencing a rapid transition to a distributed, digitized, and decarbonized energy economy. Schneider Electric recognizes that entrepreneurs will help develop the new energy landscape by establishing innovative business models.

Consequently, Schneider Electric pursues to partner with startups that have uncovered disruptive market opportunities with a defensible competitive advantage and a compelling customer value proposition. Schneider Electric is searching for partners who could add new proposals in the electric industry and industrial automation sectors, capitalizing on the deployment, combination, and processes of energy storage assets at scale.

For these reasons, in 2020, the company decided, in collaboration with Greentown Labs, to organize the Bold Ideas challenge housed at Greentown Labs in Somerville, MA. The competition is focused on fast-tracking entrepreneurs with the mentors, team members, and business and technical resources they required to launch or scale successful energy storage ventures.

The focus was on startups with technologies regarding energy storage, mostly working on the following topics:

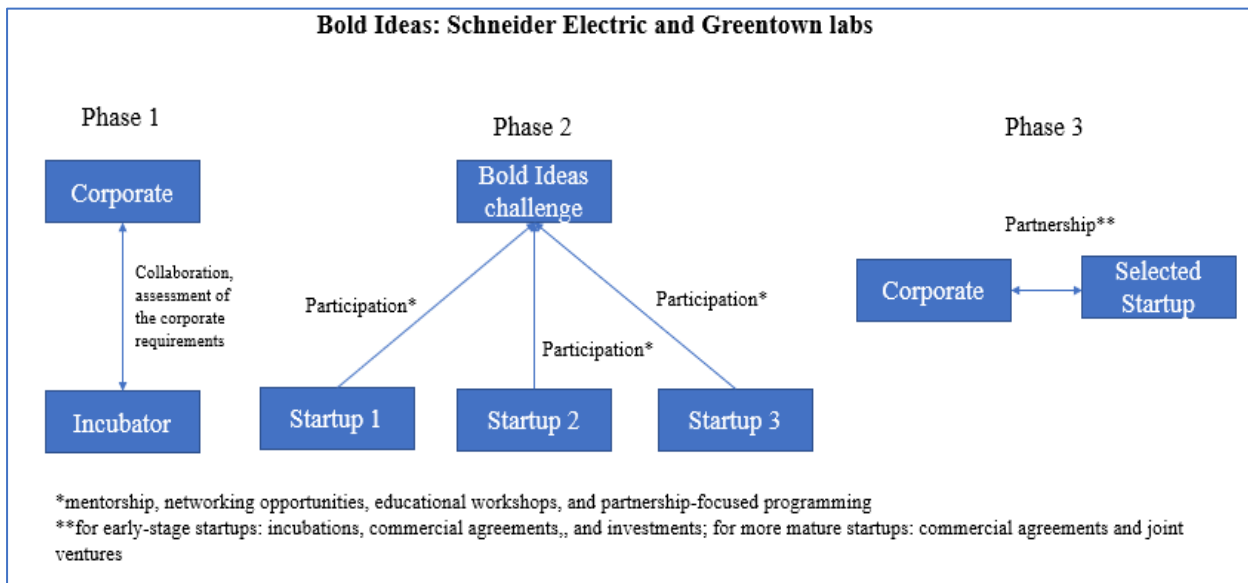
- Storage Performance Improvement
- Long Duration Storage

- New Digital Applications & New Business Models for Storage Assets.

Startups that have chosen to participate in the program would have benefited from mentorship, networking opportunities, educational workshops, and partnership-focused programming through Greentown Launch, a six-month partnership incubation program for startups provided by Greentown Labs.

Furthermore, participants received desk space and membership at Greentown Labs for the program's duration and \$25,000 in non-dilutive grant funding.

Moreover, after the six months, startups would have the chance to exploit potential partnership with Schneider Electric, such as incubations, commercial agreements, and investments. In particular, for early-stage startups, the company offers incubation support, which could include connections to clients during market discovery and validation and with outside investors, aid in team building, support in pilots, help with legal counsel, help in business planning, and guidance in structuring contracts and legal agreements. Instead, Schneider Electric is open to pursuing more immediate partnership outcomes for more mature startups, especially commercial agreements and joint ventures.



*Figure 11: OI process, throughout the collaboration between an incubator and a company.*

### 3.3.7 Case studies' comparison

After having summarized the case studies' content and outlined the different schemes of Open Innovation, it is useful to understand the key features that characterize these models and compare them. Cases will be analyzed, focusing on the first phase of the Open Innovation process; therefore, the integration process between the company and the startup will be neglected, concentrating on the methods to scout or co-develop innovative solutions.

- **Siemens-IOOTA:** Siemens always believes in the strength of collaboration: working together with partners from academia, customers, and suppliers, transforming solutions into innovations, and brings them to market. This condition results in products, services, and solutions customized optimally to the customer's unique needs, with customer feedback flowing into the ongoing development. The case underlines this typical Siemens' strategy: the firm traditionally has set industry trends, focused on being a first mover. Indeed, in an incredibly high-speed market (think about how Google at Amazon is investing in voice systems), a key factor for all players becomes the timing of entry into the market. By adopting Open Innovation with a level of inclusion Intercompany ( information are shared with an external entity), to create new assets, Siemens has chosen to oversee a strategic market segment and to do so in the shortest possible time, using a startup. Though, the process starts with the engagement of internal resources: there is a sort of constraint for the startup called to innovate for a specific topic/reason. This process does not allow startup to be free to innovate, but at the same time creates solutions ad-hoc for Siemens. Moreover, people inside the company could clearly understand the firm's requirements, but they probably will suffer a bias, influenced by the corporate's strategy/policy.
- **Enel Innovation Hub:** Enel believes that Open Innovation and Sustainability are key factors in solving global problems (the concept of Open Innovability). In this regard, Open Innovation and Sustainability are the two pillars on which the Enel Innovation Hubs put their roots, to share with startups skills, support them in the advancement of their projects from an industrial point of view, and give them access to the markets with which Enel itself is in contact. In this sense, Enel operates as an industrial partner, offering startups and SMEs access to laboratories, providing experts and facilities, internal and external to the structure, data, and, above all, knowledge of the market and the electricity sector. Enel also provides startups with its network

of contacts with partners, investors, and financiers. At the end of the validation phase, technological solutions, and new business models of success are scaled internationally, leveraging Enel's global network to become an integral part of the business. To sum up, Enel's idea is to let startup free to innovate (low leverage) by supporting them with its experts: in this way, startups solve the initial problem of lack of resources/funds and scale-up in less time. Furthermore, Enel avoids taking equity because it thinks that a big company's management is not suitable for startups that require a faster growing.

- **BMW Startup Garage:** it is the Venture Client unit of the BMW Group, therefore it is a real startup client at an early stage when its product, service, or technology is not yet mature.

Compared to Venture Capital, BMW buys the startup's creation, not its equity. It means that startups get a supplier status, supplier number, purchase order, and revenue. It concentrates on supporting startup's prototypes, assisting them learn about the automotive industry, and connecting them with decision-makers for business development. For that, startups work directly with BMW's engineers and managers on real innovation projects (high integration and leverage). Therefore, BMW is not like accelerators: indeed, the latter generally focuses on activities that help entrepreneurs getting their business started, such as building prototypes and business models, establishing a legal structure, finding target customers, and raising seed funding.

BMW has understood that they should not be one institution with one single business model that will not ever alter. They have developed an innovation ecosystem where different products, services, and business models interact with each other, but also, they are consciousness, throughout the company, about the industry's ongoing and coming disruption. In this meaning, BMW Startup Garage, as the corporation's internal innovation unit, has the objective of:

- Coordinating all corporate innovation activities
  - Being a specific contact point to manage the connections of co-innovating startups with all other sections of the corporation
- **Shell Venture:** one of the main benefits of corporate venture capital is that it can offer its portfolio companies support beyond funding. Via a global network of assets, new projects, and interactions with co-investors, suppliers, and service contractors, Shell can generate a classic win-win condition for the portfolio firms and its own business. Shell's businesses are fascinated



to access new technologies and business models, while portfolio companies can use their technology as part of Shell's supply chain and have it as a launching customer.

In other cases, the stress on the internal innovation unit is relatively high: think of the BMW case, in which its engineers have to support the development and the validation of startups' prototypes. Corporate Venturing allows complementarity: the company can have the maximum effort in its innovation unit and create a pool of latent innovation that can be absorbed within the company when the time and maturity are right. Moreover, the model permits high flexibility: equity participations have the extraordinary elasticity to be positioned on the innovation scale by merely moving the cursor.

- **"Bold ideas challenge":** the case shows the collaboration between Schneider Electric and the Incubator Greentown Labs that have organized the "Bold ideas challenge" to solve the company's specific issues.

In this situation, the challenge has a crucial role, because startups will receive support through resources, through the access to SE's global footprint of technical experts to solve problems, such as the Storage Performance Improvement. In this way, startups compete to realize the best answer, and, at the same time, the company gains ad-hoc solutions. Moreover, the Incubator represents a real intermediary with competences in the startup environment, and it is used to dialogue and collaborate with them. For this reason, with this kind of collaboration, companies should be able to find solutions to their issues more quickly. In the following chapter, it will be explained more in detail this kind of cooperation.

Case study	Features
Siemens-IOOOTA	<ul style="list-style-type: none"> <li>• Engagement of internal resources→Low flexibility and bias</li> <li>• Ad-hoc solutions</li> </ul>
Enel Innovation Hubs	<ul style="list-style-type: none"> <li>• Not imposing ideas but supporting startup from a technology and development perspective and let them free to innovate→Low leverage (w.r.t startups)</li> <li>• No-equity taking</li> </ul>
BMW Startup Garage	<ul style="list-style-type: none"> <li>• No-equity taking but Venture Client model</li> <li>• Centralized model</li> <li>• Co-innovation and co-development to create ad-hoc solutions</li> <li>• High integration and leverage (w.r.t startups)</li> </ul>
Shell Venture	<ul style="list-style-type: none"> <li>• Equity-taking</li> <li>• Low stress on internal innovation unit→complementarity</li> <li>• High flexibility</li> </ul>
Bold ideas challenge	<ul style="list-style-type: none"> <li>• Challenge's key role→ fast process to create ad hoc solutions</li> <li>• Incubator as an intermediary→High accuracy</li> </ul>

*Table 3: Case studies' comparison.*

## 4. An Open Innovation project

This chapter describes a project started in 2020, between I3P, Incubator of Polytechnic of Turin, and a corporate operating in the Financial Automotive industry. There will be depicted as the main phases and the corresponding outcomes. It is also meant to introduce the following chapter, which will be the competitive analysis performed by the author of this work of thesis with his colleagues' supervision.

### 4.1 Corporate Incubator model

As described in the previous chapter, with case studies' help, a company could collaborate with incubators and accelerators to access startups' knowledge and technologies. Generally, the model and the collaboration could be summed up in five points (Fig.15):

- the corporate collaborates and funds a corporate incubator as a separate object
- the Incubator attracts startups working on technologies broadly aligned with the corporate's strategy
- The Incubator offers to its resident startups various resources, including office space, computing resources, mentoring, and funding
- If a startup develops an innovation sufficiently mature for integration into the corporate's existing or future business projects, the company becomes its customer
- Optionally, the corporate becomes an investor in a successful startup.

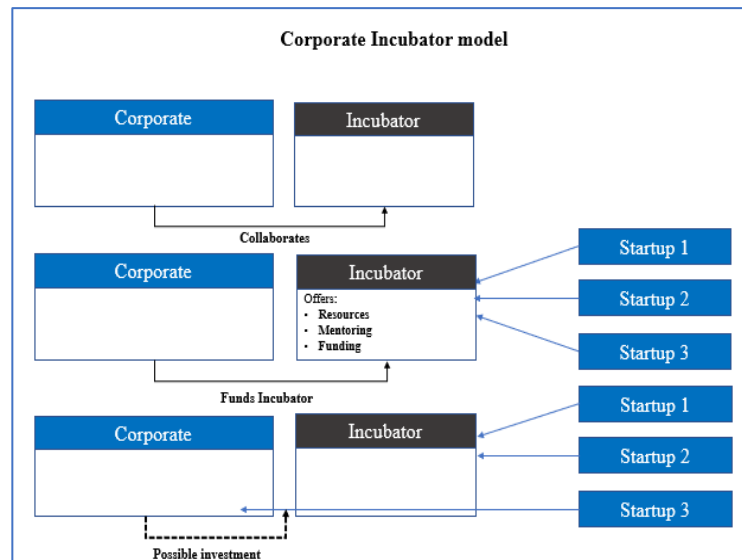


Figure 15: common scheme of the corporate and incubator model.

## **4.2 The role of the Incubator I3P**

I3P supports the formation and development of innovative startups with high technological intensity and growth potential, created both by university researchers and students, and by external entrepreneurs, delivering strategic consulting services, coaching, mentoring, fundraising sustenance, and spaces.

The mission of I3P is to assist the ecosystem of entrepreneurship, intending to create economic development and employment in innovative industrial systems. The Incubator embraces a cooperation strategy with private subjects and institutions, involved in research and advanced training, in-services for technology transfer, in the financing of innovation, in internationalization.

The collaboration with the Polytechnic of Turin is key to the support proposed by I3P. The University and the research and innovation institutions linked to it are the main pool of technical and scientific know-how to develop incubated startups and deliver access to exceptionally talented human resources.

In the project with the financial, automotive company, I3P plays a role of intermediary between the firm and the startups that could have the technology of interest. Indeed, in the next years, the Incubator's part aims to be of an expert intermediary between corporate and startups and keep supporting startups in their development.

The project's element of interest is that both the company and the Incubator have never done this kind of collaboration, so it is a real case "0". Another element of interest is the fact that, same days after the agreement with this company, other firms ask the Incubator to start the same path: this could mean that probably, in the future, in Italy, the collaboration of this type will increase.

## **4.3 The phases of the project**

The company asks I3P to develop a plan with "best practices" to perform OI activity. The Incubator translates this request in a "funnel" model that starts with a phase of exploration of its internal organization. After this analysis, I3P wants to organize a Call, in which ideas will be selected. The last stage will be a Proof of Concept, in which the goal is to understand where the solutions could be applied in the company. The final step will probably be a kind of partnership between the company and the startups selected.

What is new for I3P is the phase of Call, while the first and third phases regard methods and knowledge knowns by the Incubator. The most innovative feature of this project is just the multi-functionality of I3P that will perform all three steps when usually there are entities that organize Call and ask for a consultancy firm to provide them the "exploration" information.

Moreover, in this thesis work, the focus will be on the first phase of the project, where the author has performed a competitive analysis. The other phases will be only described qualitatively because they are not the thesis's aim.

### **4.3.1 The phase of exploration**

It is the first phase of the project. In this case, the word exploration means to analyze and study the company of reference to understand which are the main features, issues, and essential strategic elements of it.

#### **4.3.1.1 Description**

The phase of exploration includes the other two sections inside.

The first one aims to create "boundaries" of the company; in particular, it is useful to understand the firm's requirements and, at the same time, to help it perform a self-assessment of its resources and capabilities. This analysis's outcomes are needs in terms of technologies that the firm has. After having identified them, it is also important to assign them a priority.

The second one is creating a structured process of integration of innovation both for internal and external sources. In particular, I3P helps the company integrate external elements and structure its internal organization to create value for internal ideas.

#### **4.3.1.2 Approach used**

To do this phase of exploration, I3P decides firstly to study the organization to understand the internal structure. After this, it was performed a primary market analysis, which means interviewing the firm's opinion leader and, at the same time, doing some surveys. Afterward, in collaboration with his colleagues, the author of the thesis has performed a competitor analysis that will be described in the following chapter.

Therefore, a workshop has been organized with the company's Innovation team (composed of 17 people) to understand the firm's requirements, instead of doing a one-to-one interview. The workshop has been divided into three parts:

- a seminary hold by Professor of Polytechnic of Turin Marco Cantamessa, in which he has described the "best practices" and issues related to Open Innovation activity
- general surveys to understand how the employee of the company think of the process of integration of the innovation (Fig.16, 17, 18, 19, 20, 21, 22)
- after 15 minutes to answer the questions, the meeting finished with discussing the results of the survey with comments both from I3P's team and the company.

## Section 1: role of Open Innovation

- What level of dependence you think you can have in the activities of Open Innovation compared to the influence exerted by the various internal departments (e.g. Scouting decisions, investments, ...)?  
*Strictly independent* ☐ ☐ ☐ ☐ *Strictly connected*
- How much support do you think the activities of Open Innovation can give to the innovation activities?  
*No support* ☐ ☐ ☐ ☐ *A decent support*
- Given the company's strategy, what risk appetite do you see in Open Innovation activities?  
*Risk adverse* ☐ ☐ ☐ ☐ *Risk lover*

Figure 16: survey about the role of OI in the company.

## Section 1: role of Open Innovation

- What is the degree of importance of the following purposes for Open Innovation?

	<i>Not at all important</i>	<i>Not so much important</i>	<i>Important</i>	<i>Very important</i>
❖ <i>Encouraging the development and adoption of enabling technologies</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Encouraging the acquisition of new solutions effective techniques for internal processes</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Encouraging the acquisition of new solutions techniques whose value proposition is directly perceived also by the customer</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Access to human resources with skills hard to find</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Familiarize yourself with the innovation frontier and develop a higher "absorptive capacity" w.r.t new solution</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 17: survey about the role of Open Innovation in the company.

## Section 2: process of Open Innovation

- Which modes of interaction with the outside are most appropriate for the company?

- ☐ *Prizes and challenge (ex. Call-for-startups)*
- ☐ *Industrial partnership*
- ☐ *Commercial agreement*
- ☐ *Equity investment*
- ☐ *IP acquisition*
- ☐ *Other:*

Figure 18: survey about the process of Open Innovation in the company.

## Section 2: process of Open Innovation

- What do you think is likely that the following actors can manage the activities of Open Innovation?

	<i>Very improbable</i>	<i>Improbable</i>	<i>Probable</i>	<i>Very probable</i>
❖ <i>Internal actors (Ex. Internal department that processes needs)</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>External actors (Ex. Suppliers)</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Intermediary of the innovation sector</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 19: survey about the process of Open Innovation in the company.

## Section 2: process of Open Innovation

- What is the degree of importance of the following actors for Open Innovation?

	<i>Not at all important</i>	<i>Not so much important</i>	<i>Important</i>	<i>Very important</i>
❖ <i>Operative figures defined by management</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Operative voluntary figures</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Internal Innovation Committee</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Startups</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Research centers</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Company's suppliers</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Not current company's suppliers</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Incubators/Accelerators</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Technology transfer of university</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 20: survey about the process of Open Innovation in the company.



## Section 2: process of Open Innovation

- What is the degree of maturity to collaborate with the following actors?

	<i>Not at all mature</i>	<i>Not so much mature</i>	<i>Mature</i>	<i>Very mature</i>
❖ <i>Operative figures defined by management</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Operative voluntary figures</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Internal Innovation Committee</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Startups</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Research centers</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Company's suppliers</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Not current company's suppliers</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Incubators/Accelerators</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Technology transfer of university</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 21: survey about the process of Open Innovation in the company.

## Section 3: typical finding mistakes

- Analyzing the finding issues in a OI process, what is the probability that they are present in the company's process?

	<i>Improbable</i>	<i>Not so much probable</i>	<i>Probable</i>	<i>Very probable</i>
❖ <i>Ambiguous strategy</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Lack of commitment in different organizational level</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Investing time without real goals</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Reducing OI as communication instrument</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>No use of adequate seniority</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Reducing targets</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
❖ <i>Skip targets during the development</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 22: survey about the typical finding mistakes of Open Innovation in the company.

Once identified the requirements, interviews were performed some weeks later with four opinion leaders to understand the main technological topic of interest. Interviews have been done with a

survey format, but with open questions, to interact well with the firm. Three modules constitute the structure:

- Question about the firm's requirements linked to the internal processes in the short term; ask about the firm's requirements about products and services; a question about the needs and challenges in the long term (Fig.23)
- questions asking if the firm had already identified a technological topic of interest in internal processes and products and services (Fig. 24, 25)
- section regarding past experiences, underlining what worked and what did not (Fig. 26).

## Section 1: roadmap of Open Innovation

- To improve the INTERNAL PROCESSES, describe what are the needs that you imagine to be able to meet in the SHORT PERIOD (12-24 months) using innovative technical solutions.

---

- To improve the PRODUCTS and SERVICES offered to end customers, describe what are the needs that you imagine to be able to meet in the SHORT PERIOD (12-24 months) using innovative technical solutions.

---

- Describe what are the possible "challenges", that require the acquisition and exploitation of innovative technical solutions, that you imagine to be able to face in the LONG TERM (to 5 years).

---

*Figure 23: survey about the roadmap of Open Innovation of the company.*

## Section 2: scouting technology solutions

- In order to improve the internal processes, in view of the needs outlined above, have target technological areas already been identified to be explored in order to find the most appropriate solution?
  - *Yes, target technological areas have already been identified to be explored for all known needs*
  - *Yes, target technological areas have been identified, but not for all known needs*
  - *No, target technological areas have not yet been identified*
- If you have found target technology areas to explore to improve internal processes, please indicate what they might be.  
.....

Figure 24: survey about the scouting of technology solution of the company.

## Section 2: scouting technology solutions

- In order to improve the products and services offered to end customers, in the face of the needs outlined above, have target technological areas already been identified to explore in order to find the right solution?
  - *Yes, target technological areas have already been identified to be explored for all known needs*
  - *Yes, target technological areas have been identified, but not for all known needs*
  - *No, target technological areas have not yet been identified*
- If you have found target technology areas to explore to improve the products and services offered to end customers, please indicate what they might be.  
.....

Figure 25: survey about the scouting of technology solution of the company.

## Section 3: past experiences

- In the past experiences in the field of Open Innovation, what were the things that in your opinion worked well (so feel satisfied)?  
.....

- In the past experiences in the field of Open Innovation, what were the things that did not work (so feeling dissatisfied)?.....  
.....

*Figure 26: survey about the past experiences about Open Innovation of the company.*

Once collected the answers of the opinion leaders, the idea was to make a list of technological topics: this list is essential for I3P to elaborate on each of them and then, to perform another survey to understand the priority the importance for the company about these topics (Fig. 27, 28, 29, 30). Afterward, a second meeting with the firm's innovation team has been organized to share the results with them and figure out if the outcomes are really in line with the company's thought.

## Section 1: exploration of FINTECH topic

- Innovative technologies and solutions need to be researched to improve the SMART-BANKING service

Not at all important ○ ○ ○ ○ ○ ○ ○ Very important

- To improve the service of SMART-BANKING, it is necessary to search for innovative technologies and solutions in the field of CYBER-SECURITY (e.g. authentication systems, KYC, Network security, ...)

Not at all important ○ ○ ○ ○ ○ ○ ○ Very important

- To improve the service of SMART-BANKING, it is necessary to search for innovative technologies and solutions in the field of BUSINESS INTELLIGENCE (E.g. Data lake, Predictive Data Analysis, ...)

Not at all important ○ ○ ○ ○ ○ ○ ○ Very important

- To improve the service of SMART-BANKING, it is necessary to research technologies and innovative solutions in the field of DATA SCIENCE / ARTIFICIAL INTELLIGENCE (e.g. Augmented Analytics, Credit Scoring, Fraud detection, ...)

Not at all important ○ ○ ○ ○ ○ ○ ○ Very important

*Figure 27: survey about the possible exploration of fintech topic for the company.*

## Section 1: exploration of FINTECH topic

- To improve the service of SMART-BANKING, it is necessary to search for innovative technologies and solutions in the field of DIGITAL PAYMENTS (e.g. authentication systems, fraud detection, ...)

Not at all important ○ ○ ○ ○ ○ ○ ○ Very important

- Innovative solutions must be sought to improve the offer with NEW FINANCIAL PRODUCTS (in addition to credit cards and deposit account)

Not at all important ○ ○ ○ ○ ○ ○ ○ Very important

- Innovative solutions must be sought to facilitate the adoption of BLOCKCHAIN technologies in the processes (Es. Insurance Sandbox, Smart-contract)

Not at all important ○ ○ ○ ○ ○ ○ ○ Very important

- In the FINTECH field, are there any further issues to be explored in the short term (12 - 24 months) that are important for FCA Bank and have not yet emerged?

.....

Figure 28: survey about the possible exploration of fintech topic for the company.

## Section 2: promoting the digitisation of processes

- Innovative solutions need to be sought to improve REMOTE-WORKING management of human resources

Not at all important ○ ○ ○ ○ ○ ○ ○ Very important

- Innovative solutions must be sought to improve the CUSTOMER-CARE service

Not at all important ○ ○ ○ ○ ○ ○ ○ Very important

- Innovative solutions must be sought to improve the management of INTERNAL AUDITING processes (e.g. risk management, internal compliance processes, ...)

Not at all important ○ ○ ○ ○ ○ ○ ○ Very important

- To facilitate the DIGITIZATION OF PROCESSES, there are further issues to be explored in the short term (12 - 24 months) that are important and have not yet emerged?

.....

Figure 29: survey about the possible adoption of digitalization in the processes of the company.

## Section 3: roadmap of innovation

- Try to classify the following topics in descending order of importance, with a view to Open Innovation

	<i>AI</i>	<i>Cyber-security</i>	<i>Blockchain</i>	<i>Digital payments</i>	<i>New financial product</i>	<i>Remote-working</i>	<i>Internal Processes</i>	<i>Customer Care</i>
<i>First</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Second</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Third</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Fourth</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Fifth</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Sixth</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Seventh</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Eight</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Nineth</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>Tenth</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Figure 30: survey about the prioritization of topics for the company*

Therefore, to sum up, the deliverables of this phase are two reports. The first one is about the internal organization structure, the internal requirements, and the needs in terms of technology (and the list of topics with firm's priority); the second one the proposal of the topics developed by I3P with also a "big picture" of what competitors are doing. Because if from the internal analysis of the firm emerges that they are interested in a topic, but competitors are not developing it at all, it could be interesting to understand this situation's reason.

### 4.3.2 The Call for Ideas phase

The second phase will consist of the organization of an event in which startups, with innovative solutions in line with the company's requirements, will be able to apply and propose their technologies. It will be a real Call for ideas in which the selected startups will present in the Pitch Day, and senior leaders will decide the winners.

A critical part of this phase will be collecting the startups' application that will be necessary to do in one month for time requirements when it usually takes two months. Moreover, it is also required for this kind of event to create a logo and a website to sponsor it in terms of advertising and marketing, but they have to be in line with the firm's communication format.

### **4.3.3 The Proof of Concepts phase**

After the Call, the following step is the creation and the firm's financing of PoCs. In the world of research, they concern the design of a prototype of a technology. In this case, and in the "industrial" world, starting from a pre-existent prototype of the technology, the goal is to adapt it to the corporate's context. Therefore, there will be a technology and the challenge to adjust and figure out how this kind of technology can solve its issues. So, it will be a matter of integration and understanding of how the solutions can create value. The conclusion could be a commercial agreement, hiring the startup's personnel, or a joint venture.

## **5. Competitive analysis**

This chapter aims to support the phase of exploration of the project between the Incubator i3p and the Automotive financial company. The reason for which this part has been inserted is mainly the fact that from the internal analysis of the company and the resulting assessment of the requirements could leave out some crucial details. Therefore, it is a complementary section that gives the company a "big picture" of its main competitors' current developments and moves. Moreover, it helps to figure out if the assessment requirements align with the current technologies and trends to prepare an "ad-hoc" call-for-startups.

### **5.1 Introduction**

The reference sector is that of the Financial Automotive Industry: in particular, the focus concerns the so-called Captive Finance Company. They are companies under the control of an automotive company that offers loans and financial services to these companies' customers.

About 82% of consumers access financing to buy a car, while only the remaining 18% do not receive funding to complete the purchase. Of the consumers who benefit from financing, about 46% of them use Captive companies to finance their purchase. In comparison, 54% use the financial services offered by Non-captive companies.

In line with the general macro-trend of opening up to the technological innovations brought by digitalization, Captive Finance Companies also try to renew their products and their business processes, with the common goal of offering the customer the best User Experience of purchase.

Before analyzing the companies belonging to this sector, the chapter will describe the current innovative trends.

For example, companies are moving to adopt digital services in the process of financing a car. Besides, companies are implementing new payment methodologies such as mobile payment or wearable payment. Similarly, to make the financing process more user-friendly, companies are trying to adopt Fintech methodologies, also to better manage customer transaction data. Another trend that is developing recently is creating e-commerce platforms for used vehicles of the reference group, to expand the revenue streams and stimulate financing. Finally, companies are implementing solutions in terms of mobility, for example, by adopting the car-sharing model.



This work aims to analyze the global panorama of Captive Finance Companies, intending to carry out a comparative analysis between them. The study's focus will be to try to represent how they address the issues of Open Innovation and understand the degree of innovation in their products and services offered on the market.

i3p's client is one of the leading players in the sector of reference; for this reason, competitors have been chosen with a top-down approach, so taking the industry and figuring out which are the most relevant players. As a methodology, each company has been analyzed through a descriptive form with the following sections:

- **Company presentation:** introduction of the company, active business lines, the geography of the markets in which they are present, and management results
- **Technological trends in the products and services offered:** analysis of the most relevant innovative technologies per business line
- **Open Innovation activities:** description of the methods and technologies sought with OI methods.

In conclusion, a comparative analysis has been developed between the different companies, comparing the technologies found and the different modes of Open Innovation.

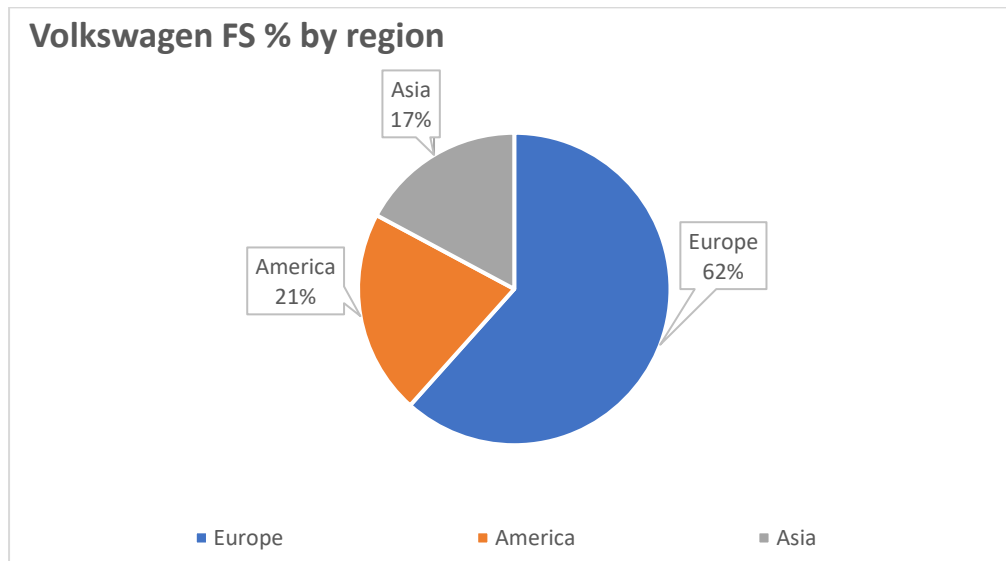
Annual reports and financial statements have been used to search this information, therefore bottom-up approach, and relevant websites regarding this sector's macro-trends, so top-down approach.

These are the seven direct competitors identified:

- Volkswagen Financial Services
- Toyota Financial Services
- Ford Credit
- BMW Financial Services
- Daimler Mobility
- RCi Banque
- PSA Finance

## 5.2 Volkswagen Financial Services

Volkswagen Financial Services operates and coordinates financial services as a subsidiary of the Volkswagen Group. As a Volkswagen Group partner, its main task is to promote sales and retain customers for the Group's products. In the chart below, the market shares of Volkswagen FS are illustrated (Chart 1).



*Chart 1: Volkswagen FS market share divided by region in 2019.*

It is important to note that Germany accounts for 19% of the European market share.

The company uses internal KPIs to monitor the evolution of their strategy and their business: an example is the market penetration, the contracts concluded, and the new contracts. As far as financial KPIs are concerned, the company monitors business volumes, ROE, and the relationship between costs and profits. The main business fields are described below (Fig.31).



*Figure 31: business fields and main applications of Volkswagen FS.*

In 2019, revenues of Volkswagen Financial Services were 38 billion, 15.8% more than in 2018. Return on Equity (ROE) was calculated as an indicator of the company's profitability: the group recorded a ROE of 12.6% in 2019 and 10.5% in 2018.

### 5.2.1 Technological trends in the products and services offered

In 2016 Volkswagen FS acquired Paybyphone, which through web-mobile applications, smartphones, and smartwatches, helps millions of consumers to pay for parking quickly and safely. The acquisition of Paybyphone expands the presence of Volkswagen Financial Services in the market for mobile payment solutions and places the organization as the leading supplier for the parking sector. Volkswagen Financial Services also acquired a 92% stake in Sunhill Technologies GmbH, a German market leader for mobile parking solutions in 90 German cities.

In 2017, Volkswagen Financial Services created the Heycar platform, a tool specifically developed for the online sale of used cars (also to encourage financing): recently, the service has been extended in the UK.

In 2019, VFS acquired 75.1% of the shares of Truckparking B.V. It creates an innovative application that helps truck drivers plan their routes across Europe by showing them safe parking available on the road and allowing them to book their seats online.

In 2019, VSF established a partnership with NABU (Nature And Biodiversity Conservation Union) by launching the Blaue Flotte (Blue Fleet), an e-mobility program for Fleet Customers. The initiative focused on investments in sustainable projects for the protection of wetlands.

The joint venture with Volkswagen Financial Services AG and Logpay Financial Services GmbH was created to become one of Europe's largest fuel suppliers with Logpay Transport Services GmbH. The companies intend to unite and expand their commitment to fuel and service cards and the fuel trade throughout Europe. The union now creates the opportunity to refuel in Germany and throughout Europe with a single fuel card to exploit price advantages.

### 5.2.2 Open Innovation activity

Regarding Open Innovation, VSF has also recently created the new Ubility hub: thanks to it, the company aims to collaborate with researchers, startups, and universities. The two fields in which the company is looking for innovative ideas and alternative solutions are mobility and financial services. VSF offers startups its network, an area of application, new customers, and resources. The access' requirements concern the possession of digital know-how that can give added value and excellent financial stability of the startup, with a history of at least one round of financing obtained and a customer base resulting from a market positioning already occurred.

The processes and activities on which the current situation is most focused are:

1. **Complaint management:** finding digital solutions that improve process efficiency and customer experience customization
2. **Carbon Token:** technologies that can connect transport and parking via carbon token to create a kind of mobility chain from the suburbs to the city center, encouraging behaviors to drive "climate-neutral-in-traffic"
3. **Driver-car interaction for the b2b customer-based identity management and digital transactions**
4. **Cooperation with other service providers:** simplification and digitization of interaction and transaction processes to use services from other partners.

The starting procedure of a POC is as follows:

1. A short telephone call introduction

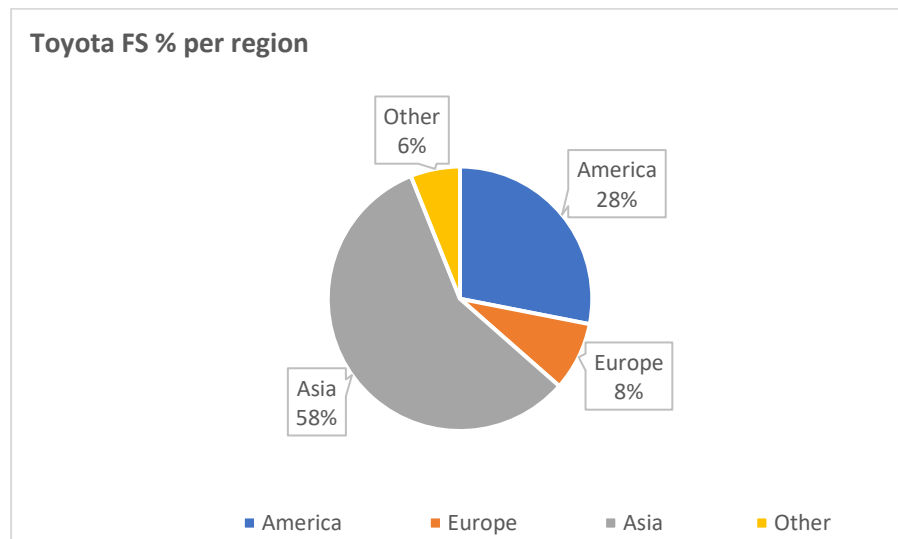
2. If positive, we continue with a pitch session at Ubility in front of the company's analysts
3. If the evaluation is passed, the Poc begins with a duration ranging between 3 and 6 months
4. Implementation and Growth-plan.

A concrete example of a partnership with startups was with the Portuguese Fuelsave. The technology allows companies to save 20% on fuel and gas emissions, thanks to a live "training" to the driver, using the data of the truck driver's running conditions that are transmitted "in real-time" to the cloud. In part, the technology is an interface that adapts to the driver's cabin. A mobile app that continuously provides quick tips (and a GPS app) to improve performance based on current road conditions.

### 5.3 Toyota Financial Services

Toyota Financial Services covers more than 30 countries and regions, including Japan; it coordinates financial services operations and is wholly controlled by Toyota Motor Corporation (TMC).

TFS has built a global network covering about 90% of the markets in which Toyota sells its vehicles. Focused mainly on car rentals, leases, and loans to dealers in the group, TFS provides financing for cars' sale to around 11.6 million customers globally. The chart below shows the market shares achieved in 2019 by Toyota FS (Chart 2).



*Chart 2: Toyota FS market share divided by region in 2019.*

The company has a strong presence in Asia, with a market share of 43% in Japan.

The service offered by TFS is hugely connected to the consumer. First of all, the company provides buying (Pay per Drive) and leasing (Lease per Drive): through a well-constructed website, with quizzes to the consumer to understand his real need, TFS aims to put the customer at the center of his business model.

To simplify the internal processes and improve the user experience, TFS also proposes some initial questions ("Which plan is right for me?"). According to the answers, the site will suggest the package/plan best suited to the customer. It also offers a quiz of 7 questions ("Buy&lease quiz") to make it clear to the consumer whether the best solution for him/her is to take advantage of a financing or leasing service.

As for the economic and financial aspects, TFS recorded ROE of 13.7% in 2018, while in 2019, it decreased, reaching 9.8%. Revenues was around 17 billion in 2019, about one billion more than in 2018.

### **5.3.1 Technological trends in the products and services offered**

In April 2019, Toyota Motor Corporation and Toyota Financial Services created a virtual organization, Toyota Blockchain Lab, which carried out initiatives to use blockchain technology, including verification of the technology application through some demonstration tests.

In the following customer-focused initiatives, in November 2018, demonstration trials under specific conditions were completed, confirming the usefulness of blockchain technology in each application:

- **Customers:** adoption of ID sharing, digitization of contracts and improvement of personal information management
- **Value digitalization:** diversification of financing methods through digitalization, building medium to long-term relationships with customers.

Instead, in 2020, Toyota Finance New Zealand, a subsidiary of Toyota Financial Services, announced that it had established a partnership with Ephesoft, a leader in data analysis and extrapolation, to accelerate the process of applying for a loan and agreeing on payment. In

particular, Ephesoft is a modern platform that uses technologies such as artificial intelligence and machine learning to enhance digital service in areas where the number of documents required is very high. TFNZ will integrate the solution into the cloud with its system, allowing its employees and customers to extract useful data. Supporting documents, such as the income statement, address, can be identified, classified, extracted and validated through a faster and more accurate loan validation process.

Also, in 2020, TFS launched the new brand Kinto, dedicated to mobility services. The new brand is built around five pillars: Kinto Share (car-sharing), Kinto Join (carpooling), Kinto Ride (ride-hailing), Kinto Flex (vehicle subscription), and Kinto Go (multimodal).

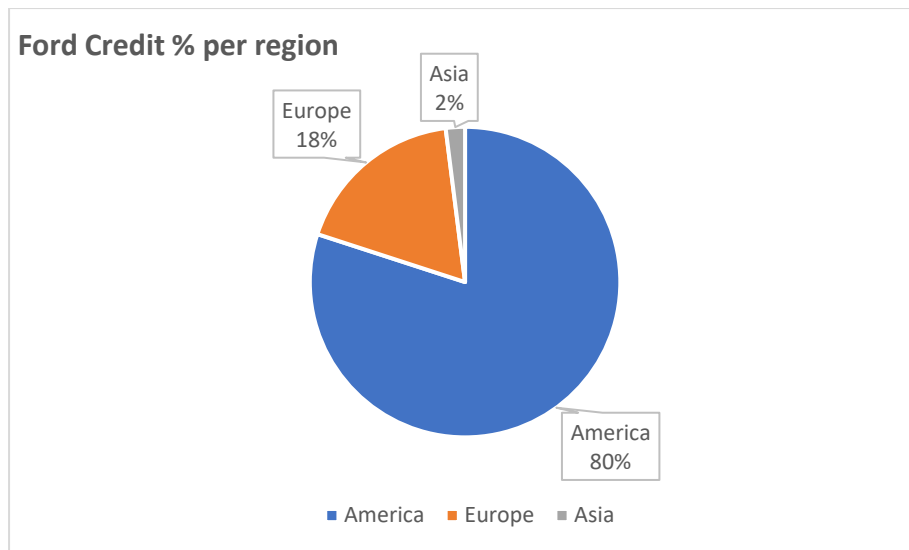
### **5.3.2 Open Innovation activity**

In 2018, TFS announced a global partnership with Plug and Play, one of the leading accelerators of Silicon Valley, to promote Open Innovation solutions in the Fintech field. Thanks to the collaboration, the two companies intend to promote corporate innovation by using startups that offer financial services solutions. Moreover, the partnership aims to simplify the process of "startup engagement" to accelerate TFS's innovation process.

In June 2020, TFS announced that it had co-invested \$80 million in the SYNQA startup for a C round. The latter (consisting of two companies in turn, Omise and OMG network) has developed blockchain technologies that facilitate online payments, also allowing the use of different currencies and cryptocurrencies for each transaction.

## **5.4 Ford Credit**

Ford Credit, the financial services division of Ford Motor Company, is based in Dearborn, Michigan. Ford Credit's predominant stake is in financing Ford and Lincoln vehicles and supporting Ford and Lincoln dealerships. The business of Ford Credit (Chart 3) is mainly developed in America (80%) and Europe (18%), while in Asia, the market share turns out to be very low. (2%)



*Chart 3: Ford Credit market share for region in 2019.*

The company offers a wide variety of types of financing through dealerships around the world. Ford Credit has a broad portfolio of financial credits and operating leases that can be classified into two types of portfolios ("consumer" and "non-consumer")

Financial receivables and operating leases belonging to the "consumer" portfolio include products that finance individuals and businesses to purchase Ford vehicles from dealers for personal and commercial purposes. Financing to private individuals includes installment sales for new and used cars and leasing for new vehicles to private and commercial customers, such as leasing companies, government agencies, rental companies, and "fleet customers".

Instead, in the "non-consumer" portfolio, financial credits include products offered to car dealers; to these, a loan is executed for purchasing vehicles to improve their facilities and finance some of their financing programs.

In 2019, there was a slight increase in the company's revenues compared to 2018, remaining stable at around 10 billion; Return on Equity also experienced a small growth (15%) in 2019, since in 2018, there was a ROE of 14%.



#### **5.4.1 Technological trends in the products and services offered**

Ford Credit offers services such as online payments and "search inventory" (find the car you are looking for in the nearest dealer) and has an online configurator. It aims to serve and assist the customer through the Fordpass app, with which the customer can:

- access complementary features for his car
- request assistance on the road
- pay directly from the app and find his car when it is parked.

Besides, Ford Credit has an innovative service of "Estimated Payments" with which the customer can calculate financing or leasing from home, according to his needs.

Finally, Ford recently launched the Ford Approved program, which was born to meet the needs of those who want a used car. The program involves vehicles of the so-called Ford Certified used park, models with less than five years of life, maximum distance up to 120,000 km, and complying with the Euro 6 regulations. Ford Approved used cars are selected by the Ford network, after being subjected to careful checks on 75 areas of intervention, from the body to the electric parts of the vehicle; also, Ford Approved customers also have the opportunity to benefit from personalized Ford Credit funding.

#### **5.4.2 Open Innovation activity**

In 2016, Ford allocated new funds to support the emergence of new startups through the talent scouting program carried out in collaboration with Techstars Mobility-Driven by Detroit.

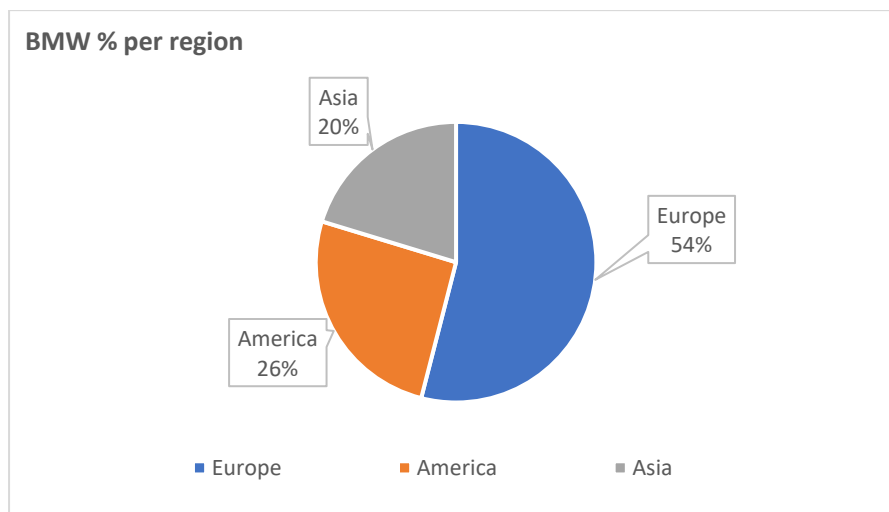
Entrepreneurs from worldwide can participate and submit their project by registering at the dedicated site; the ideas will be developed within the incubator Techstars Detroit and then presented through a Demo Day. Program participants will be invited to propose projects and ideas within four main themes: Consumer experience; Information technology and big data; Multimodal transport; Flexible ownership models, and user experience. At the end of the program, up to 12 startups will be selected, each of which will receive \$120,000 support and be followed directly by Ford's mentor.

Besides, in 2017, Ford Motor established a partnership with Autofi, a startup in San Francisco. The startup has developed a dealer platform to make it easier for customers to purchase and finance

vehicles. After selecting a car, they can apply for funding, choose the terms of the contract, and then review and choose the optional vehicle protection products, all via an online service. Customers can then review a final summary of funding terms and schedule a time to complete the transaction and pick up the vehicle.

### 5.5 BMW Financial Services

BMW Financial Services is a financial services company of the BMW Group. The reference products are BMW, MINI, and Rolls-Royce Motor Cars. BMW Group's financial services worldwide are provided in more than 53 countries. In the pie chart below, the market shares achieved by BMW FS in 2019 are illustrated (Chart 4).



*Chart 4: BMW FS market share per region in 2019.*

BMW proposes itself to the customer through consulting services, to decide the solution according to their needs. It prepares a configurator to have a more realistic idea of your car.

The segment's main activities include the financing and leasing of cars and motorcycles of the BMW brand. Customers can also choose from a range of insurance and banking products. The BMW International Group also provides comprehensive financing and management services for corporate car fleets in 20 countries. The segment also supports and finances the organization of BMW dealers.

From an economic-financial point of view, BMW FS had revenues of 30 billion in 2019, and in 2018, about 28 billion; the ROE was 15% in 2019, while in 2018, the company recorded 14.8%. The company recorded that in 2019, 52.2% of the BMW group's new vehicles were financed by BMW FS (22.3% with leasing, 29.9% with financing).

#### **5.5.1 Technological trends in the products and services offered**

In 2017, BMW Group Financial Services (BMW FS) selected UK-based fintech provider Sword Apak to support its core European operating systems' planned harmonization. The first component was Sword Apak's Wholesale Floorplan Finance System (WFS) supply for the bank's commercial finance business.

WFS is a fully integrated back and front office system that works perfectly in multiple geographic areas. The first international dealer financing system can be implemented in various accounting, legal, and tax jurisdictions in different languages and currencies, minimizing entry costs to new markets.

In addition to making online payments, BMW has recently adopted the Digital Dox system: with it, you can upload documentation for credit analysis from smartphones.

Since 2019, BMW has also created real e-commerce (BMW shop). Through the site, there is the possibility to buy spare parts or accessories for your car through three steps:

- Selection of the desired product
- Choice of dealer
- A choice between home delivery or pick-up at the dealer.

#### **5.5.2 Open Innovation activity**

In 2018, BMW Group Financial Services organized the Collaborationlab. This event gives startups access to a large potential market for collaboration and innovation with consultants and analysts' support from the L-Marks investment fund. The selected startups had access to first-class mentoring, accessing suggestions from leading experts in the automotive and financial sectors.

The event is structured in four steps:

1. **Application:** application of startups to the program
2. **Pitch day:** during the Pitch Day, the startups present their solution to a team of senior BMW leaders who will decide, based on a selection process, which startup will participate in the Collaboration Lab program.
3. **Start of the program:** the intensive ten-week collaboration between BMW and the selected startups begins. During this period, the key objectives that the startup wants to achieve are set, receiving mentoring from senior leaders and external experts to achieve these goals.
4. **Demo Day:** During Demo Day, startups present the 10-week tutoring outcomes and a proposal for future engagement with BMW.

The main areas of interest of the Open Innovation program are four challenges:

1. Digitalization of the customer journey
2. Data analytics solutions
3. Implementation of blockchain technologies for data warehousing, payment, and customer information tracking
4. Life-cycle management for leasing services

One example is Carlabs, who started working with captive companies after being selected at BMW's "Collaborationlab" in September 2018. In the first phase of the partnership, Carlabs aims to provide automated customer service in the payment area with tools such as the digital assistant or chatbot to answer startup customers' questions, thus providing artificial intelligence-based digital assistance.

Also, the event's specialist chose two blockchain startups in 2018.

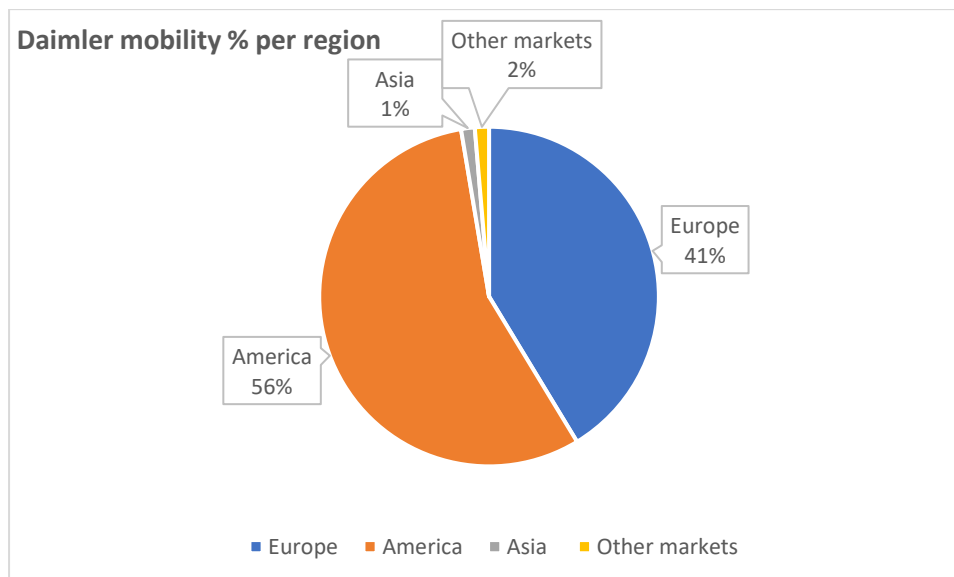
The first startup is Supermoney, a digital payment company in the UK. Their solution allows you to make payments by scanning a QR code into a digital wallet. The aim is to manage counterparty risk for buyers and sellers. The startup intends to make payments to traders faster, cheaper, and safer.

The second startup in the blockchain field is Bloom. Their product allows customers to use the credit check process without giving up control over the data. So, the customer stores the data on their phone verifies their identity, and applies for credit without putting their data at risk.

## 5.6 Daimler Mobility

Daimler Mobility (formerly Daimler Financial Services) is Daimler's global financial services and mobility provider. The company finances, leases, and insures cars and commercial vehicles of the Daimler Group, optimizes commercial customers' fleets and offers banking and credit card services/debit in more than 40 countries. The reference brands are mainly Mercedes-Benz and Smart.

The business of Daimler Mobility is more focused in the areas of Europe (about 41%) and America (about 56%); instead, Asia and other markets have a share of about 1,3% and 2%, respectively (Chart 5).



*Chart 5: Daimler Mobility market share per region in 2019.*

The business model is closely linked to the "fleet management" system and digital mobility solutions. Thanks to these two components, Daimler can satisfy many customer requests, such as financing, leasing, and insurance contracts. Its "value proposition" lies in the concept of mobility "from years to minutes" or the possibility to travel with their vehicles for a few minutes (Car sharing) or years (Leasing).

Daimler Mobility's revenues were 29 billion in 2019, an increase of 2 billion compared to 2018; even the ROE has experienced moderate growth from 2018 to 2019, rising from 11.10% to 15.3%.

### 5.6.1 Technological trends in the products and services offered

Daimler M. manages the process thanks to the Athlon platform; the latter provides leasing vehicles and vehicles to fleet customers. It has also developed e-payment services. All these products are aimed at creating a mobility ecosystem.

An example of robust digitization of processes is Mercedes Pay: system based on payment directly from the vehicle or through the mobile app, for example, to pay for parking.

As far as truck leasing is concerned, Daimler has recently introduced Dynamic Lease: through this service, it is possible to use a telematics system to record the total distance traveled by truck, allowing the consumer to pay according to the length even travelled.

### 5.6.2 Open Innovation activity

Daimler Mobility actively promotes partnerships and collaborations with startups and has recently established a central contact point: the Startup Intelligence Center (SIC). The Startup Intelligence Center is an entry point for innovative startups that seek to collaborate with Daimler to improve their products, gain access to pilot markets, or develop new ones.

As Open Innovation, Daimler Mobility aims to serve startups in four different ways:

- **Invest:** Verimi and TURO are examples of startups in which Daimler has invested in several rounds. Of particular mention is the investment in Auto-Gravity, an app that digitizes the entire journey of financing and purchasing a car, from the geographical identification of the most suitable dealer to the proposal of at most four financing offers customized the needs of the customer.
- **Acquire:** the acquisition of your-now startup is the primary example. YOUR-NOW is made up of:
  - ❖ REACH-NOW: platform/application that allows the user to plan his own trip (mainly in the city) advising him/her the route, the possible means of transport and, the total cost
  - ❖ PARK-NOW: platform for remote parking reservations
  - ❖ CHARGE-NOW: infrastructure network for charging electric cars
  - ❖ SHARE-NOW: car-sharing platform

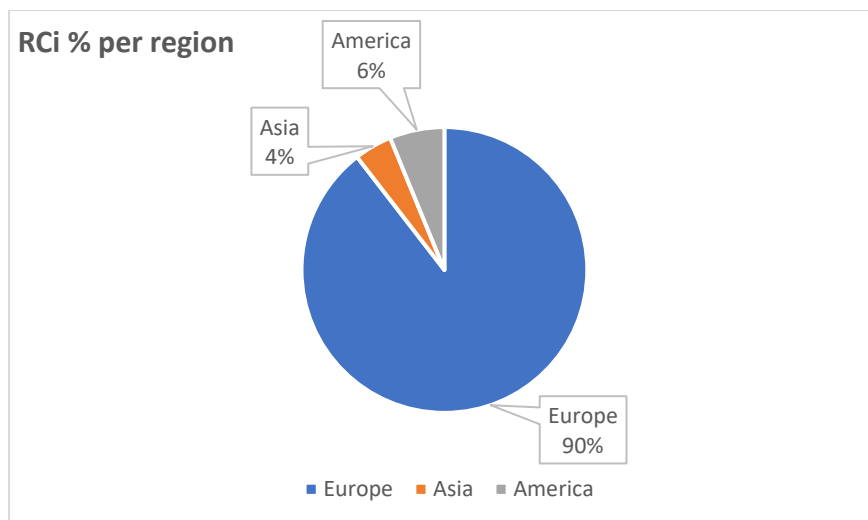
- **Found:** Daimler founded VAN2SHARE which is an innovative van sharing and sending platform that connects drivers, vehicles and order requirements.
- **Co-create:** there are also some examples of co-creation between Daimler and startups:
  - ❖ **Blockchain HELIX:** the platform offers a Digital Identity solution for individuals and companies, called helix id.
  - ❖ **Pypestream:** Pypestream is an American corporate conversational AI solution for customer service

The focus areas of the SCI are divided into:

- a. Mobility Services
- b. Artificial and Emotional Intelligence
- c. Big Data & Analytics
- d. Blockchain & Cryptocurrency
- e. Lending & Crowdfunding
- f. Augmented and virtual reality
- g. Banking Technologies
- h. Cyber Security Fraud Detection
- i. Financial index aggregation and management platforms
- j. Mobile Payment
- k. Insurtech

## 5.7 RCi Banque

RCi Banque is an international company based in France specializing in automotive financing, insurance, and related activities for the brands of the Renault, Nissan, and Mitsubishi Motors group. RCi Banque recorded the following market shares in 2019 (Chart 6): Europe (88.97%), Asia (4.25%), America (6.16%).



*Chart 6: RCI Banque market share per region in 2019.*

RCI Banque offers a complete range of financial products and services to its two main markets: the end customers (Retail and Corporate) and retailers of the Renault, Nissan, Dacia, Samsung, and Datsun. The main services offered are listed in the next table.

Business	Customers	Dealer network
Lending	✓	✓
Finance Lease	✓	N/A
Operating Lease	✓	N/A
Services	✓	N/A

*Table 4: RCI Banque's main services.*

Mobility is managed by RCI Mobility, a subsidiary of RCI Banque. The projects mainly concern car-sharing, with three different possibilities:

- **Glide:** corporate car-sharing service, available to group employees, who can book some vehicles in the company's fleet
- **Get&go Micra:** the web platform allows you to group from 2 to 5 users who share the same mobility needs.
- **Renault Mobility:** with this service, the Renault Group can offer companies and the public its vehicles equipped with car-sharing technology.



The company recorded revenues of about 3.6 billion in 2018, while in 2019, they were about 3.8 billion. Return on Equity, an indicator of profitability, declined from 2018 to 2019, from a value of 19.20% to 18%. Below is the revenue composition of RCI Banque.

#### **5.7.1 Technological trends in the products and services offered**

An example of technology implemented by the company is the RCI Connect application, launched in 5 countries in 2017. Through the RCI Connect app, each customer can manage their financing, insurance, and service contract through their own custom space. The RCI Connect app also aims to enrich the customer experience with exclusive offers, tailored advice, and new services such as parking geolocation.

In March 2018, Octo Telematics (Octo), the leading global telematics leading global provider for the automotive insurance industry, announced that it had entered into a worldwide partnership with RCI Bank and Services. As part of its sales process, RCI Bank and Services will offer customers the opportunity to include an Octo device in their car to make their vehicle tailored to them and their driving style. Octo will use his big data analysis to develop a complete profile of each driver and vehicle. This profile will include a driving score that measures each driver's unique style and monitors the car's condition, allowing RCI Bank and Services to provide tailored services based on each driver's driver profile. Data collection and analysis will take place on the IoT-enabled Octo's Next Generation Platform (NGP), developed with the support of Salesforce, Software AG, SAS, and SAP and consulting companies Deloitte and Capgemini.

In 2019, Rci Banque created e-commerce (Dacia online shop), in which the consumer can buy their car entirely online.

#### **5.7.2 Open Innovation activity**

As early as 2017, RCI Banque was active on the Open Innovation front with the partnership with Startup Inside, an incubator present in four locations worldwide, including Paris, realizing a "Fintech Labs weekend": the competition attracted more than 100 participants from a variety of sectors. The challenge was to create a startup in the Fintech field in just 50 hours, similar to a Hackaton. The event is structured with the following activities:

1. Each participant, proposing an idea or project, was asked to present the same through a concise "elevator pitch" lasting one minute.
2. Following the presentation's evaluation, about ten groups were selected on topics considered most attractive, giving about two days to work on them.
3. On the last day, each team presented the project through the final pitch session.

Besides, RCI Bank and Services has created a Mobility Services and Innovation Direction to provide end-to-end, innovative, and tailored mobility solutions. The division will also ensure profitability for the startups in which it has invested while promoting mutual sales synergy. Finally, this new department will pursue partnerships with recognized startup accelerators and OI programs to stay at the forefront of the latest technological advances.

An example is the investment in Marcel, a platform 24 hours a day, seven days a week, through which customers can book, in advance or at the moment, a PHV (Private Hire Vehicle) in the Paris region.

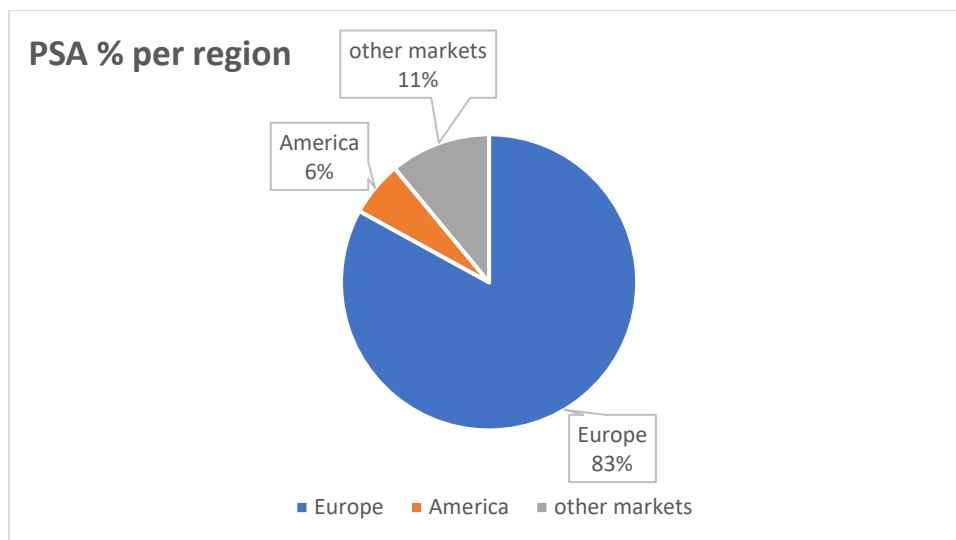
Two other examples are investments in:

- **Yuso**, a shipment management solution dedicated to PHV, taxis and delivery companies that offer companies the peace of mind of the automated fleet and driver management
- **COMO Urban Mobility**, which provides an integrated payment solution specifically designed for urban mobility professionals.

## 5.8 PSA Finance

Banque PSA Finance is the financial subsidiary of the automotive company PSA Groupe. Banque PSA has a direct presence in 20 countries. The brands represented are Peugeot, Citroën, and DS. The company offers complete and innovative financing, insurance, and leasing services: this is to take advantage of a new vehicle of the PSA group brands or a used car.

In the chart below, however, the market shares are presented by region (Chart 7). It should be noted that in the 83% recorded in Europe, 74% is constituted by France.



*Chart 7: PSA Finance market share per region in 2019.*

PSA Finance offers financing services for new and used vehicles; moreover, through FREE2MOVE, it provides leasing solutions.

As for mobility, it is managed directly by the PSA group, with the FREE2MOVE platform. It offers services of:

- Connected fleet management
- Electric charging
- Short/long term rental
- Digital car sharing

PSA Finance's revenues remained stable between 2018 and 2019 at around 2 billion euros; the ROE went from 17% to 18%. In the table, the shares of revenues per target customer are highlighted.

### **5.8.1 Technological trends in the products and services offered**

In 2019, as part of the digital acceleration awards organized by BFM Business, Banque PSA Finance won the award in the category "Banque Assurance" with the EFFIGAME project.

EFFIGAME is a digital training platform for Banque PSA Finance. Commercial teams can learn and train with videos, podcasts, mini-games, and a sales interview simulator. The combination of

artificial intelligence has created a multifunctional simulator (which offers more than 16 million combinations): thanks to the interactive video, sales situations are closer to reality, and managers can animate their teams, monitor their performance, and customize individual coaching.

### 5.8.2 Open Innovation activity

In 2016, PSA created the Business Lab, designed to detect, test, and transform opportunities into marketable products and services for the PSA Group, even outside its core automotive market. The lab's work is organized into three programs:

- **Business Innovation Hub**, which detects business and technological innovations by promoting interactions with innovative ecosystems around the world and acting as the main entry point for startups
- **Business Factory**, which conducts large-scale experiments of new businesses and new value propositions for customers
- **Venture Development** which facilitates partnerships with innovative start-ups and acquires minority stakes in these activities, either through venture capital funds or directly.

In 2018 PSA Groupe announced an Openlab dedicated to artificial intelligence, together with Inria, the French national institute for committed research on computer science and automation. The study areas were mainly autonomous and intelligent vehicles, mobility services, manufacturing, design development tools, design itself and digital marketing, and quality and finance.

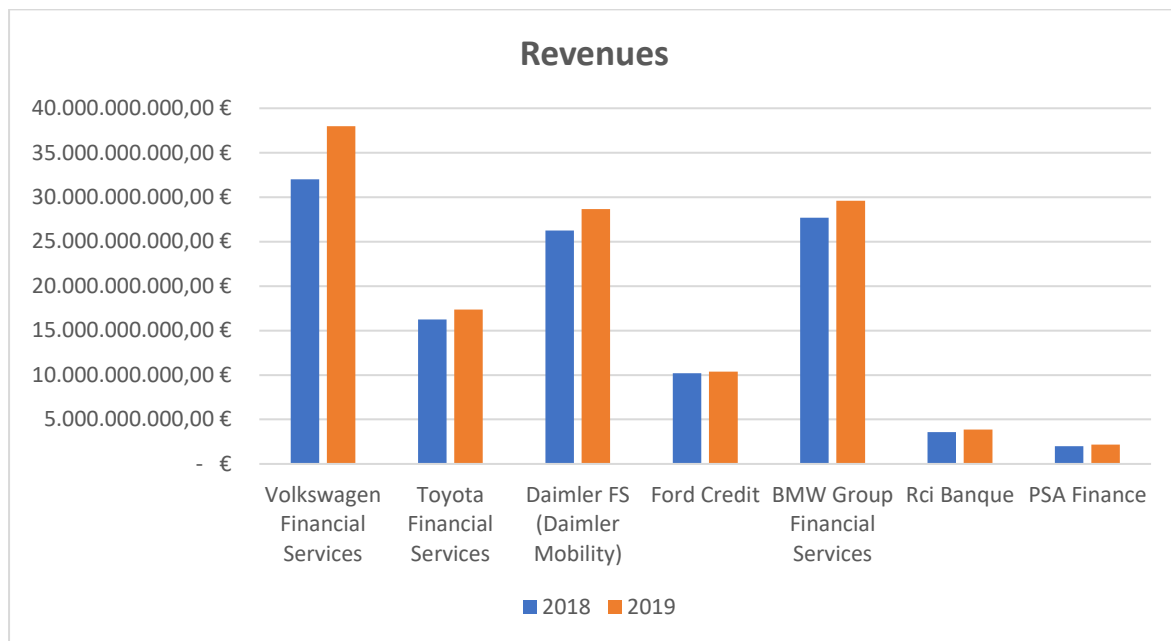
At the end of 2018, PSA Finance established two partnerships with two startups, Wagonex and Drover. Startups offer car subscription solutions. For example, Wagonex provides this service by placing the customer in front of four steps:

- Search for the car
- Choice of rotation (duration of contract with a given car)
- Agreement on insurance
- Collection of the car or delivery at home

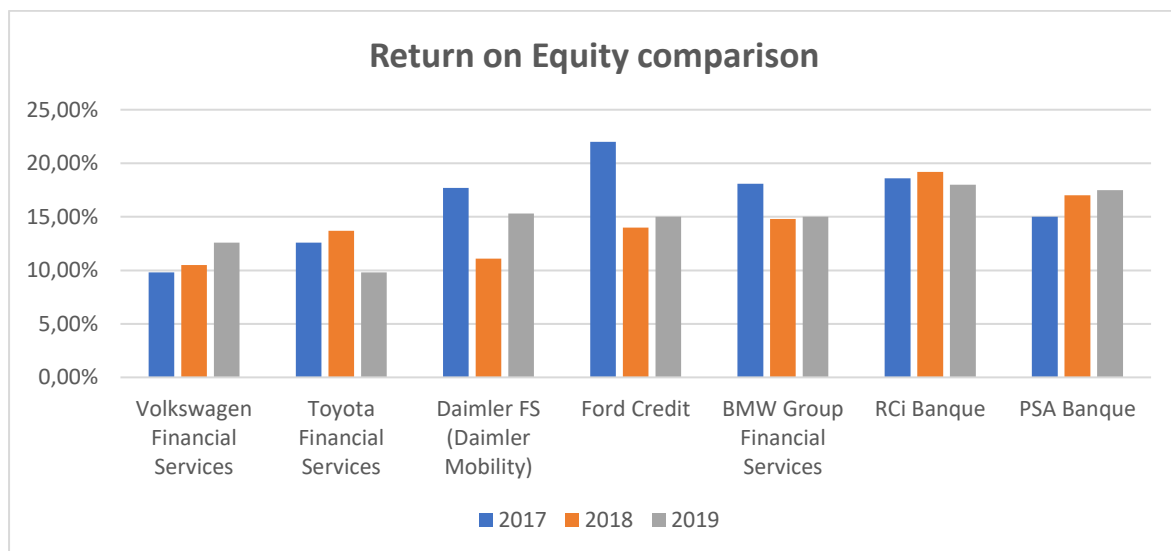
The operation of Drover is similar to the one mentioned above.

## 5.9 Competitors' comparison

The following graphs and figures show a comparative analysis of the competitors' different Revenues and ROEs (Chart 8, 9). The combination of these two indicators gives a clear understanding of the competitors' financial position. As outlined by Chart 8, Volkswagen FS, Daimler FS, and BMW have the highest amount of Revenues in the years 2018 and 2019.



*Chart 8: comparison between revenues of competitors.*



*Chart 9: comparison of the ROEs of the competitors.*

By definition, ROE is considered a measure of how effectively management is using a company's assets to create profits. Comparing the ROEs of each competitor, it can be concluded that companies with the highest performance in terms of profitability are BMW FS, RCi Banque, and PSA Banque. The market shares have been compared to understand where competitors have the most importance/influence in the matrix below.

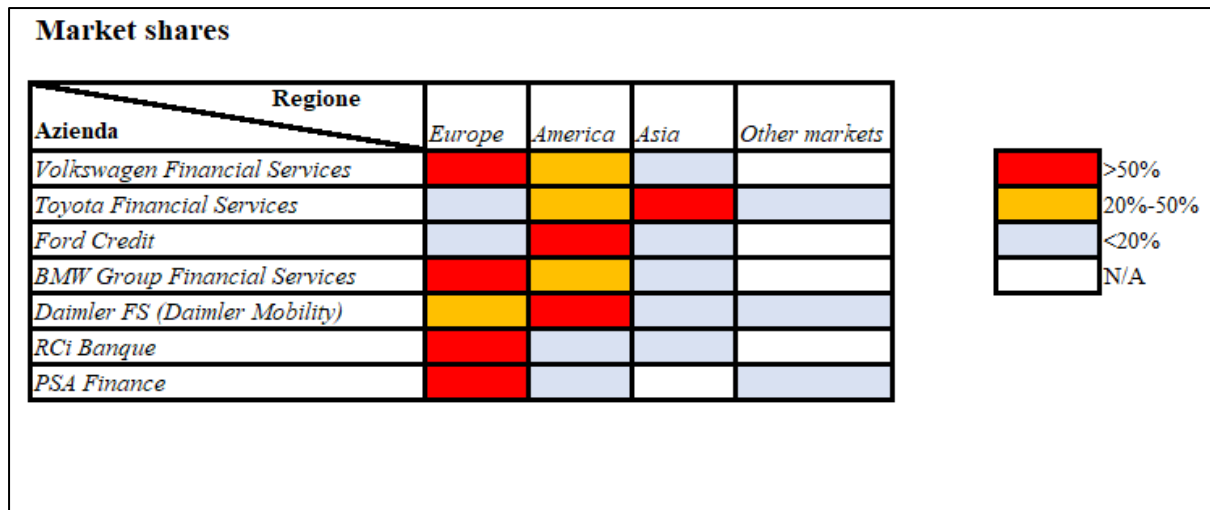


Figure 32: matrix of the different market shares of competitors.

As regards the innovative context, the following charts show the competitor's current trends: data have been gathered, to figure out which technology are the most widely adopted (Chart 10).

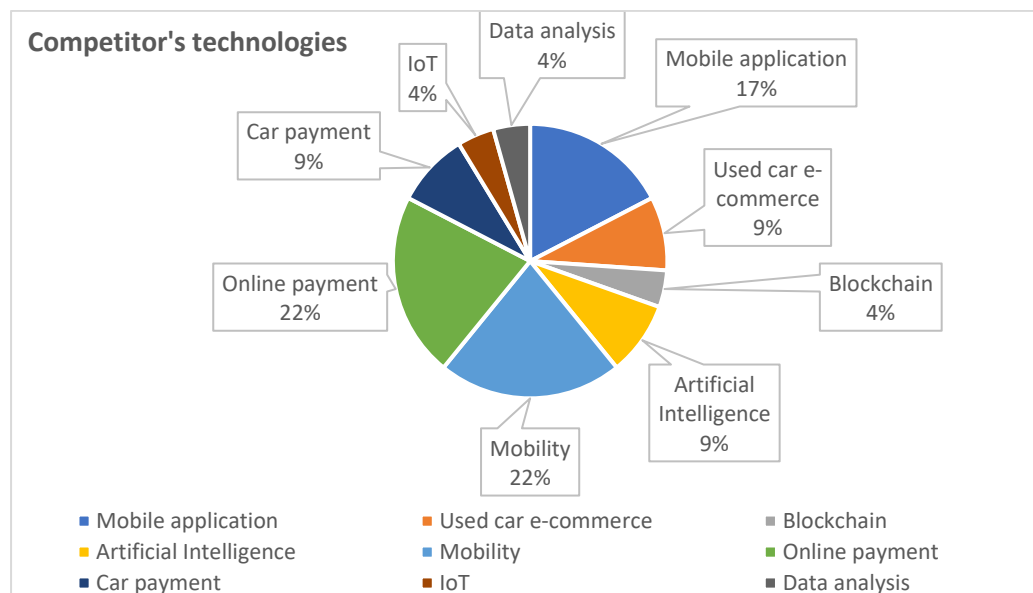
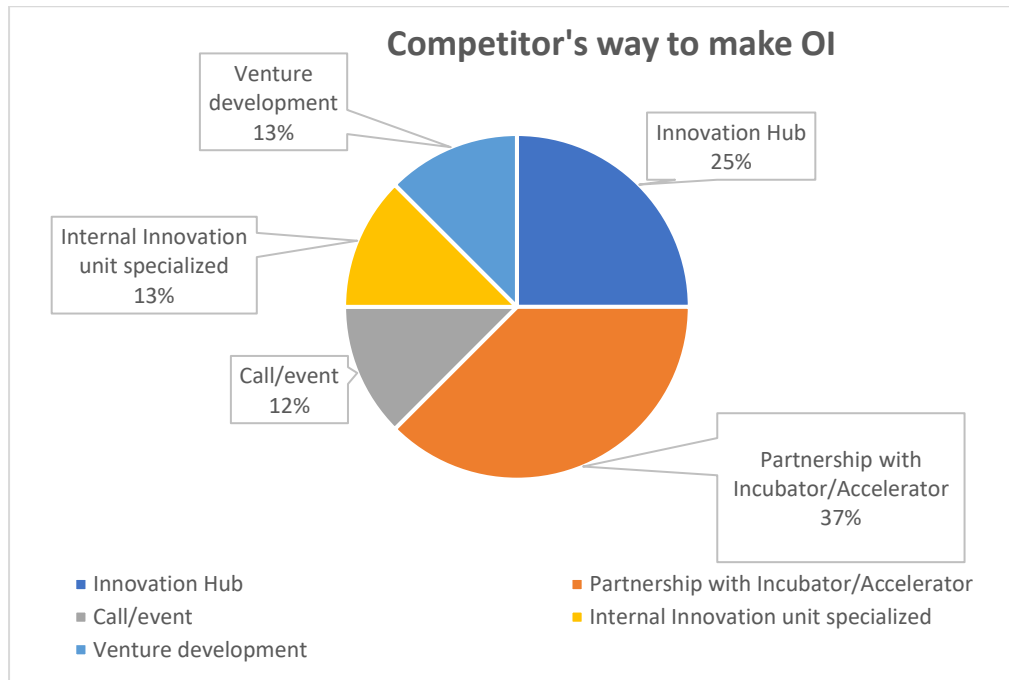


Chart 10: distribution in percentage of the competitor's current technologies.

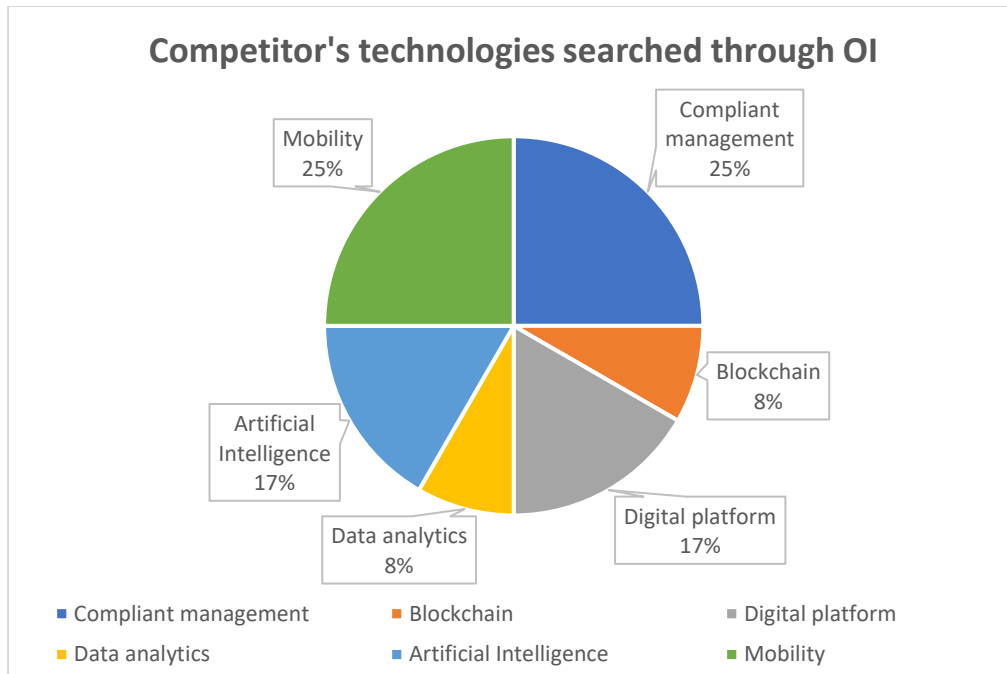
Regarding Open Innovation, Chart 11 shows the way through which competitors perform it: most of them (37%) have collaborated with an Incubator/Accelerator. Several companies (25%) have instead created an Innovation Hub, specialized in OI practices/relationships with startups. The others have adopted the Venture Capital scheme or have made an Internal Innovation unit specialized (13% each), while 12% have organized a Call/event dedicated to scout innovative solutions.



*Chart 11: competitors' ways to perform Open Innovation.*

As described previously, it is also valuable to check if the internal requirements of the Incubator's client are in line with the competitor's current technologies searched through OI programs. What emerges is:

- most companies have researched technologies/innovations for compliant management and mobility (25% each)
- several companies have sought Artificial Intelligence and Digital Platform providers (17% each)
- some companies have sought Blockchain and Data Analytics (8% each).



*Chart 12: competitors' technologies sought through Open Innovation.*



## **6. Conclusion**

After describing the Open Innovation phenomena both in general and specific terms and collecting information from a real project developed by an Incubator on behalf of a big company, the last section explains the main reasons for which OI is significant for the recovery after the pandemic of Covid-19.

### **6.1 The right time for Open Innovation**

In the difficult early months of the Covid-19 pandemic, something remarkably educational began to occur: firms started working together openly without precedent, putting the capacity to generate value before the possibility to make money.

Siemens, for example, unlocked its Additive Manufacturing Network to anyone who requires assistance in medical device design. Another example is the heavy truck maker Scania and the Karolinska University Hospital that have partnered: Scania is not just changing trailers into mobile testing stations, but also directed some 20 highly expert purchasing and logistics specialists to locate, acquire, and transport personal protective equipment to health care workers.

Cooperation could save human lives, but it can also generate advantages for firms, even though they usually ignore it in typical situations. For more than ten years, scholars and instructors have studied OI and have taught students how to innovate in a more spread method. They have observed how firms have used hackathons and other OI forms to create creative solutions that do not reach the implementation, leading to disappointment among employees and partners. Many firms do not believe in this kind of participatory method of innovating, remaining only an ambition.

Nevertheless, OI's current use reminds the great potential that this method comes with even if there is a crisis or not. OI has the potential to extend the space for value creation: it permits in many ways to create value, both through new partners with complementary capabilities and by revealing hidden potential in long relations. In a crisis, it can help organizations find new ways to solve pressing issues and, at the same time, build a positive reputation. More importantly, it could also be a foundation for future collaboration, in line with sociological research showing that trust grows when collaborators voluntarily go the extra mile, offering unexpected supports to each other.

Open Innovation will play an essential role during the Covid-19 pandemic, and once it will be over. The following paragraphs will describe how firms can manage OI common issues.

### **6.1.1 IP is not the current focus**

Earlier research has discovered that many firms are anxious about value “leaking” from cooperation with outsiders. Consequently, they usually collaborate only on a few marginal tasks, but not on the fundamental problems. For instance, many chemical companies in Europe and the U.S. made it impossible for their open innovation partners to provide suggestions and advice: they do not reveal their most crucial issues because that could compromise future patenting.

As mentioned in the previous chapters, these IP problems are essential and relevant, but they could hinder any OI initiative from becoming real. Though, during the Covid-19 crisis, it could be wise to pay attention more to generating value than capturing value.

Smart firms collaborate on important aspects without risking harmful exposure. For instance, if heavy truck maker Scania (firm known for its world-class manufacturing system) sends some of its best manufacturing specialists to work at Stockholm-based Getinge to increase their ventilator production, it risks none of its core technological assets. However, by contributing to building medical capacity and fighting the virus, it is speeding up how quickly its plant will be back up and running.

### **6.1.2 Manage the dual motivation**

Once the first steps of OI have taken, companies usually realize that they rely on employees and partners' voluntary and active participation to succeed. Instead, firms require to rely on a combination of hard and soft motivations to stimulate internal and external agents. Organizations need to identify their partners' proper basis.

For instance, a Harvard Business Review research on open-source software development has demonstrated a different set of incentives among developers. Some developers are motivated to share their code because of the labor market signaling liberally. Other developers are guided by strong ethical reasons, opposing any move to develop software that cannot be reviewed, changed, and openly shared. On the other hand, firms want to give time and resources since it is an excellent way to access complementary skills and assets. Allying these motivations with companies'

requirements takes effort, curiosity, and modesty. While this could be easy in the initial phases of a partnership replying to the virus, firms should not expect cooperation beyond the epidemic to go without problems. Instead, it is worth working in advance to find the partners' motivation.

### **6.1.3 Discover new collaborators**

A likely-to-occur challenge in OI is to take on new collaborators. They always entail costs in terms of scouting, validation, compliance, and the establishment of new social relations between individuals. When there are difficult problems as a pandemic, new partners need to provide complementary skills and perspectives.

The huge scale of the crisis could have improved these challenges in two ways.

For starters, management has took a lot of the risk connected with new collaborators by sending communications that OI is a good solution. For instance, Jim Hackett, Ford's president, declares he has authorized his employees to be "scrappy and creative" when cooperating with GE Healthcare to discover solutions to the pandemic.

Second, not only the dispersion of the virus has increased exponentially but also the pool of potential collaborators. When firms across the world have the same crisis, and many are looking for new methods to conduct business, a combinatorial exercise proposes that there are many better collaborators available than some time ago. A crisis can push companies to discover a superior number and new kinds of alliances. If companies keep open-minded towards new partners also after the crisis, they will probably have great results in terms of innovation.

### **6.1.4 Urgency leads transformation**

The preliminary steps in terms of OI in "normal times" are relatively simple, as described in the previous chapters. Nevertheless, the outcomes are often quite inadequate. To fully gain value from the approach, companies require to understand the transformational contest ahead. These initiatives are usually a small part of the problem, and successful OI usually needs operational and structural variations. These variations are hard to adopt for employees, teams, or even business units.

In a period of crisis, the required executive focus is suddenly there. Smart firms take advantage of this possibility to reconsider their innovation infrastructure. For example, higher education could

stand as a symbol and show that OI can operate at large-scale and that the conservative sector can modify its structure. Most likely, classes starting the day after the crisis will be replaced by digital choices. Much was left for individual teachers to understand, but university principals sent reassuring communications supporting experimentation and clearing bureaucratic obstacles. In the preceding few weeks, academics worldwide have been cooperating, splitting tips, teaching plans, and experiences to turn a slow system into an agile digital one. This situation shows that frequently the main barrier to successful OI is just the reticence to commit to it.

## **6.2 Looking ahead**

These are the most likely and hopeful developments. The main question is: to what extent these comments will be accurate in the future? When the situation returns to normal, how many innovative ways of innovating will remain inside firms? And how will the society face other significant issues, such as global warming, that are no longer far on the horizon but are already here?

The hope is that the world's reaction to the coronavirus has taught society that a distributed experience of a shared enemy can allow the rapidity, intensity, and creativity required to tackle even the most significant challenges. For managers, the essential idea is to think about what needs to be presented after the crisis.

A big issue usually modifies the behavior of consumers, employees, and partners. Probably, client preferences will remain the same, but frequently they do not. Having discovered new means of managing OI during a pressure can then bring much-needed flexibility and, in the end, ensure the company's solidity, a suggestion could be to not waste those practices by planning for returning to the old normal, but rather to arrange for a new normal.

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