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Mapping Innovation in the private & public sector

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SCHOOL OF SCIENCE AND TECHNOLOGY**

A thesis submitted for the degree of
Master of Science (MSc) in e-Business and Digital Marketing

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I hereby declare that the work submitted is mine and that where I have made use of another's work, I have attributed the source(s) according to the Regulations set in the Student's Handbook.

January 2021
Thessaloniki - Greece

Abstract

This dissertation was written as a part of the MSc in e-Business and Digital Marketing at the International Hellenic University. The present work is mainly intended to provide an holistic view over the mode that both public and private sector incorporate and utilize innovation strategies, cite the types of such strategies being mentioned in the existed academic literature, as well the practices that are being followed from business and governmental entities. Drivers and barriers that affect the adoption of a certain innovation type, open innovation, in both sectors are also being discussed. In the end of this research, the objective is to demonstrate a classification of the different ways both sectors develop and implement their innovation strategies, as well of the drivers and barriers that both afore-mentioned organizational types are facing in their endeavor to adopt an open innovation strategy. Ideally, the discussion that will occur, as well the research outcome may assist organizations to recognize their own innovation patterns, identify innovation types as suggested from literature and practices and be motivated to re-adjust their innovation tactics with others quoted in the current work that would be more efficient in conjunction with their existing business models. Of course, this thesis aims also to contribute to the scientific community by providing concentrated knowledge over innovation concept for both private and public sector.

I would like to thank my supervisor, Prof. Vassilios Peristeras, for the valuable knowledge and guidance he provided all the years of my studies in International Hellenic University. I would like to express my gratitude and appreciation for Athanasios Deligiannis, who supported me throughout this study, as well I owe a big thank you to my husband, Chrysostomos and the rest of my family, who embraced my efforts and supported me throughout this experience.

Keywords: public sector innovation, private sector innovation, open innovation, implementing innovation

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Date 04/01/2021

Preface

This following thesis was written as a part of the MSc in e-Business and Digital Marketing at the International Hellenic University targeting to map innovation concept in both private and public sector.

I would like to thank once again my supervisor, Prof. Vassilios Peristeras and Athanasios Deligiannis for their valuable contribution, as well my husband and family for their support.

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Introduction

Innovation is a key variable in order for all organizations to remain viable, successful and efficient in a fully changeable environment. Having perceived its necessity, as well understanding the interest of firms to learn more over this issue, the current work focuses on mapping innovation concepts in both private and public sector. Specifically, this thesis demonstrates the mode that these sectors develop and implement their innovation strategies, quotes the innovation typologies discovered from the available literature, as well elaborates on the innovation practices that are being used from both sectors to accomplish innovation. Furthermore, the drivers and barriers that affect open innovation adoption, according to literature, are being classified and examined. The main target of this research is to map and compare all the afore-mentioned knowledge, so that from the results and classifications that will come up, all types of organizations may be able to identify similar innovation patterns to theirs or detect innovation types and practices that have not used or thought about before that may fit to their business models and may make them more efficient. Undoubtedly, this assemblage of knowledge regarding innovation targets also to contribute to scientific community.

In this journey of mapping innovation concepts, the context of innovation strategy is firstly being examined. Pisano (2015) highlighted how vitally important it is for organizations to cultivate and retain a flexible structure or create a space for individuals to innovate, always in the terms of the general business strategy. This way, the staff may have the capability to produce and propose valuable unique roadmaps in accordance with company's policies that boost its efficiency and competitiveness.

Following, the innovation types and practices are being discussed. Regarding innovation types, there is a quite rich and interesting placement of several researchers, whom opinions vary in relevancy with the most suitable categorization for innovation. Product, process, organizational and marketing innovation (Tavassoli and Karlsson 2015), technological or business model innovation (Pisano 2015), breakthrough, sustaining, basic research and disruptive innovation (Satell 2017) are indicative examples of the different researchers' proposals. Concerning innovation practices, there is also a wide bibliography that presents them as activities that promote controlled actions, which eventually

result in a desired innovative outcome. According to Cankar and Petkovšek (2013) a very effective practice that may bring innovative products or services to the audience is the cooperation between public and private sector. Pisano (2015) added that as great innovation practices may be considered the adoption of separated R&D working groups to share research job in smaller projects, the creation of internal business projects, the building of groups that may manage capital and find allies, the cultivation of open innovation and the development of “crowdsourcing”. Moreover, another view classifies these practices as internal and external activities that after all lead to the generation of innovative products or processes (Anzola-Román et al. 2018).

Having quoted the basic dimensions regarding innovation as a concept, the review delves deeper into analyzing independently private and public sector innovation. From private sector view, it is of high importance that organizations in order to survive and reinforce their position, as well expand their horizons, they take the risk to innovate, even highly, examining also areas that are not well known. Innovation in private sector includes the entry in new markets, the expansion of entrepreneurial activities out of the narrow borders of a country, the achievement of significant growth and competitive advantage. Essentially, innovation provides the solution to surpass obstacles and accomplish significant results for the survival of the organization (Gunday et al. 2011).

From the other side, innovation in public sector follows a differentiated path. Usually such organizations take advantage of the established methods and knowledge and do not go a step further (Gao et al. 2018). However, as public sector supports a great number of businesses and citizens, it is forced to follow the contemporary tendencies and improve the quality of its provided services. Innovation in public sector is more a medium to facilitate people’ routine by upgrading the existed processes, policies, changing the culture and making it more agile so that valuable outcomes will come up (Bason 2010 in Szkuta et al. 2014). Therefore, public sector innovation is an emerging concept with great margin of improvement (OECD 2017).

Moreover, the drivers that affect open innovation adoption are being examined. As far as the public sector is concerned, according to OECD (2017), the drivers, in this case, include political and public or business forces, the lack of financial resources or insufficiency of staff. Furthermore, the need of public services’ users to participate more in the

civil procedures, the necessity of government to extract knowledge over social concerns or problems and build services that may be more efficient, the cultivation of a better relationship between government and citizens with public authorities to respect users' views and problems and therefore, receive their trust, are all critical drivers to open innovation. Additionally, as drivers are regarded the advancements in ICT (information and communications technology), as well the plethora of "challenges in social environment" that pushes public sector to obtain more knowledge, exploit ICT and facilitate the needs of the community (Kankanhalli et al. 2017).

Conversely, in the business sector, profitability, efficiency and survival are widely considered as crucial drivers. According to Birudavolu and Nag (2019), it may also be considered the share of risk between partners, the participation and collaboration of different stakeholders with different scientific background that may contribute significantly in company's enhancement and innovation performance, as well of customers' feedback that is necessary for a company in order to be sustainable. Also, companies participating in such a community may have the ability to approach a wide spectrum of suppliers, new niche markets or bigger customer segments, gain significant resources that may include even scientific personnel, as well knowledge over a new for the company market or field. Together with the previous advantages a company may have access to new distribution channels by which it may be able to promote personalized services and products always in accordance with the knowledge that has gained. Of course, such an innovation activity has also a set of positive outcomes to company's general performance. Personalized solutions assist in bringing more satisfaction in customers, thus sales, productivity are growing, as well profit (Birudavolu and Nag 2019).

Furthermore, barriers in adoption of open innovation strategies is an equally significant variable that is being examined in the current research. When referring to private sector, it is obvious that especially small or medium companies are dealing with lack of resources, thus, even if they try to innovate, they do not benefit in the same percentage as the bigger ones do. The latter enjoy the privilege of obtaining sufficient funding and skillful workforce to run such initiatives (Taran et al. 2015). Bellantuono et al. (2013) indicated that in most cases the barriers that have to do specifically with open innovation are cultural and set the examples of the "Not-Invented-Here and the Not-Sold-Here syn-

dromes”, while also cited that other reasons that companies avoid such innovation are the “knowledge gaps”, fear of imitation (copyright issues) or of security of the company’s internal data and potential data leak to competition (Drechsler and Natter 2012; Lichtenthaler et al., 2011; Mortara et al. 2010). (Bellantuono et al. 2013)

As for the public sector, lack of financial resources, skills, flexibility in decision making, risk in acceptance of both personnel and users are some of the most common barriers it deals with (Spithoven et al. 2013; Raipa and Giedraityte 2014). According to Albury (2005), as such obstacles may be regarded the lack of adequate funding to support renewal for a long-term period, not enough influence or abilities of politicians or public managers to support strategically such an innovation or any sudden change, not adequate motivation to employees, public policies that may create difficulties or no flexible policy in adopting any new technology that may enhance the provided service (Albury 2005).

To conclude, this work is structured as follows: In the first part, the academic literature in regard to innovation strategies, types and practices that are being applied both on private and on public sectors are presented. Then, the drivers and barriers for adoption of an open innovation strategy in both cases of public or private organizations are being examined. From the above knowledge, classification frameworks have been constructed, which include the differences of developing and implementing innovation in the two before-mentioned sectors, as well the categorization of drivers and barriers of adopting open innovation. Finally, the research ends up with a discussion over the research results, as well the relevant conclusions and limitations.

Research Questions

Although there is a quite rich literature around innovation concept both in private and public sector, it seems that there is scarcity on works that gather, analyze and compare the mode innovation is being developed or implemented between these sectors. In addition, there are a lot of papers that mention innovation typologies or innovation practices, but there is not yet a collective work that concentrates knowledge over all these parts of innovation for both governmental and business sector. Simultaneously, innovation is a concept that more and more organizations try to incorporate in their routine, as well scientific community, understanding its added-value, produces all the more new studies over this issue for the private, as also for the public sector that revealed the need to innovate quite recently.

To this direction, and as the scope of the current research is to assist organizations to recognize their own innovation patterns, identify innovation types as suggested from literature and practices and utilize this knowledge for their own benefit, the dissertation was focused on answering the following questions: (RQ1) What are the similarities and differences between public and private sector innovation strategies? (RQ2) What are the innovation types being proposed for these sectors? (RQ3) Are the innovation practices that are mentioned in the literature similar in civil and business sector or are there different activities proposed for each case? (RQ4) What factors affect the success of innovation implementation in both sectors? (RQ5) What are the drivers and barriers for developing open innovation in each sector? The first question targets to extract knowledge from the existing literature regarding innovation strategies in both private and public sector and compare them to find similarities and differences. The second question is about quoting the innovation types being mentioned in the scientific sources to detect, which types are most common in each sector and what are the differences between sectors. The third question aims in identifying innovation practices to both sectors and set them in parallel. Furthermore, in the fourth question, the goal is to detect the factors that affect the success of innovation implementation. Eventually, the fifth question has to do with open innovation and it aims to clarify which the drivers, as well

the barriers are that force or hinder the adoption of open innovation in private and public sectors.

Literature Review

Introduction to innovation

Innovation is a concept that has been widely discussed in the last four decades, as it is, undoubtedly, a survival determinant for all kind of organizations in the current difficult, demanding and competitive environment. According to the research of Gunday et al. (2011), the inaugural point of realizing the necessity of innovation development came after 1980's, simultaneously with the globalization and fierce competition.

In the forthcoming years, around 1990s, a sequence of digital applications starts appearing assisting businesses in evolving their innovation processes. The digital disruption wave begun affecting and changing business models, as well the way innovation is being developed. Furthermore, in the same terms, e-commerce that has been started being adopted from many companies cultivates their ability of creating new innovative projects, products and creates more opportunities for exploitation (Nylén and Holmström 2015).

Together with the positive achievements, these innovative transformations brought up also uncertainty, complexity and pressure in the wide business sector. Especially, small and medium-scale enterprises (SMEs) were being puzzled and began searching new modes to sustain their position in the market, such as producing new goods with new methods or even changing their business strategies to obtain results that will eventually satisfy their customers. Hence, from that point, organizations changed the way they innovate and started searching how their innovation capability will boost company's general performance (Mohamad et al. 2015).

Innovation Definitions

In the effort to decline the complexity, researchers have provided plenty of definitions, so that innovation will be perfectly delineated to all involved stakeholders. Passing through the work of the above mentioned researchers, innovation is described simply from Damanpour, Sabat and Evan (1989) as a decision to adopt a new system, norm and good within a company or from Yeşil et al. (2013) just as the evolution and application of new concepts inside a firm. OCDE (2005) defined it as an initiative that is being devel-

oped and implemented in the production sector, since it may be a new product, service or process, or in the marketing department, or even a new organizational practice. All previous-mentioned are included in the work of Mohamad et al. (2015). Furthermore, in their work, Olsson and Bosch (2016), stated that innovation is the birth of a new idea, as well the procedure till its accomplished, either this is the creation of a product or a service that will eventually provide an added-value solution to consumers that they will be willing to purchase. Rowley et al. (2011) also mentioned Bessant et al. (2005) view, who focus in innovation as the key to sustain both “growth” and “competitive advantage”. The same scholars, Rowley et al. (2011), referred also to innovation ecosystems as a concept, which consist of both partners and customers, as well of all the interested people, who are involved in cost and risk sharing and together with the company brainstorm, examine their ideas, develop and co-evaluate if they are valuable enough for customers to eventually be implemented. In the work of Wang (2010) it has been clarified that as partners, it may be the universities, public and private scientific and economic organizations, industries or governments and that the novel ideas, which occur from this ecosystem interaction enrich the existing knowledge, create training activities, develop and commercialize the new or existed technology in the company.

Innovation Benefits

Having perceived innovation’s context and scope, entrepreneurs started creating the basis for exploiting the existing knowledge to achieve value, profits and competitive advantages for their companies. Evidently, after years and quite lot of researches, innovation adoption has showed its significant results in organizations performance, skills’ development, improvement of productivity, as well positive effects on employees (Gunday et al. 2011). The concept of innovation remains also the same when referring to service sector companies. The latter achieve innovation mainly through open resources and ICT systems (for instance in insurance companies), but in general, knowledge remains the most crucial factor for all kind of organizations that if managed properly, it may provide significant opportunities and advantages (Rajapathirana and Hui 2018).

To build the above-mentioned infrastructure each firm should first understand how important the innovation that is going to develop is and then, gather all the necessary

competences to adapt in the changeable environment and link them with the internal part of the company. "Innovation capability" is the medium to achieve quickly the expected results, even this is a new product or a new process. Each organization should consider this ability as an important asset and of course, take into consideration that innovation and competitive advantage would not exist without it. Adler and Shenbar (1990) stated that innovation capability as a concept includes the ability of creating new goods according to customer needs, combining technologies and products to deliver the expected outcomes, as well the ability to reply with solutions, when competitors bring such opportunities. So, the significance given in innovation capability will provide the relevant results. (Rajapathirana and Hui 2018)

Innovation Process

To delve deeper into the research main issue, the stages of innovation process are being mentioned. First, "ideation" is the step, where ideas and capabilities are being born exploiting the knowledge from other previous companies' case studies or data gathered from market research. Second, in "concept creation" the most realistic ideas are being identified, while in the last step "customer validation", the customers that will be addressed are being defined. After these stages the innovation is finally a reality, produced and delivered to consumers (Olsson and Bosch 2016). Boer and During (2001) indicated four steps so that a firm would reach the development of a new function, product, technological improvement or enhancing its organizational parts. Shortly, the first step includes setting the goals regarding innovation, then, scheduling the process, managing the procedure and eventually, adjusting wherever it is necessary. There are also three types of important activities that should take place in the innovation process so that it will be definitely successful: "problem solving" in every stage of creating, developing and implementing the innovation, "internal diffusion" that includes both information diffusion, as well the way it will be communicated among people that are participating in innovation development and "organizational adaptation", which refers to the activities to adapt people and processes according to the innovation concept so that everything inside the company will be operative and productive.

Furthermore, Boer and During (2001) highlighted the work of Rogers (1983), who defined five innovation characteristics, which affect the mode that the innovation process will be applied. These are the “relative advantage”, namely the level of understanding that the innovation is more valuable than the existing situation, “compatibility” with the existing policies and values of the company, “complexity” of the innovation idea to be understood, “trialability or divisibility”, namely the capability of innovation to be tested and “observability”, which is the level that the outcomes of innovation are evident to other people.

Innovation Management

It is crucial to mention that the successful innovative transformation in any organization's map is not a simple issue. It demands following controlled steps in order to reach the completion of the renewal. In this path, complexity and uncertainty should be set away, certain activities should be assigned to each employee, as well roles and reliance among people joining the venture should be defined to end up to a specific outcome. As identified, innovation is a concept being born from people and managed by them. Therefore, organizations, which dare to innovate, have to be ready on managing the whole procedure (Boer and During 2001).

In general, innovation should be controlled in order to be successful. Top managers have to be aware of every step, monitor both procedure and employees and provide solutions when needed, as well review the internal (business strategy) and external (market) environment to align and keep the balances with the progress of innovation. Thus, it is essential that they obtain such skills and attitude that will affect positively the whole operation. Also, creativity and a more certain innovative result need trial-error learning, therefore sometimes and if there is financial and time tolerance, people should have the chance to test their own ideas. The learning outcomes of the innovation process should be communicated inside all parts of the company, even the ones not participating in order to enrich their knowledge that might be useful in the future. Eventually, there is always the risk of not finding the resources and competencies in the time needed for innovation progress (Boer and During 2001). This is something that should be avoided,

because lack in these capabilities and resources may stand as obstacle in the mode of innovating (Nylén and Holmström 2015).

Innovation Success Factors

According to Rajapathirana and Hui (2018) the innovation success depends also on “organizational culture”. If this is in line with innovative way of thinking, open to dialogue, new solutions, products, processes, changing of business models or technologies inside the firm, then innovation capability is high, so both results and performance of the company will be great. Evidently, the culture of an organization is an important factor that affects the sources, qualities and skills that will be used to contribute to the “innovation performance” thus determines a significant part of the general outcome.

Moreover, Rogers (1995) referred to factors that affect innovation spread inside a firm. Specifically, it was mentioned that the “characteristics of innovation” that makes it suitable for the specific firm, its “complexity”, “type”, the communicational diffusion system that transmits data for innovation inside the company’s different departments, the culture structure, the position description and content of change-managers shape the way that innovation will eventually be developed in the organization. (Walker 2006a)

Innovation in Private and Public Sector

The four dimensions that innovation may affect considerably in every firm, due to the improved concepts it brings to the companies, are its “innovative performance”, which consists of all new elements that occurred due to innovation adoption, such as the new goods and new processes, “production performance” that influences company’s general efficiency and market value, “market performance” and its “financial performance”. As for “innovative performance”, according to literature, when the innovation is about a new product, it is aligned with improvement in sales, as well in market shares. And when it is aligned with new product, marketing, process and organizational innovations it leads to a more holistic customer acceptance and satisfaction. Having all these in mind, it is evident that private companies innovate to gain both competitive advantage and a great general performance. Therefore, it may be mentioned that the more the firms innovate, the greater the value, reputation and market share they will gain (Gunday et al. 2011).

Consequently, when referring to general private organizations, innovation leads undoubtedly the way to entering new markets, expand entrepreneurial activities out of the narrow borders of a country, achieve significant growth and sustain a stable, competitive position in the market. Essentially, innovation provides the solution to surpass obstacles and accomplish significant results for the survival of the organization (Gunday et al. 2011). From the other side, when referring to public organizations, innovation is more a medium to facilitate people' routine by upgrading the existed processes, policies, changing the culture and making it more agile so that valuable outcomes will come up (Bason, 2010 in Szkuta et al. 2014).

Andersen and Jakobsen (2018) indicated that innovation in public agencies happens when there are changes in organizational structure. Specifically, they discussed that innovation may be a by-product of "political pressure" with the sense that politicians have the strength to share the existing resources according to their opinion. In these terms, innovation happens only when they allow financial and human resources movement, as well confirm the "democratic legitimacy" to facilitate a public scope. Of course, public administrators despite the political environment, they also deal with pressure for always conforming their initiatives according to public policies. Another factor that influences the case of adopting or not an innovation is the "learning process". People who are occupied with upgrading the public procedures and facilitate citizens' routine, may gather experience from other examples, where relevant innovation strategy has been developed and decide accordingly if this is suitable also for their case's improvement or not.

Innovation Models

The abundance of researches on innovation both in private and public sector provided a lot of insights. Among them there were identified innovation models for both sectors that indicate the trajectory of innovation through the years. According to the research of Hawi et al. (2019), in private sector the innovation models that have been developed in sequence are the models of Van Lancker et al. (2016) "1st innovation model", which dealt with innovation as a product that companies developed due to technological advances that pushing companies to change, the "2nd innovation model" that considered market demands as the reasons to cause change in companies and the "3rd generation

coupling model” that includes both technology and market as factors to achieve innovation. Then, the Cooper (1990) “stage-gate model” indicates that innovation is being developed in stages and each stage assess the previous one to continue till releasing company’s innovation in the market. Moreover, the “4th generation interactive model” of Van Lancker et al. (2016), is an advancement of the first three models that notes the interaction connections including these with third parties outside the company, the “network model” of Cooper (1990) that is a more detailed version of the previous one and defines all the external linkages and data and finally the “open innovation model” from Cheng and Huizingh (2014), which incorporates more complicated relations, and networks from the previous model. In the public sector, “Damanpour’s (1991) public innovation model” simply refers to three steps “generation-adoption-diffusion” of innovation, then “public innovation framework” by A. Hughes, K. Moore and N. Kataria referenced in Rogers-dillon (1999) is a little more detailed version of the previous model, “Nesta innovation model” in Şandor (2018) refers on stages till the completion of innovation and simultaneously includes the procedures and capabilities that are needed to achieve it and eventually, “innovillage systematic innovation model” of Mulgan (2014) that occurred from practical experience and on the contrary to previous models, this one refers to collaboration of different parties to develop open innovative activities and products. After all the afore-mentioned, Hawi et al. (2019) concluded that public sector lacks the stages of “exploitation of new opportunities and commercial sustainability of the innovative ideas” on its models that are extremely important. (Hawi et al. 2019) Taking into consideration all the previous knowledge, it is obvious that innovation is a complicated concept with various attributes. Thus, it would be more efficient to examine it through the prism of strategy for both business and governmental sector.

Innovation Strategy

As proven from all the above mentioned, innovation is being developed not in a chaotic manner, but has to follow certain steps and methodology in order to succeed. In this context, it is critical that innovation is in line with the general corporate strategy of any business or organization. The research of Birudavolu and Nag (2019) explained that

alignment between the “critical success factors”, which are the attributes that make a customer willing to purchase a product or service, the capabilities and resources of a company are required to accomplish the engagement between innovation and strategy and are characterized as the key to achieve great performance and results. An additional connection that should be satisfied is this between a firm’s competencies and the new opportunities that are presented. If both these fits are strong then there would be increased interest to invest on innovation in order to bring added value to the organization. Also, Hollenstein (2019) added that the exploitation of technological and organizational abilities, as well human and other resources in a strategical manner leads on gaining an important competitive advantage.

Hence, exactly because the difficulty is almost all time on managing and executing the innovation in a strategic way, the following researchers provided some directions for innovation strategy.

Innovation Strategy Definitions

First, Pisano (2015) highlighted how vitally important it is for organizations to cultivate and retain a flexible structure or create a space for individuals to innovate, always in the terms of the general business strategy. This way, the personnel may have the capability to produce and propose valuable unique roadmaps in accordance with company’s policies that boost its efficiency and competitiveness.

Furthermore, Gilbert (1994) defined innovation strategy as the plan that describes the mode and the extent till which a company may utilize innovation to implement its corporate strategy and accomplish great results. Katz et al. (2010) agreed that the main target of innovation strategy is to accomplish company’s strategic goals that is the reason why innovation plan should define the availability of resources and in which type of innovative activities they will be used. Dodgson et al. (2008) mentioned also that innovation strategy determines the “type of innovation” that is most suitable to a company, as well the allocation of available resources, so that the company would achieve assets and great performance. (Lendel and Varmus 2011)

Bagherzadeh et al. (2020), in an effort to define the well-formed innovation strategy concept, mentioned in their work that its existence is essential for firms in order to clari-

fy how and which resources outside the company they have to extract to promote innovation (Chiaroni et al. 2011), how to connect and bring effectively together the internal with external environment according to innovation strategy's certain directions, plans, policies, as well provide proposals over areas that need improvement, reviews and financial schedules (Zobel 2017). Brunswicker (2014) and Chiaroni et al. (2010) from their researches in SMEs and Italian firms respectively, agreed on the above-mentioned and defined it as "Outside-in open innovation". Conclusively, all these elements of innovation strategy, if managed properly will definitely lead to greater innovation performance. (Bagherzadeh et al. 2020)

Additionally, according to Birudavolu and Nag (2019) innovation concept should be accompanied with strategy. Currently, without this splice, no organization would achieve to innovate. Developing innovation through a specific strategy assist in creating a healthy and sufficient environment for firms, where employees could communicate and learn more flexibly, while also react with customers in a more operational manner. When innovation strategy is aligned with business strategy all operations inside the organization are expanding their capabilities and customers become more satisfied, receiving more personalized services based on their needs. Moreover, it is possible to think about an open innovation strategy, where communication between company and customers is more interactive. All these eventually, lead to an upgraded company with satisfied consumers, new opportunities and great returns. Gunday et al. (2011) confirmed this statement by stating that innovation strategy adoption leads to high company performance when it has been analyzed thoroughly and is aligned with corporate strategy. In this case, top management can set goals, priorities and plan the use and execution of new processes and technologies inside the company in an attempt to accomplish company's improvement and sustainability.

Innovation Strategy Structure

Innovation should follow the three basic strategic axes of the business applied in order to catch all the opportunities, understand the capabilities of the firm, identify the resources, make wise decisions avoiding uncertainty, measure the results, organize the

plan and produce valuable outcomes. These are “strategic position, strategic choices, and strategy action” (Birudavolu and Nag 2019).

Rudy (2004) described shortly that innovation strategy includes firstly the taxonomy of various innovative ideas occurred from brainstorming, then develops company’s vision and eventually, sets the available options so that management will be able to implement the innovative solution. Kadár and Vida (2007) mentioned that the “structure of model of innovation strategy” follows five steps. Firstly, it is the analysis over the external environment, then, over the internal, company’s strengths and weaknesses so that as a third step, many “competitive strategies” are starting being formed (others targeting on enhancing quality and others on profit, entering new niche markets or upgrading current position and growth). In the next step, managers identify the innovative activities that should be developed and implemented and finally, the innovation strategy structure includes the assessment of the innovation performance. (Lendel and Varmus 2011)

Innovation Strategy Necessity

It is of high significance that many innovation ventures fail due to lack of strategical plan. The outcome of failed practices showed the way to set specific goals, organize and communicate the values and norms of the business in all the involved parties and assist diversity between employees, so that the innovation process will be controlled and the result less uncertain. The need of a specific innovation strategy is also visible as while there are plenty of great practices to follow, there are not so many resources and capabilities for a company to apply them all. Therefore, it is crucial that there will be certain focus to the main concept that a company wishes to develop, inside the narrow terms that the strategical plan will provide. At this point, researcher also highlighted that each organization is unique, as well the way the innovation strategy will be developed on it. Therefore, imitation of another innovation plan of another company poses the risk of not being suitable and fail. (Pisano 2015)

Factors Affecting Innovation Strategy’s Success

Another issue arising around the innovation strategy concept is that of the implementation. In fact, as researchers have proved, the most difficult part is to execute the plan

that has been defined in the innovation strategy. Top management has to ensure the smooth development of the activities and cultivate as possible and in the level needed an agile corporate culture so that both the expected innovation performance and competitive advantage will be achieved. Organizational culture, according to scholars, would be more flexible to change and adapt only in the context of the agreement between the existed culture tolerance and the strategy's oriented rules and requirements that have been set, otherwise it will be just waste of time and estimated quality won't be achieved. Therefore, managers could contribute to the success of innovation strategy if they evaluate, manage and affect the organizational culture properly (Chen et al. 2018). Furthermore, Terziovski et al. (2010), having conducted a survey over 600 Australian SMEs, mentioned that both SMEs and large companies will thrive and achieve great results, if they understand that they should align innovation strategy with company's culture, as well sustain a certain structure when innovating.

Management is also a challenge on digital innovation strategy. This is why Nylén and Holmström (2015) created a framework with five main areas that should be measured separately in order to lead the renewal in a way that it will be preferable and profitable for the organization in which is applied. Specifically, the sections are "user experience" that refers to the value the provided goods have for customers, "value proposition" of the product, "digital evolution scanning" for opportunities, company's abilities and "improvisation" degree to flexibly utilize the digital advances and create something new.

In the work of Boer and During (2001) is mentioned that there are strategies that satisfy the overall innovation venture of a company. Such instances include the controlled effort to erase uncertainty by placing specific targets, setting of certain roles in order to limit complex activities and solve issues regarding work assignment, creating auxiliary working groups that communicate the needed information to people involved in certain activities. Other strategies that are suggested are the reduction of the bulk of data that is going to be processed so that there might be the chance to obtain knowledge only from a sample data, the use of insights that occur from learning process through "trial and error" practice, as well use of ICT to achieve innovation.

The innovation strategy that will be shaped at the end should articulate what kind of value it is providing to the interested stakeholders, using which combination of innova-

tion types to achieve it. In any case, managers should always bear in mind that innovation is a dynamic process therefore the formed strategy should be flexible to the changes that may occur both in the internal and external environment of the company (Pisano 2016).

In addition, building a clear innovation strategy should be in the same, responsible mode as developing any other strategy inside the organization. This means that top management should place vague goals, objectives and actions that will direct at creating certain value for customers and eliminate any kind of complexity and uncertainty inside the internal environment of the company. This value may be translated in development of a product with better performance from competitors' or it may be a solution that will save them money or will last longer. It is of high importance that when the strategy plan will be created and agreed on, all the up and down streams of the company, namely suppliers and customers, will adjust to it and develop competencies according the terms that have been established. Senior management's obligation is to elaborate on what value it attempts to create for both company and customers, explain how it intends to extract knowledge and all the necessary resources to bring the plan in the surface, then define the roles of its department inside the organization to accomplish innovation and finally, create different scenarios of action if the external environment changes. Attention should be given also in competition as if there isn't the case of patenting the innovative value provided to consumers, there is always the case of competitors imitating the solution and lead to reduction prices war. In order to sustain its position in the market, a company is suggested to constantly invest on renewal of its processes and products so that it will make it harder for competitors to reach it. Anyway, managers should always have in mind that innovation strategy should remain always competitive and continuously improving by accumulating knowledge, making tests and adjusting in any change (Pisano 2016).

Following on these views and in order to extract more knowledge, both sides of private and public sector innovation strategies are being examined in the next sections.

Innovation Strategy in Private Sector

As discussed, innovation strategy is a very significant concept in order to keep firms sustainable, agile, organize their capabilities and resources and make them overcome environmental challenges that may occur. Innovation in private sector can be expressed either as the introduction of a totally new or improved product, process, a marketing or an organizational change that will be enabled through a succession of technological, structural, cultural and promotional renewal. Each company may be benefited by examining and exploiting conducive circumstances to innovate as it can reinforce its position in its environment, develop its efficiency and performance. Managers in private firms have to set the basis, collect all the valuable knowledge that may create stimulus for new achievements, train the staff and create openness so that up and down-stream partners will have the opportunity to offer their knowledge and views and thus contribute in enhancement of innovation value. Dedicated leaders and their skilled subordinates in conjunction with the right sources lead to fast conquering new markets, productivity and financial growth. Thus, undoubtedly, competitive private organizations are them, which have strategically set innovation as a core long-term value and keep searching for opportunities to differentiate themselves, make new provisions or lower prices for customers. Whichever are the size, growth rate and results of the company it should always re-invest to bring more opportunities and innovations on the table (Canning and Edralin 2019; Cankar and Petkovšek 2013)

Mezher et al. (2006) from the experience with Lebanese industry, agreed that in the private sector the bet is to keep being competitive. This will be achieved not only by brainstorming great ideas, but most importantly managing them, while simultaneously forecasting future market trends. Obtaining a certain strategy is important in order to cope with all technological and social changes and demands for better quality or lower prices. Specifically, the writers suggest that businesses should aim on having professional managers in the critical positions and not to hire less skilled employees, as well to permit and accept both success and failure so that employees would feel comfortable. Moreover, motivate and reward them, set the necessary basis for educating and training them and upgrade the company's strategy so that it will support activities for new products and new markets also outside country borders to promote its exports and gain profit.

Additionally, it is proposed that firms focus on strategies that embed technology and the relevant advances as their core, as this is an important factor for profitability, study closely the innovative product's performance, either successful or not, adapt policies, methods and processes to be more agile and assist "bottom-up and sideways communications" inside the company. Of course, it is suggested not to underestimate competition and try not to copy its provisions, but create new products, original to company's values. Also, the innovation strategy should concentrate on examining the external and internal environment for existed technological equipment that may be needed in the future, find any obstacles or weaknesses that will avoid its adoption, compare it with competitors and eventually, decide which of the provided solutions are more beneficial to grab the opportunity, use them and develop innovation.

It is of high importance to be mentioned that whichever strategy a company decide to adopt, top managers should have in mind that environment changes, thus innovation strategy and direction may be significant to change (Hollenstein 2019). Phenomena, as that of "pro-innovation bias" from Rogers (1995) referenced in Walker (2006b) isn't accepted from the private sector community, as they aren't real. Specifically, it is mentioned that usually firms change their strategy in a small period, in approximately three years in order to sustain viable. An instance of changing strategy is if a new technology comes up, the company should grab this opportunity by changing its current strategy so that from the exploitation of the new technology, it could gain competitive advantage. Therefore, a firm should always adapt its internal strategy according the demands of the external environment and always keeping a balance between them. Certainly, a change in the innovation strategy isn't a simple decision to be made. Managers have to identify if the current strategy is less-beneficial and if the switching costs are worth to be made (Hollenstein 2019). In any case, as general performance of the organization improves when innovation occurs, the directors have to identify openings ("the performance gap") that may keep the company behind its competition, as well they should dare to be the first to take business activities a step forward, before competitors do it, invest and apply the necessary type of innovation needed to each case (Walker 2006b). Rahman et al. (2015) in their research added also that environment would be always complicated,

thus managers have to always look for strategic solutions, while supervising and organizing all relationships and operations.

Interestingly, Spithoven et al. (2013) mentioned “open innovation” as a strategy worth adopting in SMEs. In this work, the writers refer to Gassmann et al. (2010) mentioning that there are three parts to achieve open innovation. The “inbound open innovation strategy” is about collecting necessary information and stimulus from the external environment so that it will combine them with the existed internal technology and experience. In “outbound strategy”, this has to do with the mode the innovative outcomes (products, services or else) will be delivered or positioned or commercialized in the market. In the “coupled” case the strategic part is to network both previous strategy parts effectively.

Except for “open innovation”, Jin et al. (2010) in their research for Chinese private companies referred also to “disruptive innovation” as innovation strategies to excel a company. The main element in the first proposed strategy is that each firm, by adopting it, may gain knowledge that would contribute to obtain competitive advantage, new capabilities, great innovation and business performance and thus build a new corporate model and open new markets to satisfy. In the second strategy, the innovation comes up all of a sudden, causing damage in competitors, either because the innovative product is cheaper, thus affecting existed market or concerns a different customer segment and opens a new market. The research also ends up by stating that these two strategies seems to be used simultaneously in Chinese companies and in developing countries in general, as from the one side they decline innovation cost and gain knowledge on how to manage the gathered information and from the other side, they are forced to re-transform their operations and market focus.

Furthermore, Xu et al. (2003) that were occupied with TIM (total innovation management), mentioned that according to Zhejiang University Research Center for innovation and Development (RCID) (2002) in order to ensure that innovation will be successful there are some prerequisites that should be satisfied. Specifically, strategy existence is crucial in order to guide and align all the departments of a company from technology developers to management to a certain path, cultivate collaboration between them and achieve raising innovation creativity by each individual in an agile manner concerning

the time and the innovation concept. The innovation strategy should always take into consideration also non-technological factors that affect the result, such as culture that is a determinant to TIM to upgrade technology management in a company, achieve competitive advantage and great company's performance. Using an example of a private company, Xu et al. (2003) indicated that top-managers should be open to innovative ideas, deal with every employee as an "innovator", encourage and provide them the necessary directions so that they make the ideas a reality.

Undeniably, as technology is a dominant factor in innovation generating in private companies, it is of great concern that firms, as a core element of their strategy, will first care about applying technology innovation inside the corporation properly and after that direct their focus on developing the general innovation. As the previous scholars mentioned, Zheng et al. (2010) stated also in their work that each person in a company may be an innovator, therefore it is essential that there should be hired qualified employees that would contribute in finding opportunities and spreading technology innovation in company's internal environment. The "tech innovation strategy" includes also the management of technological equipment, R&D and general such resources. Moreover, in the general innovation strategy Zheng et al. (2010) included of course, "marketing innovation", which brings light into the mode of competition's activities, market trends and general opportunities or threats, "organization innovation" that refers to company's structure and roles and that it should be agile to bring efficiency and lessen the time to produce the total innovation, "culture innovation" to incentivize all employees to come up with innovative solutions and "institution innovation", which support the innovativeness in every level and reward it. All the above are part of the TIM and are necessary to be in line with the tech innovation and of course with the general innovation and corporate strategy in order to excel the existing capabilities of the company and performance. According to writers, this handling is appropriate both for SMEs and larger corporations. Hu (2011) referred to "technology innovation strategy", too and stated that each firm has to opt the kind of such strategy that fits to its own current business strategy, the industry that it belongs to, the level of competition, the competences and objectives it has.

Xie and Liang (2013) studied the cases of big enterprises (Samsung, Apple, Xiaomi, Nokia) in order to provide an “innovation strategy index” for private companies. From this research occurs that the innovation strategy of each company should be vague and proper according to the feedback of consumers, its competences and weaknesses against competitors so that it will direct to differentiate and generate innovative solutions.

Examining the reference of Liu (2009), it has been confirmed once again that innovation strategy is vital for companies (in that case global ones) and the writer categorized them to three types “rule makers, rule followers, and rule breakers”. The last case is the one which may achieve the competitive advantage and leadership among competitors. Companies are suggested to make their effort by innovating in strategy, changing their business models, “play the game” differently according to Charitou and Markides (2003) or altering the structure of organization as Verweire and Van den Berghe (2008) suggested. Furthermore, Rajagopalan and Spreitzer (1996) proposed that changing the nature of company will bring the strategy innovation. Further to the afore-mentioned, it is indicated that companies could ally with competitors to achieve positive outcomes for both sides, examine and transform their strategy, their complex structure and mixed culture according to environmental changes taking always into consideration the existing resources and how they will be distributed. As strategy innovations in global organizations may be considered the transformation of business objectives, model or partners, integrating old with new processes, buying other firms to obtain important capabilities or adapting their provided goods according to market needs and trends. (Liu 2009)

The procedure of strategy innovations is described in four stages. First, “formation stage” is about examining both internal and external environment, resources, performance of each department inside the firm and methods to accomplish operations, as well relationships with third parties (government, suppliers, customers). Moreover, it has to do with scrutinizing competitors’ performance to discover forthcoming opportunities and threats and make crucial decisions to better manage skills and resources. “Performance stage” is about creating an entity which will be responsible for bringing successfully new policies, incentives for staff, delimiting the budget for resources and activities and sustaining a culture to assist innovative strategies to flourish. “Controlling

stage” includes the surveillance and monitoring of achievement of innovation objectives. Finally, “evaluation” is a stage that takes part all over the duration of strategy innovation procedure and before and after each of the previous stages to identify if the goals are being achieved. In general, it comes up that in terms of strategy innovation, especially global companies are obliged to change their strict structures or create virtual ones with the assistance of ICT to spread the necessary resources wherever there is the need, form the working teams and hire managers that have the crucial skills according to the new strategy plan (Liu 2009).

Furthermore, Liu (2009) mentioned “thinking innovation” as the primary step before the development of strategy innovation. It is important to cite that in global companies the very first step in order to bring novel ideas that keep them sustainable is to extract information from every aspect, internal or external, judge them creatively and open its communication channels in a way to cooperate with other parties, outside company. Besides, global firms on the contrary to SMEs or large companies are not afraid of competition, rather it’s better to open up and cooperate with it to achieve the expected results.

Wang (2009) identified some difficulties of creating innovative products, when examining SMEs, and proposed that it would be more efficient if companies were adopting a more agile innovation strategy that will be based on tight confidential cooperation with external partners and will provide technological services most. In general, through the research occurs that SMEs are great innovators that invest a lot on R&D. Anyway, there is always the case of developing a new product or service in SMEs that is why David (2003) in Wang (2009) explained that in such firms, on the contrary to larger ones, where there is less bureaucracy, innovation is thriving.

It is a fact that managers would have to choose among different innovation strategies, some of which will decrease costs or provide visible positive results in productivity and others such as promoting a new good in the market that will have incremental outcomes in relevance with the previous mentioned practices. In the last case, time and investments are demanded in order to support potential problems or delays that may occur. Usually, as mentioned in the research, “product and process innovations” cause big changes, with the latter to provide more productive outcomes from the first one.

The bigger the changes, the more resources they may need till their fulfillment. However, it has been proven that when they reach the last point of innovation completion, they may have better results, than the innovations that happen gradually and refer only to the upgrade of a certain characteristic of a product (Lee and Sang-Mok 2007).

Sinan Tumer (2010) that gained experience with the research conducted on service industry that included both private and public organizations, stated that specifically service sector is growing more and more and is being extended out of the borders of the company's geographical base, as well forced to provide continually upgraded services to users. In this case, the strategy that should be obtained from a company should be according to global policies, maybe outsource partially some of its systems and exploit Internet of Services and Internet of Things to access new markets and develop more flexible services. The writer also introduced the "Service Delivery Framework" that according to him is a mode of better and global service delivery that allow finding, optimizing and managing it or share it through third parties or cloud hosts, while also providing the relevant support service.

Adner (2006) through his work over innovation strategy, advised that it is very important to identify all the risks that exist in the ecosystem that the innovation will be developed so that the company will be aware of and opt how to overcome them. Risks may be delays on receiving essential supplies or resources from partners in the innovation ecosystem, or failure to manage technical issues or accomplish coordination between partners. Every firm have to recognize these issues and try to mitigate them with certain plans and mutual agreements in order to achieve a successful innovation. In the case that innovation strategy does not include the ways to decline or erase such risks, then it is better to miss the chance of developing the novel venture.

In the next section, the innovation strategy from public sector's side is also being examined.

Innovation Strategy in Public Sector

In the private sector the reasons to develop innovation are more than obvious. Competition and survival essentially force firms that have no other choice than to innovate and differentiate from the others. From the other side, public sector hadn't exposed the ne-

cessity of innovation neither in the same extent, nor for the totally same reasons as private. Usually, changes in the technological background, customers' preferences, organizational and political structure or "purposes of institutional legitimacy" may lead the public initiative to innovation that may be services' and / or processes' improvement. To our knowledge, "New Public Management", as well "Reinventing Government movements" have also set the basis so that innovation would start changing the current public sector (Walker 2006b).

The generation of an innovative activity and need for building such a strategy according to Walker (2006a) may occur in the terms of communication between central and local public authorities, too. These entities motivate one another to upgrade, improve its provisions to citizens, gain new knowledge and compete. Of course, the different structures, external political factors, either local councils, elected authorities or else, and people that constitute the public organizations, as well the dissimilar culture affect the adoption or not of an innovation and demand different way of implementing the relevant strategy in each case (Walker 2006a). Also, the financial performance, as well the relevant policies of each public entity are determinants of the kind of strategy that would be followed in order to enhance its support to social problems, as well delivery and quality of provided services to citizens and users (Arundel et al. 2019).

Most of innovation strategies in public sector are about improving established services by implementing new or slightly changed procedures using tools, such as e-government, over existing matters, processes and resources. The flexibility from public policies in such issues and "changes in ministerial priorities" benefits both citizens and government itself with the added-value and opportunities that are being created. It is visible that as in private sector, the process for developing an innovation in public is essentially a decision that is being taken from the public management and ends up to the citizens, as the general public structure is hierarchical, top-down (Dunleavy et al. 2006).

Furthermore, public organizations stated that obtaining financial resources, expanding innovative activities in horizontal public entities, brainstorming, seeking for opportunities to develop alternatively public services and making experiments to see what works may be significant success factors for innovation development and part of the relevant strategy. There are also external factors affecting success of such renewal. Cooperation

with third parties (“interagency, executive agency, non-departmental cooperation”) assists in enriching knowledge and support that may be used in building innovation plan (Dunleavy et al. 2006).

In the research of Bartlett and Dibben (2002) it became evident that environmental or financial forces may be significant factors that urge government entities to innovate. In recent years, after 1980s, fundamental changes happened in the mode bureaucracy was organized, in the hierarchy models and public sector started being incorporated into a different era, where it should align its provision with the market demands (“market-oriented corporate governance or managerialist model”). Citizens-customers’ voice begun being crucial and development and productivity started incrementally being very important factors for involved stakeholders that watch the general performance and develop strategic projects. The writers also added the concept of “community strategy”, where local public entities are supported to create new procedures so that community would have the ability to discuss their needs and local management should try to meet them. Therefore, participation or citizen involvement becomes an innovation driver that can improve the provided services to the audience.

The results that are usually expected from innovation adoption in public sector are boosting service delivery, building new sources that will be used to improve the provided services, enhancing quick reaction in citizens’ requests, creating new services, bettering mode of internal assessment, lowering existing costs and facilitating employees’ working routine (Dunleavy et al. 2006).

As managers do in the private sector, central administrative authorities in public have to provide the directions so that innovation strategy will be efficient and incorporated in the existing strategic plan. Therefore, support and emphasis should be given in using innovative processes to enhance both productivity and effectiveness from the core till the small separated public entities. The coordinated effort for innovation building should focus on identifying the existing capabilities of the different public organizations, integrating on the existed evaluation systems for their innovation performance, enriching solutions that have to do with supplies (“procurement solutions”) to improve efficiency in this part and developing educating sessions for employees over innovation. Also, to identify cost resources and make targeted and prosperous innovative moves

central government should gather all the necessary information on where the expenses are coming from. Usually, private companies have a clearer view in this case (Dunleavy et al. 2006).

In the development of innovation in public sector, the first role, before the one of management is this of political management. Therefore, a great part that affects it, is that of political interests. As mentioned in the work of Bartlett and Dibben (2002), sometimes it may be convenient for local government when complexity and uncertainty rules so that it will create obstacles for the opponent political party to set balances and innovate, despite the fact that public management may force to fix the whole situation. According to Morris and Jones (1999) in Bartlett and Dibben (2002), the public managers may be also them who wish to find solutions that will facilitate citizens' lives, the ones who partially make an effort to transmit the basic rules of public services strategy and them who believe in innovative solutions as a way to resolve citizens' difficulties and satisfy their needs.

Walker (2006a) contributed also to the above-mentioned, by stating that for public organizations, politicians are them who are regarded as the people who affect the evolution and progress in open innovation and in the development of provided services to audience, therefore they also affect the innovation strategy according to which the balances and values will change accordingly. Essentially, as they are elected from people, Walker (2006a) indicated that they should make an effort to sustain a certain policy for which have been elected, distribute roles and be creative to the extent of their role.

Additionally, Bartlett and Dibben (2002) set two types of innovative entities in the public sectors, the "sponsors" and "champions", who are either "senior managers" or "leading politicians". Essentially, the "champions" are the ones who lead and distribute innovation inside an organization. Their strategy is concentrated in extracting and utilizing people' cultures, views, knowledge and anticipations in order to develop innovation inside the organization. Further to this knowledge, the writers noted that there are two types of cultures inside a government entity, "public" and "empowered". Shortly, the "public champion" activates more to bring innovation that will assist public needs, while "empowered champion" makes efforts to bring changes for his own interests. In any case, "champions" and "sponsors" (who have a complementary role) are both essential

players in boosting innovation, taking of course always into consideration the policies of organization and expectations of citizens. After all, the writers ended up to the conclusion that innovation strategy development in public sector needs the management of an “entrepreneurial spirit” that will combine both the knowledge of public policies together with the international trends and competitive environment.

Following, Albury (2005) mentioned that even if it is assumed that innovation in public sector is in a lower level and behind that in private, in fact, the first samples of this concept are shown even from 60s in Open University, where the existed process of service delivery changed with a more innovative way. The scholar stated that innovation is a significant issue for public sector as it facilitates essentially public servants’ working routine by developing more efficient “disruptive” or “incremental” ways to make the work done and does not perpetuate the same bureaucratic procedures. As mentioned, development of innovation capabilities and adoption of such a strategy inside public agencies have great significance, as the need for services to become more personalized providing ubiquity and participation to the users are vital in the current and forthcoming years. To build the terms for a successful innovation strategy, public service professionals must set certain goals and be in line with all the stakeholders, such as citizens. In certain positions there should be placed senior leaders of the renewal that will coordinate, make trials of small parts of the innovation, provide tools, methods and motives to subordinates and support the decisions of the director of the department. Additionally, in order for the innovation strategy to thrive, there should be given the space for ideas expression both to end-users, as well to lower staff and to new recruits, as their newness may be proved useful to identify oddnesses, flaws, problematic areas and services. It is significant also that each public entity would consist of people with different background, as well all involved civil servants should have the ability to use external knowledge sources, so both this variety and extra knowledge would boost creativity and thus create differentiation and bring new skills and qualities. The efficiency of all departments in generating ideas should be compared and measured against some standards as this is an additional incentive to promote innovation. Also, senior supervisors should opt the most valuable ideas according to certain “criteria” so that they would avoid any non-productive choices and consume only the necessary qualities and resources for develop-

ing the important ideas. Supplementarily, managers may have the ability to adopt a lessons' learned innovation having the experience from another service that was successful, but should always have in mind that neither the services have always the same response, nor the audience, nor employees can adopt them as efficient as they may imagine. Therefore, by analyzing the activities each time, they may realize if it will be effective and cost-efficient. The innovation strategy should also take into account the heavy pressure, strict public policies that may cause difficulties in innovation development or stop creativity and make an effort to decline them.

According to OECD (2017) and the insights from Observatory for Public Sector Innovation (OPSI) that is "a global forum for public sector innovation", public sector has to go far from just being innovative. It has to build more flexible systems, structures, procedures so that problems may be revealed, many novel solutions may occur, exploitation of these ideas may be facilitated more and eventually an innovative proposal may occur that with the previous installations may be implemented with the best possible way. Essentially, and as proven also from the literature and researches, there are certain variables that affect innovation, such as the governmental policies, the people working in public sector, the availability of financial resources, the existence of strategy to overcome obstacles and a support system for all public entities, as well a structure for knowledge management. All these variables have to be positively formed so that innovations that may come up, may be implemented effectively, servicing and contributing to the public good. The researchers clarifying that most of the times there are not just the legislations that may hinder innovation, it may also be the level of understanding from the public servants. Also, as far as people are concerned it is imperative that the whole government culture should be directed in innovation cultivation and that any obstacles to it should be deleted. All entities should embrace diversity, personal values, promote the participation and make civil servants feel like a strong community. As for financial narrowness, it is suggested that public agencies should stop being sole entities, but be flexible to "borrow" resources to other entities or activities, when there is need for improvement. Moreover, there is always the need of entities that gather knowledge, so that they can bring light to about previous successful or not innovative practices and support any new innovative venture. The obstacle in this case are some entities that

have remained stuck to inflexible, bureaucratic practices and the bad competitive culture inside public agencies. In general, it is mentioned that in order to cultivate the necessary basis for innovation, it should be examined the ability of a public entity to innovate, if there are enough incentives for people joining the entity so that they will want to take part in innovation development and implementation and if there is the “opportunity”, namely if the entity can join a cooperation with other entities, if it is creative and independent from others (OECD 2017).

In the work of Crosby et al. (2017) is recognized that governmental authorities need assistance from external parties in order to build a successful innovation strategy and overcome challenges that occur (“climate change, refugee flows, food insecurity etc.”). It is also mentioned that despite the fact that public sector has funded several of great innovations, such as “public health care, drones, solar cells, and the Internet”, according to Mazzucato (2013) in Crosby et al. (2017), it deals with difficulties when trying to build its own local, national or international innovation strategy. They suggest that public professionals should use the knowledge from internal sources, share it properly, set incentives, change strict rules that hamper innovation and make strategic moves to engage both external parties, such as “sponsors”, who may be “mayors, legislators, or agency heads” and who are mainly supportive individuals that promote the collaboration, find the funding and connect different public or political agencies, “champions” who are them who organize, urge and persuade the interested partners to take part in the innovation development by providing resources, qualities, skills, brainstorm and training, “catalysts” who are people that are either public officials or just interested parties that focus their strength on creating openness in thoughts of participants and mood for experimentation in innovation and “implementers” that could combine, lead and apply properly the ideas of the previous entities to fit in existing policies and public operations so that the innovation may be born and work in a collaborative manner and take part in improving the mutual interest. Hence, they identify that bureaucracy and intense political intervention are barriers and they introduce the role of “integrative leadership” and concepts of “co-production” and “co-creation” with users (both companies and individuals) as ways to develop innovation strategy in public sector.

Smith and Starkey (2010) studied the private sector and selected some beneficial aspects and factors that may be used to the development and application of innovation strategy in public sector. Specifically, “overt and covert innovation, primary and secondary innovation and organisational equilibrium”. “Overt innovation” is about innovative solutions that came up through research in the interesting object, whereas “covert innovation” occurs by chance, through investigation for other solutions. “Primary and secondary innovation” concerns the creation of a product or service that disrupts the current situation in the sector and that it needs new procedures to be settled and commercialized in the market. “Organisational equilibrium” refers to the activities that should take place in order to replace somehow the imbalance that innovation development caused to the public entity. Further to the above-mentioned, scholars suggested also that in case that public sector understand its weaknesses and pins its hopes on private sector, then there are three solutions or strategies that could be implemented. Public sector could purchase and utilize only some part of methods or resources or services from private that lacks, or set private sector as responsible to deliver the good that public sector couldn't or totally erase a public activity and let it to private sector to develop it. All these could be achieved with the necessary contracts, policies, agreements, loans and many more ways.

Additionally, it is crucial to mention that when innovation strategy concerns public sector then this activity influences the current governance, thus it should comply both with the management of the public entity, as well satisfy its risk tolerance in developing such innovative activity (Smith and Starkey 2010).

Cankar and Petkovšek (2013) in their work suggests the synergistic activity between public and private sector so that innovative solutions will come up that otherwise was difficult to be developed. This network facilitates the movement of knowledge, skills and competences, promotes “innovative thinking” and both sectors may innovate in a more convenient manner, while in public sector costs are being declined and services delivery is getting better.

Following on, Dodgson et al. (2015) discussed also the innovation strategy from the scope of collaboration between public and private sector and added that it is a crucial guidance statement, which provides the directions to decide, plan or prioritize the activ-

ities that should be done according to the existed resources and goals of the organization, while protecting it from unnecessary risks or threats. The scholars bring to the table also the discussion about open innovation strategy, stating that collaboration of internal skilled and experienced staff with external contributions from users and suppliers may assist the organization to adapt in the environmental changes and demands. From their occupation with Crossrail in London, they transmit also that innovation strategy defines the individual innovations that are going to be developed, as well the team that will undertake them. Of course, during the progress, managers of all level together with employees have to watch the changes and trends and transform strategy elements accordingly. In innovation strategy are included all the information regarding why an innovation or a process is being opted, how, namely with which tools and under which circumstances, as well when it will be implemented.

Innovation may occur also from citizens' forces for greater transparency, responsibility or participation capability. Therefore, there is the need of a strategy that will focus on these areas, promote collaboration and communication (online and offline) between government, citizens and private companies, use and test the fit of the latter's ideas into public sector. Such strategies may be "creativity networks, crowdsourcing or user-driven innovation", which are essentially regarded to belong in open innovation. By adopting such open innovation strategies public organizations may receive greater value than before, as more stakeholders (from citizens till politicians) could support and upgrade with their contribution, knowledge and creative ideas the general public system. Of course, well noted from the writers, all these strategies need resources, ICT investment and infrastructures to flourish. "Crowdsourcing" needs group of plenty of citizens that will gathered to provide specific solutions to certain issues. "Co-production" needs the collaboration of both public and private sector in organizing of "innovation competitions such as hackathons, cooperathons or startup weekends". Other innovations that require ICT infrastructures are "community portals" or "open innovation platforms", which may include even social media presence of the public entity and assist in active participation of everyone with "hackathons, rallies, cooperathons, or workshops". To this end, the challenges would be partially overcome with the assistance of the same the citizens and private setor with the knowledge they could contribute. But as Teece (2007) referred in

Coulon et al. (2020) the organization is obligated to develop also internal “dynamic capabilities” that will assist it and make it experienced enough in identifying opportunities and threats, forming and implementing its innovation strategy by arranging appropriately its resources and structures so that at the end will deliver valuable innovative solutions according to time and budget limitations to its audience. (Coulon et al. 2020)

In the same context, de Oliveira and dos Santos Junior (2018) indicated that the dynamic capabilities, “sensing”, which includes gathering data of the environment (policies, regulations, needs) and creating opportunities, “seizing” that refers to the novel goods or procedures that would be created from the opportunity and “transforming” that includes the mode of organization assets’ readjusting, are them, which by receiving the necessary inputs, eventually assist government entities to provide the public value as expected from all stakeholders (“providers” politicians, public agencies, “users or transparency advocates, civic technology community and beneficiaries or consumers of open data goods” (Dawes et al. 2016)). Therefore, these capabilities are essential part of the open innovation strategy in public sector.

According to United Nations Economic Commission for Europe (2017) innovation strategy in public sector has potentials to thrive. This evolution requires the existence of a more socially open environment, where competition and other external forces are pressuring the organization to innovate. In particular, public sector should develop an open network, where stakeholders may contribute by brainstorming and assist in implementation of innovative activities, as well expand the incentives for innovation in public servants and managers by adding to the simple self-satisfaction the formal recognition, potential position advancement or even re-election when it has to do with politicians. To imitate a real competitive environment, changes have to occur in existing regulations, processes and provided public goods. But due to the fact that public sector is characterized for its conservatism, according to Sahni et al. (2013), it will be better to first test if developed innovation is operative and then release it, so that no complexity will occur for both citizens and public servants. Also, it is significant for innovation strategy to obtain feedback from this experimentation, as will happen in the private sector in order to understand the success level. Writers suggest that “appropriately designed experiments, prototypes, pilot programmes” or “surveys, focus groups, public meetings”

or even e-government may assist in this case. As in the free market, in public sector innovation strategy should take into consideration that citizens should have the choice to opt which product is more suitable to their needs. In this case, the risk of delivering a deficient service won't be likely, as well citizens' preferences would be clear. Thus, Sahni et al. (2013) proposed that citizens should be given both the original and innovative service to choose among them and produce relevant feedback. Moreover, Aulet et al. (2010) supported that innovation strategy in public sector should promote the tolerance that exists in large private corporations, where employees may propose innovative solutions and managers after examining them may opt the best ones to be implemented. Therefore, public servants should be motivated to bring such cases and be rewarded accordingly with a "career advancement" or recognition of the good work and let them lead the innovation process. This case, in order to be feasible in public sector, there should exist the necessary human and financial resources, as well tolerance in possible failures. Of course, the existence of internal "innovation labs" is a very crucial element that could promote the creation of successful innovations, as well the cooperation with external small private companies to satisfy a certain need or get a resource missing in order to complete innovation development. (United Nations Economic Commission for Europe 2017)

Fatur and Likar (2009) in Cankar and Petkovšek (2013) mentioned that globalization influences not only private, but also public sector, as the first one bring changes internationally according to financial and political interests that is a significant reason that public sector should innovate to be forwarded in case of crisis or else. Also, as it is natural, bureaucracy doesn't facilitate citizens' lives and public sector that is such a big services provider have to improve it by creating new regulations concerning labour market, health and other fields. As suggested before, innovation strategy development in public sector may include also the assistance of politicians, who may invite people to bring novel ideas from public sector improvement, or other public managers could also contribute in this activity, as well citizens with their participation in public forums that discuss about reforms.

Despite the fact that innovation in public sector seems more scarce and rigid than that in the private sector, Bloch and Bugge (2013) stressed that public entities are them

which started radical innovations, such as building of the Internet and currently, have the responsibility to try harder and innovate more so that both financial challenges and societal issues will be mitigated. When building innovation context, there are certain axes that should be considered. These are “the nature” of the same civil agencies, the framework, policies and regulations that strictly define the mode that the public organization will work, as well the internal and external connections of the public entity. Furthermore, the innovation strategy has to include also the relationships of public sector with private one, with citizens, with all levels in the civil hierarchy that are either in different geographical areas or not or in the same subject domain.

Concluding, it could be mentioned that innovation strategy in public sector differentiates from that in the private. The environment around public sector is less competitive than in private, as the audience remain almost always stable, consuming services from a specific public entity, as well the former does not target profit, but on raising social values. Therefore, the strategy that will be followed in each case has to do with the basic objectives and demands of the sector (Mulgan and Albury 2003).

To deep further in the innovation concept, in the next chapter, an extensive analysis over innovation types takes place that as mentioned, should be predefined and adopted appropriately in order to assist innovation strategy to thrive.

Innovation Types

Researchers occupied with innovation concept understood the significance to define types for each case of renewal depending also from the sector it is being applied. Indicatively, below are presented some general innovation types from the existing literature.

Innovation is being categorized depending on its features that may be “values of disruption, risk, adaptability, actual operation, observability, complexity, and uncertainty” according to Adams (2003) or in the words of Rowley et al. (2011) may be the extent of transformation it makes to the business field. Jacob et al. (2003) mentioned also “Innovation as object, Innovation as activity, and technological innovation by technological area” as attributes to classify innovation types. Moreover, Schumpeter (1934) proposed “marketing, process, product, and organizational” as appropriate categorization for innovation, whereas Sundbo and Gallouj (1998) suggested that the most appropriate types for service sector are the “process and product innovation” and they assorted product innovation in

subcategories: “Radical innovation, Improvement innovation, Incremental innovation, and Ad hoc innovation”. Rowley et al. (2011) in their research brought up an innovation model, which indicated that “process innovations were further classified into business systems, management, organizational, people, organizational structure, administrative, production, and technical”. In the same model, it were identified the “position innovations” that were divided into “commercial marketing and business systems”. Also, another innovation types that came up from the same work are “product innovations”, which categorized to “product, hybrid, service, and technical”. The writers also discussed that evidently, the innovation types are related with one another. (Ubaid et al. 2019)

Furthermore, Abdel-Razek and Alsanad (2013) proposed the two-dimensional innovations, which consists of two different innovation types that occur from combinations of the previous Francis and Bessant (2005) 4P’s model. Francis and Bessant (2005) categorized innovation as “product, process, position and paradigm”. Later, the same researchers, Abdel-Razek and Alsanad (2013) suggested the 10P’s model which consists of “four of one-dimensional innovation types, and six of two-dimensional innovations” which are all combinations of 4P’s model. (Ubaid et al. 2019)

In any case, the current research focuses in identifying certain types that are used specifically in private and in public sector. For this reason, in the next chapters an analysis would take place for each case.

Innovation Types in Public Sector

Walker (2006b) identified three innovation types that can be applied in public sector. First, “service” which refers on the development of novel services that will be used to cover the needs of existing or new users, then “process”, which is about improvements in existing public services and “administrative”, which has to do with public structures overhaul and includes new ways to incentivize public servants, change existing processes and make them more efficient.

In another work of Walker (2006a) a distinct approach is being suggested. The innovation types in this case are “product, process and ancillary”. Product innovation is about a totally new object or service or improved ones using upgraded materials or service delivered with a more productive way. Specifically, for public sector, three subcategories of product innovation have been identified in relevance with the interaction with citi-

zens. These are “total innovation” that is about new provisions to new type of users, “expansory innovation” that has to do with an existed public agency’s provision that is promoted to a new team of users or citizens and “evolutionary innovation” is about a new provision to current users. Process innovation is the introduction of a new production procedure that provokes changes in the current management mode, hierarchies, policy and interaction in the internal and external environment of the organization. There are two subcategories of this type, “technological innovation”, where the innovation occurs when new technological opportunities come up either in hardware or in software and “organizational innovation” that appertains to new administration activities, new strategy or new hierarchy. The third type, ancillary innovation is about generating innovative activities or services that act supplementary to the two aforementioned types of innovation and is taking insights and ideas from the external environment either this is new users or other public entities and combine them with the internal organizational part. Therefore, this type of innovation essentially promotes the cooperation of different partners to achieve new things.

Cankar and Petkovšek (2013) in their research explained that innovation is a concept that includes development of new solutions, new products or services, improvements of procedures, changes in organizational manners of action, as well in the communication modes and channels with citizens. In this context, they identified four innovation types in public sector. “Product innovation” in public sector refers to the creation of a totally new or an obviously improved product or service from the existing ones. To elaborate more, this may include advancements or changes in the service’s or product’s elements and in the mode users’ access or interact with it. Another innovation type is the “process innovation”. This case refers to radical or partial changes in the methods for the production or delivery of the public goods or services. In particular, the use of innovative equipment, software, expertise or supportive activities to bring a more efficient product or service to users is considered a process innovation. “Organizational innovation” is about applying a new mode of arranging or monitoring the work that is distinct from the previous one. The writers also presented “communication innovation” as a crucial innovation type. This refers to change of the way that services or products or even the same the public organization were being communicated till that moment to

the users and promote them differently. Also, in this case are included innovative modes that may be used in order to affect and handle the behavior of users.

With a different view, Medik and Stettina (2014) introduced a distinct type of innovation in public sector, which essentially refers to the internal part of the organization. Specifically, they mentioned the “workplace innovation” bringing their experience with it from the Dutch public sector. According to the scholars, the efficiency of service delivery is related to the level of satisfaction of the employees. This is the reason why for this specific type of innovation the experience from the private sector in such issues is considerable. Pot, Dhondt and Oeij (2012) in Medik and Stettina (2014) defined “workplace innovation” as a significant organizational transformation that refers to the application of novel procedures all over the human resource management and working processes. Additionally, Robertson and Vink (2012) noted that such type of innovations is closely related to technological innovations and that together they may achieve better results for the organization. Jansen et al. (2009) added that this activity that will provide satisfaction to employees may bring greater productivity and profits, as well prestige and customers that will keep the organization viable. Having gathered significant knowledge regarding this field, Medik and Stettina (2014) proposed “New Ways of Working” (NWW) innovation concept that includes the flexibility and support in companies that are based on knowledge (“knowledge intensive organizations”) to work from distance (teleworking) or to convenient places and on the hours that employees are more effective in the terms of following predefined policies and responsibilities. NWW in public sector could work as efficient as in private sector taking into consideration that public servants could be creative, experienced, motivated and committed to achieve organization’s goals. The difference is that on public sector there are some forces that complicate procedures, such as politicians’ strength and imposition, the close examination from local and national authorities and the demands of citizens (Rainey, Backoff and Levine 1976). Also, Boyne (2002) added that the internal rigid culture in some cases, the strict hierarchical structure and bureaucracy are also significant factors in releasing this type of innovation. Therefore, while NWW can be used to upgrade the efficiency of existing human capital in conjunction with the new technologies and improve the organi-

zation performance, in case of public sector there are some difficulties that should be erased. (Medik and Stettina 2014)

Torfig (2019) dealt with “collaborative innovation” in public sector. This concept includes the idea that it isn’t the managers or politicians or sole motivated and supported employees that make the difference and assist innovation, but both individuals from public and private sector, even citizens, that wish to contribute for the public good and create value in a collaborative manner. As mentioned in the research, lack in resources, bureaucracy and rigid regulations in public sector do not assist the need of citizens for innovations. The solution Roberts (2000) in Torfig (2019) brought is that collaboration innovation can overcome the obstacles, support mutual endeavor, knowledge sharing and produce innovative outcomes. Furthermore, the writer is concerned also with the “competitive innovation” concept but ended up citing that fierce competition consumes significant resources than using them in technology innovation or other novel products or services creation. Therefore, confirms that the most suitable innovation type for public sector is collaborative, as the partners in this group may share knowledge, ideas, risk and resources and develop and apply with the most appropriate way the innovative solutions that will satisfy their common problem. Torfig (2019) added that the participants in such a collaborative activity may be “politicians, public managers and employees, experts and professional associations, private firms, civil society organizations, citizens and service users”. Also, Powell and Grodal (2004), as well Crosby and Bryson (2010) with their works indicated that “collaborative innovation strategy” may be pushed to exceed its positive results with two modes. Firstly, if it will be blended with competitive characteristics between the projects that are being developed among the same people or entities and secondly, if a hierarchical structure exists that could manage and organize the teams from different organizations. (Torfig 2019)

De Vries et al. (2016) gathered in their research the typology of public sector innovation from several scholars. Specifically, according to Walker (2014) “process innovation”, which refers on changing the procedures that may be both inside or outside the organization in a way that will be more efficient for users, is a type of public sector innovation. Meeus and Edquist (2006) mentioned “administrative process innovation”, which is about organizational changes and methods, such as the development of an “one-stop-

shop” where services will be gathered and organized so that users may consume them only from one place. Also, Edquist et. al. (2001) referred on “technological process innovation” that is about new technological additions on current services. “Product or service innovation”, suggested from Damanpour and Schneider (2009), as in the private sector refers to novel goods to the audience. Moore and Hartley (2008) stressed “governance innovation” that has to do with new policies and procedures to solve certain societal challenges and eventually, Bekkers et al. (2011) referred to “conceptual innovation” that is more drastical and has to do with changing “the nature of problems”. For example, a difficulty or working disability may be surpassed and the only thing evaluated may be what the subject can do.

In the next chapter are presented the innovation types that as described from the literature belong to the private sector.

Innovation Types in Private Sector

Gunday et al. (2011), in their paper, cited Schumpeter’s research (1934), who mentioned five types of corporate innovation. Specifically, the innovation when a new product is being created, then new processes that assist in creating a product, changing the way the procurement is done, innovation that occurs when taking advantage of new markets and innovation in business model.

Furthermore, they referred to OECD Oslo Manual (2005), which defines four specific innovation types. These are “product, process, marketing and organizational innovation”. Elaborating on each one, product innovation has to do with the exploitation of existed knowledge to improve or give birth of either a good or a service in terms of new technologies, operating systems, elements, uses, friendlier interface for users, combinations of them or other advances. Such an innovation transforms consumer needs, opens new markets, has a clear result on profit, income and employment growth and rises competition (Gunday et al. 2011; Cankar and Petkovšek 2013). This innovation can be implemented even in service companies, such as insurance firms, where the improvement of their “value proposition” is vitally important for their survival (Rajapathirana and Hui 2018).

As for process innovation, this is about the application of advanced equipment or tools, technologies and tactics using skilled personnel to improve the mode that generation or delivery of a product is being achieved. Moreover, this type includes novel modes to turn or promote a product or service into business. Cost reduction, quality enhancement and visibly value-added products or services creation and distribution are the expected results of this innovation type. The mutual characteristic of both product and process innovation is that they are essentially technology-driven (Gunday et al. 2011).

Following, marketing innovation refers to adoption of strategically changes in the four P's (product external appearance, price, promotion, and placement) (Kotler, 1991) in order to influence new and existing customers, penetrate new markets and create the conditions to bring positive innovative results and sales to a company (Gunday et al. 2011). In their research, Alsamydai, Alnawas and Yousif (2010) in Rajapathirana and Hui (2018), they refer to marketing innovation as a medium of private commercial banks in Jordan to achieve growth and significant sustainable advantage.

Organizational innovation facilitates the firm with the adoption of successful already implemented practices internally or creation of relationships with external parties that may benefit the whole organization. Again, this kind of innovation clearly declines managerial costs ("administrative and transaction costs"), upgrades employees satisfaction and productivity with training plans and by setting certain directions for data sharing, cultivating coordinated and team work ("encourage the team cohesiveness") and creates connections with external parties and thus, extracts knowledge (Gunday et al. 2011). As referred to work of Karlsson and Tavassoli (2016) usually when general structure and hierarchy is complex it is really difficult to adopt such an innovation. On the contrary, the biggest the size of a company the most possible to develop this approach of innovation.

Having conducted a research in Korean manufacturing sector, Lee and Sang-Mok (2007) also refer to "product and process innovation", as well in "product improvement" as types of innovation. Product innovation is the creation of a totally new product to enter new markets and approach new customers, process innovation the transformation of a production procedure that improve either the financial performance of the company or

makes the procedure more efficient and product improvement refers to the incremental innovation of a certain product. It's not such fundamental as the product innovation.

Generally mentioning that the majority of firms consider product and process innovation as most crucial to obtain competitive advantage, based always in the new technologies. Rajapathirana and Hui (2018) stated that these innovation approaches assist firms to be adaptable operationally and respond immediately to potential requests for new products, improve quality, enrich knowledge and continuously develop their technological skills and applications. Only few scholars believe that both organizational and marketing innovations have an equal effect on a firm's performance (Gunday et al. 2011). Specifically, Mohamad et al. (2015) believe that productivity may be boosted and administrative costs may be reduced, when organizational innovation is present. Also, through their research it is confirmed that the latter type is a significant actor especially when it is associated with all the other three suggested from OECD. Gunday et al. (2011) found through their research that organizational or administrative renewal assisted both pharmaceutical industry by developing technological breakthroughs and logistics field by setting the basis for process innovations, as well helped other organizations to deal with changes in their external environment.

Moreover, in reference of Boer and During (2001) the researchers stated a typology according to how fresh is the innovation that comes to a company. Therefore, they mentioned "incremental, small step innovation and through synthetic innovation". Also, they mentioned that innovation may be characterized in relation to for whom this activity is novel, namely "new to the world, a country/society or an industry, a company or an individual."

In the paper of Olsson and Bosch (2016), these researchers are referred to their observations about innovation in software companies, and they categorize it in twelve types in contrast with the traditional view that they refer at the beginning of their work, according to which there are three innovation strategies. Specifically, first, "internal innovation", that is innovation driven from technological advances and suggestions from the inner part of a company, second "collaborative innovation", where co-creation is the key for achieving it and third "external innovation", where other involved partners outside the company drive the innovation concept. The authors claimed that in most

cases these strategies may be used together to produce the demanded outcome. Their proposal comes up as a need to bring more clear innovation strategies for the interested stakeholders that will assist them exploit and gain the value they were expecting. The innovation types that occurred from their research are essentially combinations of the first three traditional types, namely “internal, collaborative and external innovations”.

Shortly, the suggested innovation strategies types are “Me-Myself-I”, which is considered an internal way of creating and distributing innovation, “Be-My-Friend”, that exploits the relationships with third parties to deliver the innovative idea created into the company, “Customer co-creation”, which includes the assistance of customers to achieve innovation and “Supplier co-creation” that is the opposite. Furthermore, “Peer co-creation” is about generating innovation that occurs from the cooperation of different departments inside a firm and “Expert co-creation” focuses on innovation based on science and skilled people. “Copy-cat”, “Cherry-pick”, “Orchestration”, “Supplier”, “Preferred partner” and “Acquisition” are considered all innovation types that are externally based in order to be developed. The first is about imitating others innovation strategy. The second is almost the same, but focuses on innovation that is going to happen on a certain product, then, “Orchestration” has to do with external relationships that provide added-value that a firm may partially exploit and “Supplier” includes innovation generated from the external networks-suppliers that a company can exploit. Last but not least, “Preferred partner” is about collaborating with parties with which a firm may have common interest and achieve innovation together and “Acquisition” is about obtaining or buying other firms that develop innovations suitable to the current business activities in order to enrich company’s portfolio and creativity (Olsson and Bosch 2016).

It is of high interest that these researchers also proposed that firms with strong position and knowledge portfolio that belong in a mature market should more suitably obtain an innovation type that is more internal, developing innovative solutions by their own, managing both the successful and deleting the unsuccessful ones, while companies that are placed in emerging markets fit more in collaborative types, in order to manage complexity and uncertainty, share responsibilities, risks and costly activities, as well identify the level of value-creation for customers. Companies, which choose to adopt

ready-made, already experimented innovations or obtain a database from other parties to develop its own provisions that will have certain value for customers belong generally in the external innovation type (Olsson and Bosch 2016).

Additionally, literature of Mohamad et al. (2015) refers to many different kinds of innovation, such as “administrative versus technical”, “product versus process innovations”, “technological versus architectural innovations”, “radical versus incremental innovations”, “major versus minor innovations” and “product, process, marketing and organizational innovation.”

Pisano (2016) contributed to the existed literature with another set of typologies for innovation. Based on the queries regarding value-creation, business strategy ability to adopt innovative activities and resources-needed to achieve innovation, he indicated that technological innovation provides the ability to build both added value and a sustainable advantage. In addition to this, the work mentions four types of innovation that are affected from two variables: level of new technological advances and business model alteration. The categories that emerges are “disruptive, architectural, routine and radical innovation”. Concerning “routine innovation”, this focuses on enhancing the existing technological abilities using the current business model and customer portfolio. Examples of such innovation can be met in high-technologically advanced companies. Moreover, “disruptive innovation” is about using the existed technology in a changed business model that may provoke changes also in competitors’ business models. This type is often adopted in open source software companies. “Radical innovation” is almost totally about a technological breakthrough. Such type of innovation may appear in pharmaceutical sector, where technological improvements in genetic engineering and biotechnology change thoroughly the market requests and demands. Finally, the writer refers to the type that changes the most the firms. “Architectural innovation”, that includes both change in technology and business model of a company, as applies in fields such as digital photography, pharmaceutical companies that produce personalized medicines or else, where companies exist there have to transform their work components and methods, obtain new abilities and utilize the most contemporary technology. In general, almost all mentioned types in Pisano’s work seem to be worthy adopting due to the development they’ll offer to a company, thus the less evident,

routine innovation, is proved to be the most effective and profitable. Anyway, the writer suggests that no certain success recipe exists. Each company may adopt the innovation approach or a combination of them that will be strategically suitable for it in the phase the company will be in the current period. If it is in the mature phase, then a firm should take the chances to renew its business model or be improved up to the demands of the current technological environment. Otherwise, different firms may concentrate their knowledge to expand the existed technological background.

As there are plenty of companies activated in the service sector, Ryu et al. (2015) made their effort to provide significant insights regarding service innovation and how the adoption of such an activity may enhance a company's performance. As stated, strategy is a key component in order to achieve the wished outcome. Therefore, the existed business strategy has to be in line with the newborn service innovation strategy to sustain balance and bring successful innovation. In their literature, writers referred to three business strategy types from Porter, "cost leadership, innovative differentiation and focus strategies", to three service innovation types "new service concept, new service delivery, and new customer interaction", as well to three service innovation strategies "service creation-focused, service delivery-focused and customer interaction-focused" (which are essentially an improved classification from Den Hertog's). The last strategy includes the concepts of "customer co-production and customer contact". From the research of Ryu et al. (2015) occurs that technology-focused firms fits better with "service creation-focused" innovation strategy and "innovative differentiation" business strategy. Then, firms that belong in the fields of transportation, distribution and telecommunication better performs with a combination of "service delivery-focused" innovation strategy and "cost leadership" business strategy, while companies that appertain to professional-focused service provision field with "specialized knowledge and expertise in specific professions, including marketing research, advertising, business and management consulting" fit better with "customer interaction-focused" service innovation strategy and "focus" business strategy. In general, according to writers, it is significant that both service innovation strategy and corporate strategy will be aligned in order to produce a prosperous service innovation.

Moreover, according to Chen et al. (2018) there are plenty of researchers, who categorize innovation into “exploratory” and “exploitative” types. Regarding “exploratory innovation”, there are firms, which consider innovation as a totally new input, therefore they explore external sources, expose themselves and experiment in order to form valuable innovative ideas and plans for creating new goods or processes. From the other side, “exploitative innovation” is about improving the existing skills, qualities, knowledge, structures and relationships internal or external to achieve differentiation. In fact, as mentioned in the reference, a company needs both types to flourish and bring the best outcome.

Revilla et al. (2016), as well Xia et al. (2012) belong in the team of scholars who divide innovations as above, between explorative and exploitative types (“exploration of new possibilities” and “exploitation of old certainties”) and mentioned that in the first type the funding and other resources are basically internal (“own-generated knowledge”), as well that usually its results are visible in a short period and generate productivity, whereas in second type it requires spending on purchasing resources from external parties in order to generate innovation (“bought-in” knowledge) and its results are more visible in the future and not sure that they may be successful. But if they do, they provide the potential to the firm to remain viable. In addition, writers suggested that the combination of these types can produce another category, which is “ambidextrous innovation” (“co-developed” knowledge), which adoption yields greater or maximum results. Eventually, the framework they introduce mentions also the “no-emphasis” innovation type. In this case firms opt to combine “explorative and exploitative” innovation but choose to utilize the less possible resources. Therefore, the ability to respond to environment’ reactions is much more declined than in the “ambidextrous” type.

Karlsson and Tavassoli (2016) stressed that there are more types of innovation that literature should refer to as firms are a lot more complicated than mentioned. They stated that the basic types of innovation are “product, process, market and organizational innovations” according to Schumpeter and OECD and the rest are combinations of these ones that in total are sixteen. Anyway, companies usually do not have enough sources or abilities to adopt all possible combinations, except for larger

and financial stronger ones, that is why their options are always limited so they have to opt wisely.

Birudavolu and Nag (2019) mentioned also that companies in order to ensure that the type of innovation they will develop will be successful they choose certain methods that may assist them in the adoption of innovation. Such methods are “internal development”, which is the less risky, “internal ventures, or through licensing or acquisition or joint ventures/alliances”. The writers first referred to “closed innovation” as an innovation type. This occurs when a company relies only on its own strengths, qualities, resources and capabilities and creates the circumstances for intellectual property security in order to keep safe its ideas and provisions to the public. In this case, even though the internal development is a less risky situation, it is significant that firms will take into consideration that they will bear both the risks and costs alone. Also, the opportunity portfolio is limited. From the other side, the methods that request collaboration with third parties, such as “joint ventures/alliances” are the ones that may sustain a competitive advantage in a complicated environment, where knowledge and technology breakthroughs are required and risk-sharing will keep any company safe and wise to overcome any obstacles and exploit opportunities from the alliance. In this example, “open innovation” is the case. Additionally, Birudavolu and Nag (2019) mentioned that there is a general tendency that companies prefer to develop fast or “radical” innovation than gradual one. This is because most of the companies have already worked on their business model and have the resources to support such an activity. Whichever speed or combination of speeds they choose, companies, together with the “open” way of dealing with innovation they are more likely to build international relationships and alliances and may be able to compete and penetrate new markets, as their size, strength, knowledge will be enlarged. Even better, firms may blend close with open innovation, sustaining great alliances with a healthy inner side.

In the research of Rowley et al. (2011) many types of innovation are being mentioned. Specifically, Knight (1967) stated “organizational structure, production process, people, and product/service” as innovation types, while also mentioned other “binary” types, such as “administrative/technical”, which is about social, resources and operations management with innovative mode, “incremental/radical” that has to do with the level

of renewal and “product/process” innovation types. Oke et al. (2007) mentioned the “product (including radical and incremental), service, and process (including administrative, service and production)” types, Johannessen et al. (2001) referred to “six types of innovative activities: new products, new services, new methods of production, opening new markets, new sources of supply and new ways of organizing” and Francis and Bessant (2005) cited the “position”, which is about how goods are being promoted, “process”, “product” and “paradigm” that has to do with innovation in the way people see the existing things (“changes the perception of markets”). An example is that innovation may upgrade seemingly a simple product to be promoted and understood by customers as that it became premium. As there are many versions from different researchers, Rowley et al. (2011) presented a framework so that there would be clear segregation between the different kinds of innovation. In fact, they propose that the model that Francis and Bessant (2005) brought into light concentrates all the previous discussed types. (Rowley et al. 2011)

Furthermore, Hollenstein (2019) proposed a framework with five innovation strategies, mentioning that each organization develops only one of them. In particular, “science-based innovation” concept describes a strategy that is adopted mainly from industries, such as “chemical/pharmaceutical, non-electrical machinery, electrical machinery and electronics/scientific instruments”. Such companies utilize their scientific knowledge portfolio to create and promote their products. Both internally and internationally, they develop an R&D network where certified people grow innovative solutions. According to the researcher, this type of strategy is the most usual and attractive. Another, innovation strategy is the “investment-based”. In this case, the emphasis is given mostly on obtaining machinery and other equipment that will assist on reducing costs in process or production line. Usually, this strategy refers to companies that belong either in the construction sector or other low-tech manufacturing industries, (“food/beverages/tobacco, wood products, non-metallic minerals, metal production and metalworking”), which see the innovation only as opportunity to lower their prices and compete this way in a market. The knowledge portfolio in this case has a poor role. Moreover, “IT/process-oriented strategy” is about investing in technologies, so that the company will be internally equipped to utilize the knowledge coming from external

sources. In contrast with the two previous strategies, this one refers to large firms that are mainly active in the domestic market. Companies adopting such a strategy are mainly on the services sector, namely on “banking/insurance and business services (other than IT-/R&D services)” and “service industries with a high potential for process-oriented IT, i.e., wholesale trade, transport/storage/logistics and publishing/printing”. Following, “process/product-oriented strategy” adopted in small companies relates to poor internal and external knowledge network with only few opportunities coming up, as well focuses in innovation development in a slow pace. Finally, “IT/product-oriented strategy” is about creating new products, opening new markets by investing in innovative ventures concerning training, enriching internal knowledge portfolio using external bases, as well upgrading internal technological systems in a company. Firms that adopt this strategy belong to niche domestic markets and mainly grab opportunities related to IT. Such companies belong in “knowledge-intensive industries, i.e. electronics/instruments, banking/insurance and IT-/R&D-services, as well as in wholesale and retail trade”. Further to the above-mentioned work, the writer indicated that the firms that are usually keener on innovating are the ones adopting the “science-based” and the “IT/product-oriented strategy”. The less innovative organizations are them pursuing “investment-based” and “process/product-oriented strategy”.

Subsequently, Germeraad (2010) in an effort to provide a framework especially for companies that are interested on obtaining and protecting their new patents or managing them appropriately to sustain a competitive advantage with low expenses, specified his research only to the relation between innovation strategy with intellectual property. From this interrelation, eleven innovation strategies occur, which are also identified in Miller’s “Games of Innovation” model. These are “technology races”, “safety journeys”, “asset-based problem solving”, “RD&E tools and services”, “battles for architecture”, “innovating in packs”, “consumer research and marketing”, “unique gadgets”, “systems design and consulting”, “high-technology craft” and “news, clothing and food”. The criteria to build these strategies and relevant practices are “time-to-prototype” and “time-to-market” as these are the most suitable modes to manage innovation and R&D. The most interested stakeholders for obtaining such strategies are “company patent committees”, managers of “R&D portfolios and business strategies”.

Furthermore, Mezher et al. (2006) distinguished “technological innovation” as crucial innovation type. The writer mentioned that such a type is a procedure from which companies extract knowledge, skills and abilities for technological matters and advances. Also, added that there is no turning back when started implementing it and managers should always take into consideration that it is surrounded from uncertainty. Yang et al. (2018) referred to “service innovation” as an important asset for private companies. Specifically, they supported that this kind of innovation brings bigger productivity and efficiency, as well increases quality of the final provided product and satisfaction of consumers. Many manufacturing enterprises have been led to adopt “service-oriented” approach than industrial in order to gain competitive advantages. Furthermore, as “fast adaptation” is a significant matter for companies, the writers indicated that “adaptive theory” can be a tool for “researching service innovation”. In this view, writers referred to Eisenhardt and Tabrizi (1995), who mentioned two innovation procedures “compression strategy and experiential strategy” regarding adaptive theory. In the first case, it is believed that it is feasible to predict and monitor innovation, as well to reduce time till it is released, thus reward relevantly the people who undertake it. From the other side, “experiential strategy” includes the element of uncertainty, for this reason the success of innovation may occur through use of certain methods and by obtaining agility in changing environments. Eventually, the writers encourage manufacturing enterprises to adopt service innovation as in this way they may be involved in an upgraded technological-scientific network, which will provide expanded tools and data-bases to promote their current activities and will assist in greater business and market performance. (Yang et al. 2018)

In the endeavor to produce insights regarding creation of competitive advantages in banking sector, Baba (2012), mentioned three innovation types “service, technological process and administrative process” suitable for such companies (“banks, insurance and brokerage companies”) that are activated in service private sector. “Service innovation” is about a new or existing service to existed or potential customers. “Technological innovation” is about upgrades in software or other operation systems to deliver more efficiently or less costly an existed service. “Administrative process innovation” is essentially the organizational or social innovation, where focus is on improving

managerial methods to decline costs and optimize existing procedures. According to the writer this specific type of innovation provides great competitive advantages as it is difficult to be copied by another entity, as well it brings higher market share in the organization. Furthermore, Baba (2012) mentioned that when a firm sticks in a certain type of innovation it may cultivate a specific set of abilities through which it can extract qualities, knowledge and value without wasting unnecessarily its resources. Therefore, it is more likely that they stick to this type as they may be able to build and manage relevant knowledge in a better mode, while simultaneously they may cultivate new chances from the existing knowledge to utilize and upgrade the general firm's performance.

Moreover, Blok et al. (2015) cited the concept of "responsible innovation", in which according to Von Schomberg (2013) the partners (both different stakeholders and public entities) that participate in the innovation development are equally responsible to bring the anticipated technological, science and knowledge-based results for society. Stakeholders' involvement is judged as critical because they perceive and try to satisfy the interests of users socially and ethically. In any case, all participants are essentially co-responsible. In order for such an innovation to be successful, the scholars referred to "SEiRI" (stakeholder engagement in responsible innovation), where all processes should be transparent, interactive, quick interacting, conflict avoiding, should protect "intellectual property", cultivate a collaborative working environment and build commitment. Additionally, in another work of Scholten and Blok (2015) it has been noted that Owen et al., (2013) mentioned that despite that there is a great number of innovation approaches, almost all lack in responsibility degree.

Satell (2017) supported that there will always be reasons to innovate as there are always problems waiting to be solved. Therefore, innovation types that may assist finding solutions are many and companies, according to the writer, should exploit and combine them to bring the best results. In this view, Satell (2017) presented an Innovation Matrix, which apart from four innovation types: "breakthrough", in which the help of external parties is significant to solve problems (open innovation belongs in this type), "sustaining", which refers to innovation happening to boost the existing abilities and solve familiar problems (examples of such strategies: "strategic roadmapping, traditional

R&D labs, design thinking methods”), “basic research” has to do with delving deeper into a field for a specific reason using help from scientists and create a strategy for the future and “disruptive innovation” is about significant changes that may happen from technology to market, where companies should transform their whole business model to adapt. By defining the problem, the resources and competences that the domain need, managers can identify, which types to use to solve their problems.

Following on, Ojanen (2014) mentioned “maintenance innovation” as a concept that came up from occupation with innovation practices in “industrial maintenance services”. Despite the fact that innovation and maintenance are opposing concepts, scholar proposed that maintenance could also be considered as a mode for a novel solution for interested parties in the “industrial value network”. As maintenance innovation types are believed to be “technology-oriented maintenance innovations”, “organizational maintenance innovations” that have to do with using new ways of managing maintenance or changes in relationships with partners, “client-led process-focused maintenance innovations” which refers mostly to equipment or maintenance providers who upgrade their services to enhance satisfaction for their customers and “asset management innovations in maintenance” which include many more types of innovations that have to do with “asset information management”, namely formation of new procedures and organizations to bring innovation.

Moreover, Mei et al. (2018) were occupied with innovation in SMEs. From their experience, they suggested that “open innovation” fits in SMEs’ effort to acquire knowledge resources, boost their companies’ performance and obtain the desired competitive advantage. The connection and participation of SMEs in an ecosystem with different partners may support and protect them greatly from environmental internal and external challenges that may come.

As understood innovation is a complex concept with many aspects to be discovered. In the research of Andersson et al. (2011), there are reported placements of other scholars and organizations regarding the categories of innovation. Specifically, according to OECD and Varis and Littunen (2010) innovation can be separated in “product, organizational, process and marketing innovation”. Furthermore, Keeley (2004) stressed ten kinds of innovation that grouped in four classes: “finance (business model and networking),

process (enabling process and core process), offering (product performance, product system, and service), and delivery (channel, brand, and customer experience)". Moreover, Evangelista and Vezzani (2010) proposed "technological, product, process and non-technological" or organizational renewals. As mentioned in the beginning of the literature review, innovation essentially started being realized as a concept with the introduction of several technological advances and applications. A lot of years later, innovation is identified also in non-technological activities. As Evangelista and Vezzani (2010) mentioned the most efficient innovation type is the one that combine both technological and non-technological changes and facilitates a company that wishes to differentiate itself from competition. Following on, in the same study of Andersson et al. (2011) there is the reference of Stone et al (2008), who classified two innovation types "tangible innovation", which refers to new products or other components creation and "intangible innovation", which includes new business model, development of novel organizational structure, renewal of the rigid culture to a more flexible and improvement of company's knowledge portfolio. (Andersson et al. 2011)

Li et al. (2010) mentioned "radical" and "incremental" innovation types. "Radical innovation" can be a great assistance when competition is strong and new technology advances come up. It's a high-risk practice, because it also needs great investments, but if it proves successful it may bring high innovation performance. From the other side, "incremental" innovation is referred to more controlled conditions and is being developed gradually. Eventually, Li et al. (2010) supported "open and disruptive" innovation (ODI) as a practice to be used from companies in developing countries. The first part, "open", refers to surpassing companies' boundaries and get knowledge from third resources that may be from academia, suppliers, customers, government, other companies in the industry, research partners, allies, competition, consultants or technology professionals and others (Chen and Xu 2009). Developing such an innovation type, companies may be benefited by belonging in networks with technology professionals, who will upgrade internal systems of the firm, or may ensure that the company will be up to date with any new advances. The second part, "disruptive" is about innovation that happens due to rapid changes in the technology sector that may lead in opening a new market or to higher income. By combining these innovation types

companies may achieve differentiation from competition, greater provisions to customers, better product or services development and “backward production elimination” as they’ll be protected from unique knowledge portfolio, together with high skills in technology and market. (Li et al. 2010)

Xie and Liang (2013) introduced their innovation strategy scorecard, created from experience with big companies, such as Samsung, Apple, Xiaomi and Nokia and they referred firstly to “competitive position” which describes the position of companies in the market and future innovation steps that should be done and “product and service innovation” from the aspect of if a company has the speed to create new goods or new procedures to satisfy customers’ needs. According to them these types can be further separated in “incremental” and “disruptive” innovation. Then, they mentioned “open innovation”, which according to their opinion includes elements regarding use of resources, skills and feedback from outside of the company and eventually “business model innovation”, which investigates the eagerness and readiness of a company to change its business model (using a new technology or networking with new up and downward streams or include in the business a product of intellectual licensing), always in a way to be adaptive to market and consumer demands.

As it seems, innovation types in private sector have been examined a lot from a wide variety of researchers and for different kind of organizations. From the above knowledge it is evident that “open innovation” is a type that was mentioned from plenty of scholars in order to transmit that the future of organizations seems to be more a matter of collaboration, participation and mutual achievements. Therefore, it is of great significance that this specific innovation type will be studied further for both private and public sector.

Open Innovation

In the effort of sustaining its competitive advantage, upgrading its innovation potential and provide more valuable products or services that can solely produce to its customers, an organization has to actively ally with other companies that may provide complementary knowledge, resources, skills, technology that in combination with organization’s competencies may create a worth innovative solution that will return also profit for all

the involved partners. Such an alliance and sharing to achieve a certain goal is defined as open innovation. Chesbrough and Crowther (2006) also mentioned that open innovation is “the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively”. Moreover, Chesbrough (2003) in Mergel (2018) cited that “open innovation (OI) is the process of crowdsourcing solutions to organizational problems to ensure organizational survival or renewal”. In a way, the organization provides the permission to others (outsources) to have access in its own knowledge databases and be exempted from limitations that impede it to generate opportunities from this cooperation. Of course, no type of innovation would succeed unless there is strategy behind it. The firm’s strategy would place certain measurements, its own procedures and communication terms between itself and its partners, customers and rest environment. According to the study, the open innovation strategy should be also aligned with the PESTEL (political, economic, social, technological, environmental and legal) factors so that it could decide and act faster. (Birudavolu and Nag 2019)

Chesbrough and Crowther (2006) mentioned that companies have started to understand the importance of open innovation, as the closed innovation concept is quite limited and cannot bring all the potential solutions over the table. Until recently, open innovation was considered an option only for technologically upgraded or high-tech companies, but as appears there are already plenty of different-type traditional industries that have adopted this innovation pattern. In this way, companies have the freedom to make alliances, acquire “intellectual property” products or buy technologies, knowledge, consultancy or whatever else they miss from external entities, exploit it and sustain viable and competitive.

In the research of Traitler et al. (2011), the writers went a step forward from open innovation and described “the Sharing-is-Winning model” to discuss about “co-innovation, co-development” in a way that this cooperation and contribution to each others between a network may bring mutual positive results. According to writers, companies who decide the recreation of their identity and R&D activity in the context of an open innovation activity means that both their managers and whole organization have accepted such a change, the risk that joins it, have embraced the new external members

that affect company's performance and strategy, as well accepted the fact that consumer should be in the center of everything. Also, companies that start working under these terms understand that feedback is important ("networks, crowdsourcing") and that open innovation should participate everywhere in the "value chain" of the company, from the beginning of product creation or even from raw materials choosing. Furthermore, it is significant to obtain internal experts in the company, measure the degree of "innovativeness" frequently, connect innovation with company's goals and KPIs, create systems of rewards and evaluation and manage and create business models that will promote "co-sharing" in a way that partners (the one who provides knowledge and the other who exploit it) will feel convenient that participate in a team with equal conditions. Following, company's culture should be more flexible, accepting and rewarding the ideas of all partners and employees of all levels to exploit all the potential valuable ideas. In open innovation, "academia" is a significant sole partner that provides great resources and assist in involvement of young generation to bring ideas for companies. After all, writers indicated that commercialization is the most critical part of "the Sharing-is-Winning model".

Rumanti et al. (2016) also contributed to open innovation concept by mentioning that "knowledge sharing" is its most crucial characteristic. As mentioned in their paper, knowledge sharing incorporates all activities that have to do with communication, education, incentives, rewarding and understanding knowledge that is sharing among partners. In general, they cited that knowledge is critical to be accepted and managed properly so that it can provide the demanded outcome.

Drivers for Open Innovation in Private Sector

As mentioned in the paper of Birudavolu and Nag (2019) open innovation is a concept that has been evidently proved valuable.

The incentives for the adoption of such an approach are many. Bigliardi et al. (2012) in Birudavolu and Nag (2019) claimed that such a type of innovation may shorten the time for a company to commercialize, provide the opportunity to reduce costs, allow services and activities come together to produce the expected outcome, as well become more competitive. Furthermore, as drivers for open innovation in Birudavolu and Nag (2019) may be also considered the share of risk between partners, the participation and

collaboration of different stakeholders with different scientific background that may contribute significantly in company's enhancement and innovation performance, as well of customers' feedback that is necessary to be sustainable. Due to these interactions and relationships, a plethora of different innovative ideas arises, new competences, abilities and qualities or improvisation of existing ones are being created, the company gains new specialized knowledge for tools and methods from the partners that can be used to facilitate its current procedures or enhance them. Also, companies participating in such a community may have the ability to approach a wide spectrum of suppliers, new niche markets or bigger customer segments, gain significant resources that may include even scientific personnel, as well knowledge over new for the company market, field or customers' segments. Together with the previous advantages company may have access to new distribution channels by which it may be able to promote personalized services and products according to the knowledge that has gained. Of course, such an innovation activity has also a set of positive outcomes to company's general performance. Personalized solutions assist in bringing more satisfaction in customers, thus sales, productivity are growing, as well profit. The cooperation helps in accelerating the processes, provide agility and enhanced quality and there is always the possibility of growing the existing market share. Except for the risk that is being shared when coalesce, the allies that are being involved in this union acquire bigger strength, may ask pressure to suppliers for lower prices, have access to better technologies and more qualified staff. The union brings to its core a variety of knowledge and human resources in a secure environment as there are mutual interests. The writers also referred to the concept of "crowdsourcing" which is a phenomenon of such large unions.

"Co-creation" is considered also as a very powerful ability and driver of open innovation. In this case, consumers co-create personalized services according to company's interface and norms. The latter should adapt in customer's way of living principles, preferences and environment by working with them to provide value again for them. The value extracted from this activity is by far richer than in closed innovation. The focus on each individual maximizes the anticipated outcome. In cases such as that of open innovation forums that have been growing for many years, it appears that from the cooperation between different partners "such as corporations, government agencies, research and academic institutions" the benefits that occur are quite strong and appealing ("finding ideas, partners, collaborators, training, funding startups, finding investors, incubation,

conducting collaborative events, mass ideation contests and so on.”). Therefore, open innovation thinking is needed in order to upgrade the company, make it contemporary and sustain it through the years. (Birudavolu and Nag 2019)

Govindarajan and Gupta (2001) also stated that the fierce competition is an incentive to force innovation in private firms.

In the research of Kankanhalli et al. (2017), the opportunities of scientific knowledge diffusion through universities and availability of means to explore them are essentially drivers for the companies to develop open innovation and create ideas that are competitive and valuable for the interested audience. Of course, the value is even bigger when customer communities are getting involved and contributing in building innovation. Furthermore, Chesbrough and Crowther (2006) estimated that even just the fact that firms have the ability of utilizing technologies and R&D that they cannot obtain, due to their cost or lack of other sources, this is an important driver for adopting open innovation. In this way, companies are enabled to produce more contemporary and technologically upgraded products or services or improve the existed in a faster manner, while they may also be able with a more open view to understand which new-coming (“emerging”) technologies may cause changes or turbulence. It is less expensive to use technological installations of others than obtaining them itself. In this way, companies do not have to build new procedures or buy tools but achieve evaluation of its activities using existed tools of partners with whom engaged into open innovation. Also, especially companies which belong to ICT may obtain a great advantage and growth through open innovation as they have access to all new techs.

In the work of Yuan and Gasco-Hernandez (2019) it is again evident that open innovation, according to Zuiderwijk et al. (2016) ensures that companies will achieve competitive advantage and profits. (Yuan and Gasco-Hernandez 2019)

As occurs from Modi and Rawani (2020) research, companies are forced to innovate for ten reasons. Specifically, to increase the size of their organization merging or allying with others to gain sources, obtain technology skills and access to greater software or hardware sources, get management support and methods, gain competitive advantage, greater access to market segments, cost advantages due to economy of scale, enhanced customers’ satisfaction through personalized provisions, flexible organizational culture and upgrade the learning ability inside the firm, as well allow experimentation procedures

and failure tolerance. In general, according to gathered knowledge till this point occurs that open innovation is a great benefit for firms.

Following, Lakhani and Panetta (2007) in Mergel et al. (2014) indicated that adoption of open innovation is a way to solve lurking problems in a creative mode that wouldn't be possible to be solved alone. In the same research Chakravorti (2010) added that open innovation assists in less risk and faster innovation development. Also, Whitla (2009) supported that in open innovation are being used both the abilities and experiences from external environment to bring the best outcome. (Mergel et al. 2014)

Moreover, Bagherzadeh et al. (2020) stated that the drivers to open innovation and specifically of the flux from external environment to the inside ("outside-in Open Innovation"), are quite a lot. First of all, innovation performance of the company would be enhanced, the risk would be shared among allies and customer demands would be clarified thanks to the new knowledge gathered from external partners (Chesbrough 2003; Du et al. 2014; Laursen and A. Salter 2006; Cammarano et al. 2017). Also, the cooperation with different partners provides immediate access to a great source of ideas, resources and technological competences and reduce costs that will be an extra benefit especially for companies that belong in competition-intensive environments and are competing based on low prices (Eisenhardt and Schoonhoven 1996). (Bagherzadeh et al. 2020)

Mergel and Desouza (2013) quoted also their findings regarding open innovation in the private sector. They stressed again that such an innovation type facilitates processes regarding products or services creation and design, provides solutions to difficult problems and uses team skills (also from third parties) even online to serve company's aims.

Vanhaverbeke et al. (2008) contributed also to the same concept, citing that open innovation assists firms in taking smaller risks and grab opportunities by "buying minority stakes" from partners. Therefore, a company has the chance to learn more about a new technology, without having exposed too much financially or having used too much resources for it.

Barriers for Open Innovation in Private Sector

While drivers are many, barriers to open innovation are also significant and should be taken into consideration. Bellantuono et al. (2013) indicated that in most cases the

barriers that have to do specifically with open innovation are cultural and set the examples of the “Not-Invented-Here and the Not-Sold-Here syndromes”, while also cited that other reasons that companies avoid such innovation are the “knowledge gaps”, fear of imitation (copyright issues) or of security of the company’s internal data and potential data leak to competition (Drechsler and Natter 2012; Lichtenthaler 2011; Mortara et al. 2010). (Bellantuono et al. 2013)

According to their research Cankar and Petkovšek (2013) agreed that there are internal barriers in which the unwillingness to change is one of the most critical. Also, they highlighted that internal environments that are characterized from rigid culture and way of thinking with a lot of bureaucratic processes are also not in the first row to adopt open innovation. Specifically, they mentioned that such organizations cannot change their views for the market, do not sustain competitive or differentiative features or skills and thus cannot identify opportunities in the environment. Furthermore, as internal barriers are also considered the potential risk of failure that company feels that may occur if it transforms somehow, as well the barrier that has to do with the difficulty of management to forecast or future thinking. Scarcity in necessary financial capital, limited or no access on funding sources, lack in knowledge and human resources, difficulties in administrating intellectual property and managing innovation, relationships with external partners, as well with customers are also significant hurdles. Companies may have trouble in extracting information that will assist them in developing new products, entering new markets, commercialize locally or globally, as well firms may not have enough knowledge for “innovation support services”. The writers also suggested that there are also external barriers. These are mostly barriers that have to do with government or market problems (Cankar and Petkovšek 2013). Birudavolu and Nag (2019) added similarly that the bad performance and strategy of a country affects negatively companies which try to be integrated in open innovation forums.

Traitler et al. (2011) stressed that in order to work in open innovation conditions there is the need to spend on organizational changes. For big corporations, such as P&G, this activity may be simple, but for smaller companies, which while understanding the advantages of open innovation, such as cooperation or use of skilled staff to upgrade

company's value proposition, may have to deal with significant cost barriers that are difficult to overcome.

Furthermore, there is the general view that the internal data may somehow be transferred to competition or that intellectual properties or copyrights or even the leadership of innovation or strategy may be delivered to another external partner and they do not feel comfortable with that as they still haven't created trust-relationship. Despite these concerns, writers suggested that whenever there is "intellectual property management" due to this fact there are stricter regulations that essentially protect the creator to collaborate in a secure manner with other third parties, maybe with "contracts of endorsement and confidentiality agreements." Other barriers may be regarded the distinctions in "vision, mission, goals and motivation" between partners in open collaboration or in the "interests". In general it can be mentioned that partners do not wish to cause difficult or problematic relationships, as usually between them there are "win-win" relationships (mutual benefits). Also, the real product or service innovation happens inside the core company, while the other parties have an assistive or consulting role, therefore it could be stated that any barriers regarding leadership are usually mild. Moreover, another barrier in open innovation may be the time that is demanded in order for all partners to align and agree upon issues. Of course, even this barrier may be smoothed down with scheduling of meetings and sharing roles between stakeholders. (Blok et al. 2015)

Following, Mergel et al. (2014), as well Leon et al. (2019) also discussed the issue of data security and that companies should avoid taking the risk to share their information or solutions "publicly announced on a web platform" or provide sensitive data about an innovative solution to be publicized. From the research of Leon et al. (2019) occurs that companies mostly choose partners already known from previous working experience, which gained trust throughout the years and do not opt randomly their partners.

In the research of Bagherzadeh et al. (2020), the barriers or challenges that had detected have mostly to do with the perception level of personnel to understand the company's needs and align them with relevant solutions from the market or with valuable partners (Foss et al. 2011). Also, company should ensure that the knowledge

that will be extracted from the allies are in a form that may be usable internally (Salter et al. 2014). (Bagherzadeh et al. 2020)

Drivers for Open Innovation in Public Sector

As mentioned in the work of Kankanhalli et al. (2017) public sector has already decided to open its horizons and start adopting open innovation activities, as the existing strategies could not follow the changes in the demands of customers and new public challenges. The need of public services' users to participate more in the civil procedures, the necessity of government to extract knowledge over social concerns or problems and build services that may be more efficient, the urge for cultivation of a better relationship between government and citizens with public authorities to respect users' views, problems and therefore, citizens start trusting government are all critical drivers to open innovation.

Furthermore, the advancements in ICT and the plenty of "challenges in social environment" that push public sector to obtain more knowledge, exploit ICT and facilitate the needs of the community, such as ageing population, demands for more organized and with multiple modes provided education are significant for all communities which wish to sustain competitive and improve their people' background in order to become strong and respected among the other dominants countries. To build such a strength countries have to obtain great educational systems together with technology for all ages by creating services that may facilitate active citizens with the assistance of technology to gain knowledge over general circumstances happening on the road, traffic jam, info about public transport, weather, any kind of emergencies and city shows. Local or city authorities "under smart city initiatives" may force and assist open innovation concept in order to exploit the new advancements in technology for their own facilitation (Kankanhalli et al. 2017).

Another driver is the availability to utilize accessible data regarding for instance energy consumption and general utilities together with the existing technological applications and create an environmentally-friendly framework for better management of these resources. Also, one more ability may be to develop new digital solutions to extract data regarding the use of energy and adapt or provide solutions for people, which facilitate

their everyday routine, or municipalities and other local public agencies, which facilitate their needs to be used for them or other companies related to them (Kankanhalli et al. 2017).

Additionally, open innovation provides the capability to voters to have access in details about politicians placement over specific issues, as well to political parties to gain access and extract information about audience views, responses in social media networks and preferences and thus, adapt their profile for forthcoming elections according to the outside environment. "Sentiment analysis" existence and social media are significant tools that together with other complementary ways of extracting data, assist politicians to be able to understand and use the preferences of the audience for their own good. Also, open participation is an important driver so that citizens have the ability to take part in shaping rules, regulations together with the government or local public entity, as well have the ability to interact with the agencies and improve the provided services by sending relevant feedback (Kankanhalli et al. 2017).

Open innovation assists also in providing new potentials to the concept of security and justice, as public organizations may be able to use data "from sensors or other real-time data streams". This data may help in procedures that have to do with "surveillance activities" or in governmental parties which have to take judicial decisions over criminal activities. Public agencies may also have the ability to make publicly available their knowledge regarding the operation for instance, of "criminal justice system", and receive people' views about the effectiveness of its procedures (Kankanhalli et al. 2017). Mergel (2018) also added that as drivers to open innovation may be regarded the flexibility of using the help of external parties "contractors", when the available background of civil agencies is not enough, the cultivation of agility of public agencies' structure with no strict top-down decision-making, the experimentation permitting, as well the use of contests and rewards to bring solutions on the table, as NASA does. In addition, the connection of innovation with the mission of the entity, so that it will be supported strategically and provide awareness to users about its provisions, the creation of communities to interact with and provide solutions for specific problems, "inter-organizational" and "extra-organizational" drivers that have to do with external technologies, knowledge and experience from interacting with users and that may be

used to add value in the provisions of the organization are all significant motives for public sector to develop open innovation.

In the work of Yuan and Gasco-Hernandez (2019) is mentioned that government may achieve better value for both users and public sector itself, service performance and delivery by adopting open innovation (Zuiderwijk et al. 2016). (Yuan and Gasco-Hernandez 2019)

In Walker's (2006a) work, the "diffusion determinants of innovation" may be considered as crucial drivers for innovation in public sector. According to Berry and Berry (1999) they can be separated in four models. Firstly, the "public pressures" refer to audience pressure that forces public managers to make changes happen. Then, the raised contemporary need of "learning" or educating from external sources to upgrade the existed knowledge in public agencies is regarded also a significant driver. Managers may identify a mode of renewal from another source that may fit to the business model of the agency so they may adopt it to improve their capabilities. "Competition" is the third model, as public agencies deal with it in their endeavor to gain competitive advantages or to not be undermined. In general, other public entities may press the existence of competition in order to attract more citizens or users. Eventually, "vertical influence", according to which the organizational strategy determines and ensures the adoption of innovation in every department. (Walker 2006a)

Furthermore, as in private sector, open innovation is considered as a way to enhance public sector's performance. Citizens need a more creative public sector with flexible management that may benefit the whole economy, sustain and promote the local and global welfare to support private companies and citizens. According to the research of Cankar and Petkovšek (2013) there are three types of innovation drivers in public sector. "Internal", which includes the solution of problems that occur inside the public agencies due to rigid management or public servants handling, the need for education and training, as well the motivation mechanisms to force innovation, the activities to alleviate bureaucracy and alter the existing hierarchical "organizational structure". "External" have to do with facilitating the cooperation between public and private sector, motivating it with rewards and "international rankings" to transform their procedures or structures. Eventually, "political" drivers are about politicians and include

the level of their support in innovation, which depends on the positive result that it may have for them on the contrary to their opponents. Political actors may also influence the level of funding for such innovative activities.

Moreover, according to Collm and Schedler (2012) open innovation is a great way to solve public management challenges and introduce new agile public services. The writers presented the example of “the non-profit organization Code for America”, which cooperated with “government open data portals, such as Data.gov or OpenDataPhilly.org” to engage civic hackers of the regional technology community in the creation of new mobile apps. Also, in the same work, Mergel (2011) cited that open innovation is a way to give voice to groups of people that otherwise won't be heard, therefore suggested the participation of citizens or public servants only or the combination of both, plus third external parties to brainstorm and bring solutions to public problems and processes. To this end, it is proposed to adopt “crowdsourcing applications”, which will reinforce the availability of modes of public participation. Moreover, these applications may be able to extract data regarding “citizen satisfaction” to assist public authorities identify problematic services and improve them. (Mergel et al. 2014)

Cunningham (2016) from the experience with African public sector supported that open innovation may bring better service delivery, more clear processes that means less corruption, motivation for new job openings, personalized services, less taxes, more exports, more local solutions, “capacity building” and ICT may assist in learning activities.

In Mergel and Desouza (2013) work is presented the example of “Challenge.gov” platform, which facilitates the execution of competitions. This open innovative solution assists “federal agencies” to host competitions, let the public (citizens, communities, all types of organizations) be aware of them and invite them to participate, vote or evaluate online, solve problems and after that public authorities undertake to integrate innovation inside civil agencies or to provide a certain solution to the examined social problems. This way public entities use the citizens' view and do not have to build a certain working group to consume time and resources in order to find the solution. Therefore, the current ability of every organization to readily develop such an

application for the public good is a crucial driver to adopt open innovation. Also, the writers added that even the fact that in such an easy manner public sector may gather knowledge over societal problems and identify user experience from existed services are incentives to develop openness in public activities.

As drivers may also be mentioned the introduction of social media in people lives, which may be used to promote participation of citizens, increase transparency and democracy in public matters. The research also concentrates its findings regarding “an open innovation project called official document exchange via microblogging (ODEM: official document exchange via microblogging).” In the same work is referred the creation of new public goods through open innovation, the reporting of social challenges and invitation of citizens to solve them, therefore cultivation of a collaborative and trustful basis between them to support greater public performance and added value for all partners. Also, according to Relly and Sabharwal (2009) the global competition is a motive to adopt open innovation and transparency. (Zhang et al. 2017)

Finally, in UK government the drivers that may exist and force alteration are the goals of government itself to develop more effective services that will fit to personalized needs of citizens, follow the contemporary trends and provide services according to users expectations and eventually set “Public Service Agreement (PSA) targets” to concentrate public attention in “departments” which contribute to better final innovative results (Dunleavy et al. 2006).

Barriers for Open Innovation in Public Sector

The discussion up to this point has focused on ways of fostering and encouraging innovation and its diffusion. It is important also to recognize the barriers to innovation. Barriers, which have to be lowered or removed if high rates of successful and systemic innovation are to be maintained. According to Albury (2005), as such obstacles may be regarded the lack of adequate funding to support renewal for a long-term period, no enough influence or abilities of politicians or public managers to support strategically such an innovation or any sudden change, no adequate motivation to employees, public policies that may create difficulties or no flexible policy in adopting any new technology that may enhance the provided service. Sometimes also, there are changes that are

doomed to fail, but still, involved stakeholders may do not wish to stop them, or there may be managers who avoid risk. Furthermore, pressures from the top management to receive the results of any change may make small managers reluctant to take an innovative initiative.

Furthermore, Dunleavy et al. (2006) referred to difficulties with third parties to communicate and agree on some terms that satisfy both parts interests as a barrier to adopt innovation. Other hurdles may exist inside the organization, such as for instance, employees being negative in innovation or public entities that are isolated so that no cooperation or innovation may be achieved. Moreover, writers identified that there may be no easiness on finding adequate funding resources and that potical environment is almost always unstable. Difficulties on having adequate managers in a public authority and difficulties on communicating with private sector are also considered as crucial barriers.

As barriers to innovation in public sector are also regarded that there is almost no competition, therefore organizations are not forced to innovate, open innovation is needed, but organizations fear the transparency and exposure (Bellone and Goerl 1992), as well to take risks and adopt an innovation that may fail. Of course, the rigid public culture and processes that restrict public managers to take initiatives, as well the unawareness of the real value of public products and services to citizens and the great organizational size of most of civil authorities that are difficult to be managed are significant barriers to innovation. (United Nations Economic Commission for Europe 2017)

Mergel (2018) also added that the obstacles to open innovation may have to do with legal issues, the likelihood that the result of innovation will not be the expected, technology issues and how these are incorporated in the organization, cultural obstacles, as a fear of the change, “inter-organizational” issues that exist when different public entities have to cooperate, as well structural issues, referred as “institutionalization barriers”.

Sørensen and Torfing (2012) mentioned again that regulations, structure, political influence, no motivation in staff and the fact that different public entities do not or even cannot communicate with each other are significant barriers to open innovation in

public sector. Bommert (2010) supported that there is the case that public managers do not accept to share their position and cooperate. Munksgaard et al. (2012) stressed that the same the cooperation between public and private sector may be an obstacle, as these entities have totally different outlook, strategy, risk and time-tolerance and motivation mode of the staff. (Smith and Akram 2017)

Following, the fact that still both necessary tools are missing and processes haven't been established yet properly so that citizens may participate in the public procedures may be regarded as barriers to the implementation of open innovation in public sector. Also, the public administration managers themselves do not know the way to innovate in a correct mode in an open manner, thus they miss strategical points that cause difficulties in the right adoption of this type of innovation. On the contrary to private sector, barriers in public are much more as flexibility is missing due to strict legislation and policies, as well there is limited communicational liberty with third parties, thus, boost of internal procedures is hindered. Old-fashioned culture, no sufficient funding or no motivation in the public servants are quite significant barriers as mentioned also previously, in order to open innovation. Also, there are difficulties in obtaining knowledge from external resources, as data may be complicated, strict regulations regarding personal data and GDPR may exist, "the rigid intellectual property protection culture impedes the external commercialization of ideas and knowledge", many involved parties may have disagreements, cause delays and set obstacles in development of open innovation (Kankanhalli et al. 2017).

Cankar and Petkovšek (2013) stated that competition in public sector is limited, as well most times government lacks funding, therefore, innovation remains in the back. According to this view, the barriers that they identified are lack in resources, competences, skills, funding and grabbing opportunities significant for facilitation of citizens' lives. Moreover, public managers as well the public entities or servants wish to avoid any risk and responsibility for such a daring activity as open innovation. The speed and the level of advancement that open innovation proposes may be quite large for public entities that do have experience from the complexity that it will bring and the time that will be needed till civil employees start managing it. "Public resistance to change" is also a barrier, as most of the times public servants are reluctant to any

hierarchical or structure changes, as well in renewals that concern the way they deliver public services. Moreover, lack in skills and capabilities in separated, local public agencies, unwillingness to cooperate with colleagues even in the same agency, no vague agreements with staff, no or limited motivation, information exchange difficulties from the one department to the other, no enough time to contribute to innovation, shortages in tools, structures and educational procedures to enhance the learning process and assign of initiatives to each employee or department to bring added value. Finally, shortage in technological solutions and rigid policies hamper also the adoption of open innovation in public sector. (Bloch 2011); Carstensen and Bason 2012; Thenint, 2010). (Cankar and Petkovšek 2013)

Eventually, Cunningham (2016), who were occupied with African governments and open innovation, discovered that public sector does not set the innovation and use of ICT as a priority not understanding the strength that open innovation will provide to it, as well that there is lack of skilled human resources. Therefore, it is obvious that there are significant culture barriers.

Innovation Practices

In order to obtain a view over the practices that are used or suggested to be used so that the concept of innovation would be promoted inside both private and public organizations, an extensive research has been conducted.

According to Cankar and Petkovšek (2013) a very effective practice that may bring innovative products or services to the audience is the cooperation between public and private sector. In such a cooperation partners supply each other with the necessary resources, either these are financial, human, “intellectual property”, hardware, software and other equipment to be reciprocally benefited. Both allies by sharing knowledge, experience, and expertise may be more flexible to meet the needs of a new market or to satisfy the demands of another customer segment that they hadn't the resources and knowledge to reach. The collaborative pattern may be an effective practice also for the public sector. This way problems that may have to do with regulations or bureaucracy that hinder private sector to communicate with public in a smooth mode may be solved effectively. Also, public entities may become more agile, use open innovation for risk

aversion or reduction, assist in transforming its structure and culture, change political tendencies to be more creative and promote innovation. When organizations do not collaborate they could not achieve all the above. Usually, in private sector there aren't such practices, because competition does not easily allow it. In public, the culture usually is too rigid and the barriers high. In any case, this practice is nothing but valuable for both sectors, that is the reason why private sector try to attain strategic collaborations and public make its efforts to lower the restrictions that the current rigid structure sets, make "interorganizational networks" and exchange knowledge and experience with the private sector to achieve results that otherwise could not internally achieve.

Other researchers, think of "Cloud, Social Media, Internet of Things, artificial intelligence (AI) and robotics, autonomous vehicles, Big Data, internet of things (IoT), Blockchain, 3D printing, material science, nanotechnology, energy storage, and quantum computing" as effective practices to enhance innovation. They also believe that there should be a CIO (Chief Information Officer) to manage these practices, as well the human resources in both private and public sector. Noonpakdee et al. (2020) were also referred to the "Digital Thailand Plan" that is a practice that may change both governmental and business sectors making the effort to bring "social stability and economic wealth in Thailand" by using the technological advancements to extract and learn from existing data, innovate, gain significant resources to sustain country's welfare and create social stability and development.

Any of these cases may be proved valuable and critical to grow innovative solutions and provide to the organizations and to interested stakeholders the outcomes they expect. The selection of the tool or method is up to the context and content of the solution that developers may wish to produce.

In the Private Sector

According to Pisano (2016) some great innovation practices that a company can apply are the adoption of separated R&D working groups to share research job in smaller projects, creation of internal business projects, building of a group that may manage capital, finding allies, cultivation of open innovation, development of "crowdsourcing" and building a narrow cooperation with customers. Furthermore, the knowledge gained in

the marketing sector regarding customers' attitude can be transformed into valuable innovative activities, such as creating complementary products to firm's core product or use of different distribution channels that can reach more customers. The writer indicated also that in R&D, adoption of new technologies is the practice for developing innovation. In any case, innovation strategy will provide the necessary insights and directions to assist a company find the most suitable practices that it should follow according to what it wish to accomplish.

According to Pisano (2016) "crowdsourcing" is a usual and effective innovation practice. Crowdsourcing includes the perception that the staff of the company or its existing partners are not enough to provide specific answers to potential problems. Therefore, the company reinforces its efforts, opens up and invites people that wouldn't be able to reach, the "crowd" to join its efforts and try to find a creative solution to its problems. The writer suggests that this may happen using "a web platform offering also a financial prize". Usually this method provides fast solutions. Of course, crowdsourcing cannot bring solutions for any type of problem. As mentioned in the paper, it works better with problems that consist of parts, therefore crowd may be able to contribute with a solution to a certain part and not provide an holistic answer about a complex problem. If not, it is better to choose another tool for innovation and problem solution. Another practice Pisano (2016) referred to is "co-creation" that involves customers in order to bring innovative solutions for the company. Additionally, he supported that co-creation is a solution for firms, which certainly need customers' opinion and understanding of the solution in order to develop it. Steve Jobs had supported that the view of customers is not always reliable as they may not be sure about what will satisfy them. Also, it is possible that they may do not know what the best solution for them is or the customers that may be chosen to contribute will not be the most creative ones. Therefore, sometimes the best solution may be first to develop an innovation and then finding the customers and market that will be willing to obtain it. So, managers have to identify whether co-creation may be a suitable practice for the project they may develop. Usually it works when the technology that is going to be adopted is known and well understood from the customer segment that is going to purchase it. When technology is novel and

the firm may be addressed to a new market “rapid prototyping, early experimentation, parallel problem solving” and repetition may be better practices.

In ICT companies, the practices to achieve innovation and thus competitive advantage and growth are “digital services and open innovation-based forums that cater to digital services”. Birudavolu and Nag (2019) suggested that in order to create successful innovative solutions a firm should collaborate with plenty of stakeholders from ICT and services fields to R&D, universities and government, as well has to obtain significant knowledge regarding relevant markets from its participation in forums that discuss relevant issues. In the same research there are mentioned some open innovation practices examples, such as these of “Yes Bank-ERP provider” and “Arkadin Cloud Communications-ICT communication provider”.

Other practices that force innovation may be to follow the technological advances or applications that are similar to firm’s object and integrate them in order to upgrade the business, as well educate the staff over how to use new technologies according to company’s interest. (Nylén and Holmström 2015)

Govindarajan and Gupta (2001) suggested that successful innovation practices in private companies may be to become the first company that has understood the trends and provide a certain innovative proposal to achieve gaining advantage among competitors. This proposal may be directed to a large group of customers that competitors haven’t identified yet or may be a full inclusive solution that covers a set of products and services that otherwise the customer may need to purchase them separately or a proposal that may cover all the previous and additionally the interfaces across the activities. This process of being the first and transform the norms never stops. Firms should always keep an eye open to the next opportunity to be a step forward, otherwise incumbents or new entrants will do it.

Vanhaverbeke et al. (2008) referred to three open innovation practices. The first mover, which provides an innovative solution based on adoption of new technologies that are not yet widespread. In this case, the firm has the opportunity to select the best possible innovation out of all presented from its external environment and acquire it by making a small investment, as technology will be at an inaugural phase. (Nokia has adopted such a practice). “Delayed entry or delayed financial commitment” is a practice in which firms

can start by identifying first the “commercial possibilities” and then start developing the idea if it seems to be worthy. This practice has the flexibility of option. Firms may search early the environment for new technological advances and engage with the breakthrough that seems valuable or adopt a technology after a period of time, when it is familiar in the market and firm has identified how it works. Moreover, another open innovation practice is to exit anytime. In this case, the firm can “out licence”, or sell technologies or researches when they could not fit in company’s business model.

In the research of Caning and Edralin (2019) there are mentioned innovation practices of “Entrepinays based on the OSLO Innovation Measurement Framework”. Out of the four innovation types: product, process, marketing, and organizational innovation, Entrepinays chose marketing and organizational practices as more beneficial to their firm performance and productivity. Such innovation practices for marketing may be new distribution channels, new modes of commercializing products and services and “use of branding as a differentiation strategy”, as well “organizational innovation practices” describe the mode with which communication, interaction and cooperation are achieved and organized with company’s external environment.

Bysted and Jespersen (2014) also proposed “managerial practices” as the most efficient innovation practices. This activity includes incentives and supports personnel to participate in innovation. It also brings changes in structure, as well agrees on taking initiatives and risks.

To the same direction, Karlsson and Tavassoli (2016) referred to “organizational innovation” as a significant innovation practice. They stressed that “organizational innovations” have to do with managerial endeavors to refresh existing processes, methods, tools, systems in order to boost cooperation, communication, knowledge exchanging, education and promote innovation inside the company, among employees.

According to Yang et al. (2018), more and more firms concentrate their attention on utilizing or grow innovative practices to achieve “sustainability”. In service-focused companies, imitation of the provided services is difficult from competition. Thus, firms may enjoy sustainability from the competitive advantage that occurs from the mode they deliver their services to the audience for a long-term period till a competitor reach their level. In their paper, Yang et al. (2018) referred to “service-oriented manufacturing enter-

prise”, which in order to keep being competitive follow the subsequent innovative practices: research and adopting of fresh resources from the external environment to build efficiency, upgrade provided quality and push people to remain loyal in consuming the specific services. Following, in the same paper, the researchers stressed three service innovation practices. Firstly, there are the “guide-based service innovation practices”, which are foreseeable and have to do with learning processes from both industry and customers that will upgrade company’s innovation performance, as well with the measuring of both companies and customers in order to identify which of them belong in the first-class. Secondly, “project-based service innovation practices” refer to development of innovation plans, policies and experimentation projects in order to improve innovation performance. Thirdly, “process-based service innovation practices” on the contrary to the previous two categories are uncertain and are about altering the procedures or methods that the services are already being delivered. All three types of innovation practices assist “manufacturing enterprises” to engage and collaborate with ICT, boost firm’s “market performance”, improve and grow the provisions of firm’s service and utilize online methods to develop company’s “service innovation performance”. In general, it is significant that customers and other field’ professionals should take part in “service innovation” in order to boost “service innovation performance in an uncertain environment” and enhance firm’s sustainability.

In the work of Rahman et al. (2015) service innovation management practices are being analyzed in telecommunication sector in developing countries. As mentioned Hull et al. (1996), companies in order to sustain viable should pay attention to three practices that will assist them manage successfully the development of a new service procedure. These are “innovation process”, which includes actions to extract knowledge for both market and customers (Hull 2004), “cross-functional organization” that refers to plans building and methodical management of human resources to eventually bring innovation success. (Rahman et al. 2015)

Pustovrh et al. (2017) in their paper referred to “open innovation information exchange and open innovation collaboration practices” after their experience with “high-tech Slovenian SMEs”. From the research occurs that these activities generate more innovations. “Open innovation exchange practices” according to the paper may be the “availa-

bility of technology and materials, technology transfer offices, entrepreneurship incubators, research partners, conference and business fair visits, scientific publications”, while “open innovation collaboration practices” may be the cooperation with suppliers, customers, professionals that provide business, marketing consultancy and academia.

Pertuz and Pérez (2020) have gathered 116 innovation practices of SMEs separated in 13 sections according to “the innovation management process”. As proved, most of the times, companies chose to innovate by creating a new product or service, changing the managerial or organizational mode or exploiting human skills and resources to bring something new. Obviously, each company is unique and represents a totally different scope and business sector from others. Therefore, according to Babkin et al. (2015), each firm follows a different innovation strategy. Of course, innovation practices are also usually different following the demands of the company and the context they came to satisfy. Tidd and Thuriaux-Alemán (2016) added that there may be some basic practices that may be internationally applied in companies that belong in the same industry, but most of times they are different. In the research of Pertuz and Pérez (2020) the innovation practices that were identified have to do with SMEs, “leaning on Western culture”. The writers divided the innovation management processes in six stages. In the stage of “prospecting” or researching/mining the innovation practices that have been identified belong in the category of “benchmarking and business intelligence”, where internal and external scenarios are being evaluated regarding the market, competition and technology. Then, there is the ideation stage which includes “marketing activities” to open new markets, reach new customer segments, invite customers to join innovative activities and create advantages among competition, as well develop solutions for customers that they will wish to obtain and “idea generation techniques” that consist of methods such as brainstorming, focus groups and creation of future scenarios to search for opportunities, as well methods to organize and evaluate the ideas that have been gathered in a database. The next stage is that of “strategy construction”, where the innovation practices are about setting “innovation strategy, objectives” and procedures and align them with the business strategy, as well practices regarding “exploitation and exploration” of company’s existing knowledge and make efforts to enrich it. Moreover, the stage of “mobilizing resources” is composed of innovation practices that are about

identifying the “characteristics of organization and finding the resources for innovation development”, exploiting the human resources and direct them to generate innovation and create “strategic alliances and build the basis for open innovation”. The next stage is the “implementation of innovation management process” which includes practices regarding developing projects to assist managers implement all the knowledge, practices and methods they have learned till this stage in a time-defined framework, review the development of innovation and make changes to improve the final product before its fully developed or the procedures to be more effective and scan the environment for new technologies and adopt the most suitable for the business and its innovation process. The last stage is the evaluation of innovation process, where the innovation practices consist of using the right metrics to evaluate the outcomes of innovation and “managing the intellectual property” that all the previous activities brought to the company. As last innovation practice is considered “measuring the impact of innovation” (social or community impact and environmentally friendliness) in the internal and external environment. (Pertuz and Pérez 2020)

Hevner and Anderson (2014) supported that innovation practices practically “make use of the best ideas of design thinking”. By this term, Cross (2011) in Hevner and Anderson (2014), defined the official procedure of solving problems with a creative and novel mode to achieve a better outcome.

Bellantuono et al. (2013) in their effort to assist companies in selecting the most appropriate open innovation practices for their context they defined “the outside-in process or technology exploration or inbound innovation” (Dahlander and Gann 2010; van de Vrande et al. 2009), which refers to extracting knowledge from the external environment (customers, partners, R&D, in-licensing) and exploiting them in the inside. In addition, they referred to the “inside-out process or technology exploitation or outbound innovation”, which is about selling the internal knowledge and the “coupled process”, which essentially refers to “co-creation”, namely collaboration with third parties. Spithoven et al. (2010) indicated open innovation practices as ways to extract external knowledge and practices to achieve interaction and collaboration with external partners. Also, Fritsch and Lukas (2001) supported that such practices are them which contribute to information exchanging and facilitate the communication and project fulfill-

ment among partners. Lee et al. (2010) also stressed that these practices refer to cooperative modes between allies to facilitate funding, R&D information exchange and any other support needed. Sobrero and Roberts (2002) defined open innovation practices, as coordination procedures according to agreements with partners. Mortara and Minshall (2011) regarded the same the “open innovation” as a practice. Bianchi et al. (2011) supported that there are “inbound and outbound open innovation practices”, as also previously mentioned. Eventually, Huizingh (2011) referred again to open innovation practices as the procedures to build cooperation with third parties. (Bellantuono et al. 2013)

In the research of Anzola-Román et al. (2018) technological innovations are regarded as outputs, while the practices to achieve them (such as cooperating and extracting knowledge from external resources, upgrading of inside R&D and applying managerial innovations) as inputs.

Innovation practices in private sector are also a discussion object in the work of Adeyeye et al. (2019). There are references for “human resource practices” from Ardito and Meseni Petruzzelli (2017), who discussed the significance and contribution of them in open innovation. Also, Foss et al. (2011) in their occupation with Danish firms referred to “organizational innovation practices” that included the support of internal communication and stimulating of activities that have to do with knowledge gaining and sharing. In OECD (1999) study, there is a reference for workplace practices that are essentially part of organizational innovation. Scholars mentioned that sometimes it is better to combine practices (such as internal that have to do with the business strategy of a company, external which refer to processes to reach new customers and markets, as well practices that are about accountabilities in the working space), but there isn't a certain recipe for which ones to choose. These organizational practices when applied appropriately they create significant competitive advantages difficult to imitate. (Adeyeye et al. 2019)

Furthermore, Aas et al. (2015) were occupied with production-intensive service firms (telecommunication, financial, and transportation services), which use ICT to operate and are subjective to rigid governmental policies. The innovation practices according to this research are essentially all the methods used for strategy implementation, culture alignment with every new activity, management of portfolio and resources, as well the general innovation development process.

Blok et al. (2015) in their work for responsible innovation referred to management practices, such as monitoring of intellectual property or adopting innovation practices to obtain the first move between competition or other such practices that all may be communicated to partners in order to cultivate transparency and thus, trust. Adoption of practices that promote dialogue, collaboration and accountability may all also considered as innovative practices.

Sinan Tumer (2010) suggested “co-innovation” as an efficient innovation practice. Specifically, he referred to “living labs”, “pre-commercial procurement” and “rapid commercialization” as innovation practices that may be useful to organizations. Specifically, “co-innovation” refers to a circular unending innovation process, where if the infrastructures allow it (existence of “internet of services, internet of things, on-demand services provisioning and trading, service delivery framework and cloud computing”) each community member, either citizen, scientist or corporations may contribute with their innovative ideas to all the phases of growing an innovative solution, from research till implementation and commercialization. In this context, it is confirmed that the solution they provide, will be accepted from every aspect, namely it may ensure that it won’t harm any human or environmental rights or that the solution will keep an organization sustainable. As for “living labs”, this open innovation practice includes the creation of “application-driven research clusters” in technology field. The concept of this practice is that companies from the same sector will gathered together and concentrate their knowledge to bring new innovative, “user-friendly” and “high impact” solutions fast and ready to commercialize. This way, there may produce new modes to attract consumers, who will have already watched the development of the solution, provide their feedback and this essentially makes living labs a certain way to create processes and solutions that will be acceptable from the public. Therefore, this practice reduces the possibility of unacceptance and make customers more friendly to the use of new technologies. Furthermore, “pre-commercial procurement” is an innovation practice that creates the basis for private sector to participate in novel public markets. Specifically, public entities have the ability to ask for a certain solution and watch its development even from the start from multiple companies which compete each other, identify any risks its adoption may have, as well test it and eventually acquire it, when it fits perfect to its demands.

The solution that is demanded through this practice is technologically advanced and no other identical solution has been presented in the market, thus maybe even new R&D may be demanded. From this practice, private sector may bring to the light new solutions to satisfy new markets and public sector may adopt innovations in a quicker pace. "Rapid Commercialization" is also a practice to boost technological inventions to be promoted in a faster way to the market. To this direction this practice includes the concentration of innovators with "Venture Capitalists/Business Angels", as well public sector to make sure that the novel IT solutions will be according to consumers' demands. (Sinan Tumer 2010)

Belz (2010) presented the innovation practices of Google, Apple, Cisco to show how innovation in IT companies can be achieved. The first practice of Google refers to the IT personnel, as well the managers of the company that according to it had to devote the 20% of their working activity on their own creative projects. The latter also could spend another 10% to grow novel ideas. Another practice is that staff is free to communicate with all levels and bring their own ideas or solutions to the company. As soon as someone brings an idea, there are responsible teams to evaluate and adopt it, if it seems efficient. Apple engaged customer into "design process", as well established a common communication platform. Cisco created a management team to monitor its activity and set a review procedure. All these private companies indicated that there should be managerial and cultural practices in order to get a high innovation performance.

Taking into serious consideration the intellectual property of organizations that is lawfully and internationally accepted and efficient, firms look to find modes to innovate. Innovation practices that will bring effective results may be the existence or hiring of motivated managers that target to bring new initiatives, the supportive managers that assist staff till the implementation of the innovation, reducing bureaucracy, adopting participatory model engaging also customers, forcing staff to work for a percentage of time also for the innovation except for their other obligations and pursuing subsidies for innovative projects. Furthermore, another innovation practice being proposed is the boost of personnel to experiment with failure acceptance as a way of learning procedure. In general, it is necessary that a clear innovation strategy should exist, so that in-

novation activities will be build to fit above it, as well to company's culture (Katragadda 2006).

The same writer referred also to individual innovation practices that are as crucial as the organizational innovation practices. These include the lack of restrictions, so that the staff may express their views and ideas freely, incentivizing employees to innovate and support changes (Katragadda 2006).

Cammarano et al. (2019) suggested open innovation practices that have to do with obtaining components from suppliers that force innovation. Specifically, the research refers first to the most traditional open innovation practices identified from the literature, such as cooperation joint for creating a new innovation, consortiums, adopting of intellectual property, "licensing" and "spin-ins" (Schroll and Mild 2011). Then, it adds that the acquisition of innovative components from suppliers or the commitment of the latter to co-develop an innovative solution may also be considered as open innovation practices that provides added value to the final innovative product.

Lakomaa and Kallberg (2013) also referred to "open data" as a necessary infrastructure to develop innovative applications and services. In any case, open data is a core element in innovation procedures as its exploitation may bring growth and effectiveness. Especially, in business sector "open data" may provide an estimation of firm's viability to secure that will receive the necessary funding, find data about new market-targets, decrease time till implementation in the market, push innovative solutions further than just in applications and improve existing e-services and products.

Following, Felin and Zenger (2014) identified six kinds of innovation practices in business sector: "(partnerships/alliances, markets/contracts, contests/platforms and user/ community innovation) as open innovation practices and (authority-based hierarchy and consensus-based hierarchy) as closed innovation practices. (Loukis et al. 2017)

In the Public Sector

In the effort to identify innovation practices in public sector, Skåln et al. (2018) referred to "value creation, value co-creation and value facilitation". These concepts identify difficulties existing in service delivery and provide novel ideas that can be used to promote "service innovation" either by proposing new modes of service offering or improving the

existing ones. The writers also referred to “problem-finding and problem-solving practices”, which have to do with public servants or users (“intra-organizational actors”) that may come up with specific solutions to identified problems and contribute significantly in solving them and promote service innovation. Usually, as discussed many different actors take place to contribute in finding innovative solutions, such as public servants, citizens, the public organizations and other stakeholders.

Other scholars, such as Zhang et al. (2017) referred to the use of social media as a practice to achieve government innovation. As social media are a medium that connects the vast majority of citizens and other interested stakeholders without time barriers, as well are ubiquitous and accessible by personal computers, mobile phones or other electronic devices, they may be exploited to provide “microblogging services or applications”, engage public participation and enhance transparency in public procedures. Also, they may promote interaction between users and government over significant issues. Additionally, scholars referred to other tools that promote citizens’ informing that may also lead to innovation, such as “government websites, discussion forums, blogs, wikis, chat rooms, geographical information systems, decision support systems, voting systems, web and podcasts and e-mail services”.

Yuan and Gasco-Hernandez (2019) mentioned three open innovation practices that refer mostly to public sector: “crowdsourcing” that includes knowledge and ideas extraction from the participation of various people in online platforms that have as main goal to solve a social or public issue, “challenges and contests”, where external entities (people or companies) may contribute their insights to bring solutions for existing problems or assist in policy formation and application (Mergel and Desouza 2013), and “civic hackathons” that are organized events, which last the most two days and exploit open public data to provide digital solutions and applications that will facilitate civil problems, receive feedback from citizens, increase governmental transparency, responsibility and efficiency in public service delivery with low cost (“cost-efficient solutions”). (Desouza and Bhagwatwar 2012; McNutt and Justice 2016). (Yuan and Gasco-Hernandez 2019)

Kankanhalli et al. (2017) also referred to social media and the fact that they simply place people as collaborators to public innovation. According to writers social media can be a means of “crowdsourcing”, which is a practice successfully used also from the private

sector to use the ideas of people and can make open innovation easier even in “government agencies within the health, transportation, city planning and social services sectors, among others”. In the same research, Gascó mentioned “living labs as environments to support public open innovation processes”. This practice provides a common platform to search for problematic areas, create solutions and test them. Reddick et al. referred to “double-loop learning through social media”, which embraces citizens’ e-participation, as well Baka mentioned “co-creating an Open Platform at the local government level” to bring the significance of public participation, collaboration and “open society” concept from occupation with local public sector in Zambia. Following, Gagliardi et al. referred to “open data” as a way to build novel civil services from governmental data. Obama (2012), Singapore Government and other such public initiatives created the basis for open access to data to promote public participation, policy-making contribution and therefore innovation. Furthermore, May and Chadwick (2003), Szkuta et al. (2014) and Lohmeier (2013) referred also to e-government concept, which has been also developed to provide open information flow and service delivery to users and a lot of work has been conducted in order for the data to be accessible from everyone. (Kankanhalli et al. 2017)

Hermanto et al. (2018) discussed also the same concept of “open government data” from his reaserch in Indonesia’s public sector and mentioned that this practice may assist innovation development and diffusion in business sector, as many useful data will be provide open to learn and be exploited.

The paper of Albury (2005) referred to the fact that there are governemnts that have already cared to build places where innovation will thrive. In this context, it has been created the “Royal Mail’s Innovation Lab”, where there are all the necessary tools to assist in creative thinking. The writer added that it is also significant that public servants will have the ability to learn from any mistakes occur without being punished. Additionally, in order to protect innovation development from being rejected due to close examination in public sector activities or because of citizens don’t paying enough attention to the public issues, the practices suggested were “e-voting, patient choice etc.” in “safe-spaces”. To boost innovation, public sector may also assist the cooperations, support motivation and recognition, enrich the services’ options for users and connect funding

with innovation performance, so that a good performance may mean returning the profits in investing anew in another innovation.

Heimstädt and Reischauer (2019) referred to “policy cycle” as a practice used in public sector to accomplish innovation. According to this practice public entities (Mergel and Desouza 2013) make their requests asking for offers from the private sector and after deciding with which company they may make a contract and collaborate in order to bring a novel service or a new procedure for service delivery. In the following years, this process proved as unefficient to cope with modern demands, therefore “open innovation” presented additionally as a new practice (Chesbrough 2003; Heimstädt and Reischauer 2018; West and Bogers 2017), without replacing the previous one that is still prevailing. This practice assists in bringing light to social problems that together with the ability that is provided on engaging citizens in innovation process can contribute highly to public innovation. Transparency and participation also increase citizens’ trust in public sector. Essentially, open innovation includes the use of knowledge from every source to finally exploit it for internal purposes and expand in new markets and customer segments (Chesbrough 2003; West and Bogers 2017). The writers indicated also another innovative practice, such as “public competition BigApps” from NYC government sector. This is a web portal that consists of a great bulk of open data from local city public services regarding many fields that may assist in voting or even provide data for citizens consumption in café, restaurants etc. This way government wishes to attract the interest of businesses, academia and other stakeholders that through the open innovation practice “inter-agency hub MODA (Mayor’sOffice for Data Analytics (MODA))” may find out together, societal problems that will be solved through innovation from “the volunteer community BetaNYC”. (Heimstädt and Reischauer 2019)

According to Dunleavy et al. (2006) the innovation practices that can be performed in government entities may be the altering of agencies’ business model or improving existing processes, integrating new technological advances, either software or hardware, using of new knowledge or resources to force innovation into organization and making novel products or services or adding quality elements to the existing ones. Furthermore, practices that are in the direction of innovation are to incentivize and reward public management in order to urge them to produce new ideas and adopt new methods, im-

prove existing procedures in each public agency to unblock any processes that hinder innovation development, set groups of people to bring suggestions for new innovative ideas, boost public agencies by placing new personnel from private sector to the existing services to co-develop with the current employees innovative projects. Other practices to cultivate innovative culture into an organization are to educate staff using successful examples of innovations by providing access to them to “conferences, events, sessions or else way previous lessons”, make staff aware of the costly activities that set obstacles for innovation and productivity factors, or provide methods that may contribute in effectively extraction of knowledge and create the space for new or young staff to brainstorm, discuss together and make proposals, as well have access to higher positions into the organization. Additionally, it is significant that the agency should be flexible enough and that all employees will have the ability to express their views or proposals for innovative solutions. The employees can interact with managers through forums. Communication is also proposed to exist with citizens “(via focus groups, surveys and other forms of market research)” in order organization to get feedback and improve its facilities.

Cunningham (2016) in an effort to mention good practices for open innovation referred to a set of activities to support stakeholders better integrate to produce innovation, as well to “living labs” as a mode of education, advising and training, “co-creation”, mentioned the need of agility in public services, adaptation in local communities, extracting and exploiting new skills from external sources and integrating them to the internal environment of the organization.

Coulon et al. (2020) introduced certain activities to achieve developing successful innovation solutions. Specifically, stated that it is significant that the needs, requests, skills and characteristics (knowledge background) of users will be identified in order to create solutions suitable to them. Allies in open innovation consortiums should be gathered to discuss about the adoption of certain technological equipment or a certain service to develop. Of course, use of flexible and adaptive to the environmental changes’ tools and experimentation before the final development of the service are crucial.

The best innovative practices in the European spectrum are also being gathered in the “European Public Sector Award (EPSA)” platform “from Europe’s public sectors”. This initiative has to cope with two issues. At first place, to find ways to motivate policy mak-

ers and other public managers to innovate and secondly to diffuse this innovation. EPSA essentially gathers innovative practices and thus, promotes knowledge dissemination, education of public servants from the success of these cases and set the basis for further data analysis. Also, it is a space, where public agencies may “compete” to bring innovation. In general, using EPSA as a practice, may assist in cultivating transparency and provide knowledge availability of all case studies in the public sector and in citizens. EPSA cares to publish innovations that are simultaneously working solutions as they have already produced tangible outcomes. The methods mentioned to be used in EPSA that include stakeholders’ participation for solving civil problems and projects may be “co-design”, “co-production”, “self-management of outcomes”. (United Nations Economic Commission for Europe 2017)

After the fourth European conference that was conducted in Finland, in 2004, researchers mentioned that the improvements in public services’ quality and delivery show a new direction for public sector, the “co-era”, such as “co-production, co-design and co-evaluation”. These new tools being generating through the technological advances of the era would lead in greater local public transparency, thus raise citizens’ trust, participate and develop together such services that will solve difficult and complex civil issues. To foster innovation practices public sector administrative agencies have defined “prizes” so that both successful innovation achievement and satisfied innovators may occur (United Nations Economic Commission for Europe 2017).

Furthermore, European Commission introduced “Horizon 2020” as a practice to enhance innovation in Europe. This is essentially a programme that provides financial resources in ICT projects that try to develop a novel solution based on “co-creation” and “open government concept”, which includes “open data, open service and open process”. With this initiative, new public services may occur, users may be more interested to utilize them and more knowledge in formed structures will be created that will facilitate more stakeholders (European Commission 2019).

According Lohmeier (2013) as innovation practices can be considered the entry of a new product, service or process, as well cultural changes in public entities and the use of “eGovernment” to improve innovation. It is essential that e-government will not just be used as a means to transmit the same old processes with digital way, but there should

be enhanced to a tool that will bring innovation and efficiency or support other practices for the same scope.

Conradie et al. (2012) stressed the concepts of “open data” and “PSI (Public Sector Information Release)”, which both are bases for many critical innovation practices in public sector. Both cases cultivate transparency of public sector and engage citizens and users to decision making for innovative solutions (Huijboom and Broek 2010). For PSI it is necessary that some standard policies would exist, as well open data and certain procedures according to local government demands. Based on these issues the writers mentioned “Co-creation in a Living Labs Environment”, as innovation tools. Open data are an extremely useful tool when exploited in a collaborative manner with different partners that target to produce innovation. Living Labs are essentially “physical spaces or a social network of idea exchange” where different people, public and business sectors, as well citizens brainstorm. Other researchers in the same paper referred to “co-design and user participation” that are more usual methods, where people who utilize the innovative solution are taking part in building its design (Mulder and Stappers 2008). Of course, another practice suggested for innovation generating is “open innovation”, where “companies are seeking influence from outside, allowing an influx and exit of ideas” (Chesbrough 2003). In the light of these practices, Conradie et al. (2012) confirmed that co-creation, open innovation and participation have a strong similarity, which is the cooperation between different stakeholders to bring new outcomes or new services. (Conradie et al. 2012)

To the knowledge of Anderson et al. (2015) practices that may be used to force innovation in civil sector may be the social media, such as Twitter, Weibo in China, “smart city” initiatives, which require smart technologies to extract knowledge for routine activities of citizens (“utilities, transportation, and public safety”) and after that provide them more significant information to facilitate their lives, inform them about environmental-ly right habits and make their moves more efficient.

Al-khafaji et al. (2014) added also that e-government has contributed and facilitated a lot citizens’ routine, but the capabilities of this upgrade of existing public services in digital delivery does not end in this level. E-Government provides flexibility, access to plenty of public services, supports democracy and of course promote innovation and efficiency

in public sector. Innovation demands the use of this tool to enhance communication and interaction between users and government, improve existing services, support transparency with open data and boost service delivery.

Furthermore, Loukis et al. (2017) stressed that despite the fact that there is previous knowledge from how open innovation operates as a practice in private sector, the imitation of this in public sector isn't feasible. Therefore, it is essential to grow "citizen-sourcing methods" to start obtaining crucial data for them. This knowledge may be extracted from "social media (e.g. political blogs, news websites, Facebook, Twitter, etc. accounts (or government's website)) by government agencies". In order to solve civil problems, develop new regulations, services, processes or improving the existing ones it is necessary to "exploit the extensive knowledge of citizens ('citizen-sourcing')". The facts that people surf through the Internet, interact with public sector through social media to place their political views or opinions regarding social problems are opportunities to gain external knowledge passively that would be useful in an open innovation environment in the public sector. "Social media monitoring (SMM)" as a practice is already used from business sector to gain feedback over their products or services, understand the most appropriate mode to reach consumers and gather information regarding competition.

Gascó (2017) indicated that "Living Labs" are really valuable supporting tools for public sector that promote open innovation, where government, users and business sector may cooperate to make research and develop as "co-creators" certain solutions for their mutual problems and then have the ability to test them in a pre-decided context and co-produce them. Due to this cooperation of all these different stakeholders, living labs, according to Nesti (2015) may also be "defined as public, private and people partnerships (PPPP) for user-driven open innovation".

Husin et al. (2019) brought again the concept of open data, confirming that it promotes innovation as a knowledge contributor from government to citizens or entrepreneurs and then, sends back feedback to enhance government. According to the scholars open data itself may be regarded as innovation as it can transform different fields of a country, from political, economical to social, providing positive outcomes to users. The writers also provide the example of "Open Data Portal (ODP) by the U.S government, fol-

lowed by the U.K government and New Zealand". As proven these free and useful public information may become extremely valuable and contribute to greater performance of both public and private sector.

Santos et al. (2017) identified that the biggest part of human population lives in cities, thus, it is natural that many civil problems may exist "urban problems such as safety, traffic jams, health, education, pollution and social exclusion". To this direction these writers presented once again "Living Labs" as a method to promote social or else called "user-driven" innovation (Oliveira and Marsh 2014). As soon as a city becomes smart by devoting financial assets to boost its human and social resources and adopting such as the above-mentioned practices, then it is considered that increases sustainable innovation. Other innovation practices or methods are "Living Labs, Design Thinking and Gamification to engage and motivate citizens and city halls in the co-designing and co-creation of products and services to respond to their WINs (Wishes, Interests and Needs)". Supplementarily, the writes mentioned that "civic participation includes (social innovation, co- designing, co-creation and collaboration)." (Santos et al. 2017)

Moreover, Loukis et al. (2017) indicated that public sector adopts a lot of tools coming from private sector in order to apply open innovation practices. Specifically, uses "open data platforms" to upgrade open innovation and cultivate sustainable smart cities (Lee et al. 2014), "policy modelling and simulation" to bring changes in the rigid public policies, "social media monitoring and analytics" to evaluate "real time" people' views and respond properly, "opinion mining" to gain knowledge over people' opinion about certain issues, "reputation management" to extract information over reputé of an organization, "collaboration support" to share knowledge between organizations which cooperate, "argumentation support" that has to do with certain information exchanging to assist on reasoning about an issue and "decision support" to boost the successful decision-making. (Loukis et al. 2017)

Concilio et al. (2017) in their work for "Urban Hackathons" referred also to "open data" stating that there are plenty of sources that provide useful data for exploitation, "Internet of Things datasets" that are data from cities' sensors and "Big Data sources that include e.g. individual mobile phones' GPS locations". According to writers this data can be used for the development or improvement of civil services, as well for creating new

data from combinations between them that may sometimes, if including personal or business data, be not available freely. “Hackathon” refers to a timely and resources-bounded event, where mostly “software developers and interface designers” try to find a fast digital solution to a global issue that is not only of the interest of software companies, but also from public sector and “venture capitalists”.

In the next chapter, the reaserch questions of current work are being clarified and analyzed.

Method

In order to produce the current work, a systematic literature review has been conducted. To obtain the necessary knowledge, the research that has been made was thorough and extensive, extracting data from formal scientific electronic libraries. Specifically, the search engines that were used are: Scopus from Elsevier B.V, Semantic Scholar, IEEE Xplore Digital Library and Google Scholar. The keywords or key-phrases entered in these bases were: "PRIVATE SECTOR INNOVATION", "PUBLIC SECTOR INNOVATION", "INNOVATION STRATEGY", "INNOVATION TYPES", "INNOVATION PRACTICES", "OPEN INNOVATION IN PUBLIC SECTOR", "OPEN INNOVATION IN PRIVATE SECTOR", "PUBLIC SECTOR INNOVATION DRIVERS", "PRIVATE SECTOR INNOVATION DRIVERS", "PUBLIC SECTOR INNOVATION BARRIERS", "PRIVATE SECTOR INNOVATION BARRIERS", "IMPLEMENTATION OF INNOVATION IN PUBLIC SECTOR" and "IMPLEMENTATION OF INNOVATION". To get as many and close results as possible, the research focused on finding these key-phrases wherever in the title, abstract or context of references they were mentioned. The number of the papers that were gathered in the first place were 280. After examining their content in detail the literature was restricted to 187 research works. These references were used in the main part of the current work and are being summarized and categorized in the next chapter, the "Results", as following: "Differences of innovation strategy context in Public & Private sector", "Innovation types in Public and Private Sector", "Differences of Innovation Practices in Public and Private Sector", "Differences of implementing innovation in Public & Private sector", "Drivers in Open Innovation in Public Sector", "Barriers in Open Innovation in Public sector", "Drivers in Open Innovation in Private Sector" and "Barriers in Open Innovation in Private sector". No limits were set regarding the time period or the type of the resource. All publications considered in the paper were in English language. The last month of research was December of 2020.

Results

As mentioned in the beginning of this work, the main research objective was to examine the existed academic literature and map the innovation concept between private and public sector, so that from the quotation and comparison of the different variables between these two organizational types will occur valuable insights for both of them, as well for the scientific community.

For this reason, below are demonstrated the comparison and classification tables, which include the differences of developing and implementing innovation in the two before-mentioned sectors, as well the categorization of drivers and barriers of adopting open innovation. For these comparisons, there are used the references that have been extracted from the literature, with the rank provided in the Appendix.

Differences of developing innovation in Public & Private sector

In order to identify the differences of developing innovation in the private and public sector, the research studied separately the innovation strategy context for each kind of entity, the innovation types as demonstrated from the academic literature, as well the innovation practices that organizations adopt in order to develop a successful innovation.

Following to the above-mentioned, three tables were created that gather all the knowledge from chapters 2.2.5, 2.2.6, 2.3 and 2.5. In each of these tables, a comparison between innovation concept in private and public sector is being conducted, so that new insights will come up, as well conclusions about the mode both sectors develop innovation.

In the Table 1, innovation strategy context is firstly being examined between the business and civil sector. The plan that is used in order to adopt and develop an innovation is a crucial indicator of the different outlook and mode both entities are organized over innovation adoption, therefore the comparison between the strategy contexts in these sectors may reveal areas, where one of them may have not developed. In this case, organizations have the opportunity to identify them and make the necessary steps to improve or develop the missing activity.

Table 1. Differences of innovation strategy context in Public & Private sector

Innovation Strategy is a tool / plan to ...	Private Sector		Public Sector	
	References	Sum	References	Sum
Identify, Create & Grab Opportunities from External Environment	78, 116, 138, 185	4	57	1
Manage Internal Capabilities	34, 35	2	57	1
Handle & Allocate available resources (Technological, R&D)	34, 35, 185, 79	4	–	0
Distribute Financial Resources	–	0	10, 57, 46, 164	4
Manage Marketing Innovation (Identify Competition Activities, Market Trends, Opportunities & Threats)	185, 79, 84, 34, 35, 149, 102	7	–	0
Handle Internal Competition	–	0	172	1
Achieve Competitive Advantage / Sustain Market Position & Viability	102, 34, 35, 78	4	–	0
Identify Forthcoming Challenges	3, 34, 35	3	5	1
Recognize the level of Risk-Tolerance	–	0	152, 54	2
Increase Organization's & Innovation Performance	34, 35, 173	3	57	1
Enhance Productivity	34, 35, 97	3	15, 57	2
Educate / Train Personnel	116	1	57, 5	2
Manage Organizational Structure	185, 168, 102	3	173, 172, 15, 5	4
Handle Political Structure & Barriers	–	0	173, 172, 164	2
Differentiate from Competition	34, 35, 180	3	–	0
Scan & Invest in New Technologies	116, 78, 185	3	173, 46	2
Hire Skilled People	116, 185	2	–	0
Become First-Mover / Rule Braker	102	1	–	0

Develop New Products	163	1	–	0
Improve / Develop New Services	163, 149	2	173, 57, 15, 5	4
Build New Processes	102	1	173, 15, 164	3
Improve Service Delivery	–	0	172, 10, 15, 57, 35	5
Keep Innovation Activities in line with Corporate / Business Strategy	185, 79	2	–	0
Keep Innovation Activities in line with Stakeholders' needs	–	0	5, 54, 10	3
Change Business Model	39, 102	2	–	0
Motivate Human Resources (accept trial-error, encourage employees)	116, 181, 185	3	5, 47, 164, 12, 54	5
Reward Employees	116, 185	2	–	0
Change / Improve Rigid Policies / Processes / Methods with more agile	116, 34, 35, 163, 84	5	10, 57, 47, 164	4
Manage Knowledge	84	1	172, 57, 15, 47, 46	5
Ally with Competitors(for large firms)	102	1	–	0
Embrace Innovation Thinking (brainstorm, open communication)	102, 181, 185, 116	4	57, 5, 164, 35, 63	5
Cultivate Innovation Culture	181, 185, 102	3	57	1
Forecast Changes in Innovation Type & Relevant Switching costs	78	1	–	0
Identify & Decline Innovation Cost	84, 97	2	57	1
Cultivate Internal Collaboration	181	1	172, 46	2
Develop Open Innovation	155, 84	2	47, 35, 54, 46, 164	5
Enrich Procurement Solutions	–	0	57	1

Continually Re-invest in Innovation	34, 35, 97	3	–	0
Manage relationships & communication with third parties	–	0	57, 5, 47, 46, 25	5
Build Community Strategy	–	0	15	1
Bring / Manage Users' Participation	–	0	15, 5, 46	3
Reduce Bureaucracy	–	0	5, 47	2
Bring Personalized Services for users	–	0	5	1

In the following Table, No.2, there is a quotation of the different innovation types that scholars have identified through their research in business and public sectors.

Table 2. Innovation types in Public & Private sector

Scholars referred to ... innovation	Private Sector		Public Sector	
	References	Sum	References	Sum
Service	146, 92, 144, 130, 85, 182, 13, 180	8	173, 50	2
Process	73, 127, 97, 139, 118, 87, 92, 144, 158, 28, 130, 85, 21, 13, 167, 62	16	173, 35, 172, 51, 58	5
Product	73, 127, 35, 139, 97, 118, 87, 92, 28, 144, 158, 130, 85, 21, 167, 62, 180	17	172, 35, 50	3
Ancillary	–	0	172	1
Organizational / Administrative	127, 73, 87, 118, 28, 92, 144, 158, 130, 85, 13, 167, 62	13	172, 35, 173, 110	4
Communication	–	0	35	1

Workplace	–	0	109, 136	2
Collaborative	132	1	160	1
Governance	–	0	120	1
Conceptual	–	0	16	1
Marketing	73, 127, 11, 158, 139, 118, 87, 85, 167	9	–	0
Business Model	73, 180	2	–	0
Product Improvement	97	1	–	0
Incremental	28, 118, 130, 100, 180	5	–	0
Small step	28	1	–	0
Through Synthetic	28	1	–	0
Internal	132	1	–	0
External	132	1	–	0
Technical	118	1	–	0
Technological	118, 116, 62	3	–	0
Architectural	118, 135	2	–	0
Radical	118, 135, 130, 100	4	–	0
Major	118	1	–	0
Minor	118	1	–	0
Disruptive	135, 148, 100, 180	4	–	0
Routine	135	1	–	0
Service Delivery	146	1	–	0
Customer-driven	146	1	–	0
Exploratory	40, 141, 179	3	–	0
Exploitative	40, 141, 179	3	–	0
Ambidextrous	141	1	–	0
No-emphasis	141	1	–	0

Closed	24	1	–	0
Open	24, 111, 100, 180	4	–	0
Position	21	1	–	0
Paradigm	21	1	–	0
Science-Based	78	1	–	0
Investment-Based	78	1	–	0
IT/Process-oriented	78	1	–	0
Compression	61, 182	2	–	0
Experiential	61, 182	2	–	0
Responsible	27, 169	2	–	0
Breakthrough	148	1	–	0
Sustaining	148	1	–	0
Basic Research	148	1	–	0
Maintenance	129	1	–	0
Tangible	7, 157	2	–	0
Intangible	7, 157	2	–	0

Moreover, the Table 3 gathers and compares the innovation practices that public and private sector seem to follow, based on the academic literature, in order to accomplish innovation adoption.

Table 3. Differences of innovation practices in Public & Private sector

Innovation Practices	Private Sector		Public Sector	
	References	Sum	References	Sum
Crowdsourcing	135	1	183, 86	2
Co-creation	135, 17	2	150, 86, 48, 71	4
Value creation	–	0	150	1

Value facilitation	–	0	150	1
Open Innovation	24, 137, 156, 17, 70, 153, 96, 121, 22, 81, 9, 32, 64, 135, 134	15	42, 75, 175, 74, 45, 71, 46	7
Problem-finding & solving	–	0	150	1
Exploitation of Social media	–	0	184, 86, 6, 104	4
Marketing Practices	34, 134	2	–	0
Organizational innovation practices	34, 31, 87, 138, 2, 68, 128, 134, 8	9	–	0
Guide-based & Project-based service innovation practices	182	1	–	0
Process-based service innovation practices	182	1	57	1
Adoption of new technologies	125, 135, 134	3	57	1
Use of digital services & apps	24, 125	2	74	1
Monitoring innovation & review	19, 134	2	–	0
Activities to be First-mover	72, 166, 27	3	–	0
Delayed entry or financial commitment	166	1	–	0
Separation of work in projects & groups	135, 134	2	–	0
New distribution channels & commercializing modes	34, 135	2	–	0
Search for new resources	182	1	48	1
New Products or Services	134	1	103, 57, 5	3
Create Complementary products	135	1	–	0

Exploiting Human Resources	134	1	–	0
Idea generation techniques	134	1	–	0
Exploitation & exploration practices	134, 17, 49, 165	4	–	0
Extracting Knowledge from external environment	8, 53, 138	3	–	0
Intellectual property monitoring	27	1	–	0
Promotion of free dialogue, collaboration & accountability	27, 19	2	–	0
Co-innovation through “Living Labs”	149	1	86, 48, 45, 131, 71, 147	6
Devote time of working activity for own-creative projects	19	1	–	0
Co-development	32	1	–	0
Motivation of managers to be committed & supportive	88, 1	2	–	0
Individual Innovation Practices	88	1	–	0
Exploitation of “Open data”	93	1	126, 86, 76, 45, 80, 82	6
Exploitation of Internet of Things datasets, data from cities’ sensors & “Big Data sources	–	0	44	1
E-government concept	–	0	37, 86, 4, 103	4
Acceptance of experimentation & failure as a learning process	88	1	–	0
Innovation through Challenges & Contests	–	0	114, 183	2
Innovation through Civic Hacka-	–	0	53, 108, 183, 44	4

thons				
Policy cycle	–	0	114, 74	2
Co-production & co–evaluation	–	0	164	1
Co-design & user participation	19	1	45, 164	2
Design Thinking & Gamification	–	0	147	1
“Smart city” initiatives	–	0	6	1
Changing Business Model	–	0	57	1
Motivation of employees	–	0	5, 57	2
Exploitation of Lessons-learned	–	0	57	1

The observations of all the above tables (1, 2 & 3) are being discussed in the chapter 6 of the current research. In addition to these and in order to have a more complete view over the differences in developing innovation in private and public sector, below are also quoted significant works that have examined this issue for both sectors.

According to United Nations Economic Commission for Europe (2017) despite the fact that innovation is a crucial issue for countries and all kind of organizations globally, it seems that the strategies that are being developed for public sector are less than in the private. Specifically, it is mentioned that there are some differences in the mode innovation is being evolved and implemented in each of these sectors. The differences are being detected in the way the working staff (private sector employees or public servants) is being stimulated or rewarded, on the resources that are available and risk-tolerance.

As far as private sector is concerned, there is a separation between companies that are activated in developed and developing economies, as well between large and small firms. For the first part occurs that in developed countries the development of innovative actions is concentrated more on taking advantage of social networking, whereas in developing, innovation is most useful to bring competitive advantage, sustain intellectual property entitlements and open the way to new resources and funding. For the second part, for small, emerging companies, innovation is essentially a core of their creative existence, whereas large ones indeed invest in innovation, even though they are not

as flexible as the smaller ones and the outcomes of innovation may usually be not so effective (United Nations Economic Commission for Europe 2017).

Public sector from the other side, despite the fact that apparently seems rigid when it comes to innovation concept, it occurs that it develops innovative activity, almost equal to private (Leyden and Link 2015). As proven, public managers often grab opportunities to innovate tolerating the risk that may occur, taking though into consideration that contrarily to private sector they will not be rewarded the same way as in the latter. Specifically, it is mentioned that public managers are motivated with a better position inside the public organization, as well they may be driven by the satisfaction that will occur, when they will bring an innovative solution for the public uplift, whereas private ones are usually motivated with a greater salary. Larger differences are met when referring to funding and in the agility in developing and implementing an innovation. In this case, in public sector there may be constitutional, legal or political limitations that hinder the innovative activities or initiatives. Beyond these constraints, public sector supports innovation, and this appears on the evolution of mode of service delivery, costs reduction, provision of new, improved or lower-cost products or services and changes in the managerial or organizational structure that affect positively the public good. Indirect innovative activities of the public sector that affect private may be changes in governmental policies that promote economic growth for private entrepreneurs. (United Nations Economic Commission for Europe 2017)

Kankanhalli et al. (2017) in their research for open innovation referred also to differences between civil and business sector. They cited that there are essential distinctions in the way both entities seek for financial resources, in the mode they develop their organizational structure and monitor innovation, the level of accountability and “ownership” in each case and that most of the times public sector borrows the innovative solutions from the private, rather than initiate them. In the same work, writers discussed that most of the times the difference is detected on the same the provision that private and public entities will make to their audience. Business sector creates products or services, while in public sector it is usually an intangible good (Lee et al. 2012). Furthermore, while in entrepreneurial sector the main goal is to gain competitive advantage by extracting knowledge from the market, gain profits and sustain viable, in public sector

open innovation assists in extracting value and incorporate it in solutions for societal challenges, provision of better services and cultivation of relationships of trust and respect between public agencies and audience (Mergel and Desouza 2013). Eventually, in private sector open innovation activity may take part “suppliers, customers, competitors and partners, academic and research institutions”, while in civil sector may be “citizen networks, online intermediaries, academia and higher education, other governmental organizations (e.g., legislators), non-governmental organizations (including the private sector) and non-profits (Lee et al., 2012)”. From this research occurs that these sectors need different management, when open innovation is the case. (Kankanhalli et al. 2017) Cankar and Petkovšek (2013) added also that private sector stimulates differently its employees in order to concentrate their efforts to innovate in relation to public sector. In the first case, “career considerations, idealism, professional recognition, power, self-fulfilment and money” are the incentives, whereas in civil sector are “the propagation of a policy, idea or rationale, increased funding, problem- solving, an increase in staff, and public relations”.

Evidently, there are significant differences in innovation adoption between private and public sector, but as occurred from the literature in the previous chapters, there are also differences on implementing innovation in private and public sector.

Differences of implementing innovation in Public & Private sector

According to Klein et al. (2001), the adoption of innovation is about taking the opportunity to obtain and exploit an innovation, whereas implementation of innovation refers to the way people inside the organization will deal with the innovative concept (either new technology or activity) and the mode they will treat and use it. Additionally, researchers such as Fichman and Kemerer (1999) proved that in most organizations people delay a lot of years till eventually implement the innovation that has been adopted and named the phenomenon as “assimilation gap”. Scholars identified that usually there are two factors or types of activities that hamper innovation implementation: the activities that have to do with employees or organizational procedures. Therefore, the successful implementation of an innovation occurs firstly, from the employees’ mind-set/outlook over the certain innovation concept, as well secondly, from the existing or-

ganizational structure, the availability of financial, human and social resources and other administrative factors that include motivation, risk-taking, internal knowledge management and innovation (Song and Chu 2012) and learning support. To this direction, Klein et al. (2001) made an effort to capture this situation in their model, mentioning that the targets that organizations should try to achieve are to implement the innovation effectively and try to adopt an innovation type that would be efficient for the organization. In general, it could be stated that if top-management covers the innovation strategically, then it assists staff understand how significant its implementation is for the organization, as well, additionally, it may also incentivize them in order to boost them apply it (Klein et al. (2001). (Choi and Chang 2009)

To understand more about innovation implementation and the differences between business and public sector there was created the Table 4. As it seems, the factors that affect the implementation success reflect the differences of these two sectors.

Table 4. Differences of implementing innovation in Public & Private sector

Factors Affecting the Success of Innovation Implementation:	Private Sector		Public Sector	
	References	Sum	References	Sum
Employees outlook over innovation	66	1	–	0
The Organizational Structure / Hierarchy	66, 123	2	52, 59, 65	3
The Availability of financial resources (implementation more expensive than adoption)	66, 145, 124	3	–	0
The Availability of human resources	66	1	89	1
Administrative factors (motivation, risk-taking, failure tolerance, internal knowledge management & learning support)	66, 145, 143, 91, 174, 107	6	89	1
Top-management's motivation mode (incentivize or force)	89, 145, 90	3	–	0
Rigidity level of regulations & procedures	145	1	89	1

Capability & Encouragement to experiment (learn/training & practice over innovation)	145, 67, 186, 91	4	89	1
The preparation & forecast of potential lacks in technological skills, resources, knowledge & capacity	98, 106, 69, 170, 107, 30	6	–	0
Existence of clear innovation strategy in line with business strategy	89, 98, 77, 90	4	–	0
The degree of skills & commitment of staff	145	1	171,161,52	3
Simultaneous adoption of many technologies	145	1	–	0
Hiring of New skilled personnel / existed staff may be in the background	145, 91, 123	3	171, 52, 65	3
Implementation pace & needs	145	1	–	0
Stress & pressure to employees	145	1	–	0
User-friendliness of innovation	145, 142	2	–	0
Company's readiness & staff' values	90	1	–	0
Rewarding employees with financial motives	95	1	–	0
Leadership & culture / in public sector "the public entrepreneur"	123	1	105, 51	2
Grouping employees increases participation	83, 33, 107	3	–	0
The degree of organization's rigidity	–	0	90	1
Demographic factors	–	0	52, 59	2
The size & type of organization may define the pace & available resources for innovation implementation	–	0	65, 177, 178, 52, 51, 59	6
The "organizational location"	–	0	119,52,161	3

To perceive even better the differences of implementing innovation between private and public sector, below is presented the analysis based on the existed literature.

Innovation Implementation in Public Sector

In public sector, Klein et al. (2001) understood that the existed regulations and procedures are essential factors that transform the outlook of civil servants, when they have to implement an innovation. Therefore, it comes up that public administrators have to set the basis, allow and support staff on implementation and cultivation of “collective implementation efficacy”, providing the necessary sources and knowledge pools to assist the successful outcome. The writers also referred to the example of e-Government, where public servants should have the necessary knowledge background, the capability to experiment, learn and practice in order to implement such innovation types. Additionally, writers stressed that when employees eventually accept and invest their efforts in implementation of innovation, then it is quite more possible that the result will be positive (Clayton, 1997; Leonard-Barton, 1988). (Choi and Chang 2009)

Mack et al. (2008) referred to implementation in the public sector and highlighted the importance of “public entrepreneurs” with different roles that participate in innovation. These may be the innovator, the leader and the team builder or sometimes it may be a group of people that have the characteristics of a role and not just one individual. All these have their own accountability in implementing innovation, so that they will bring flexibility and change to the degree they affect things. On the contrary to private sector model that according to Klein and Sorra (1996) may be also flattened, in public sector there are many roles that usually do not change and thus, should be taken into consideration in the implementation process.

Demircioglu (2020) also examined innovation implementation in public sector. In this case, it has been found that innovation “context” (Egeberg 2007), and more specifically its two aspects, the organizational structures, as well demographic factors affect innovation implementation success. The research showed for instance, that civil servants occupied in big public organizations seem to be less keen on innovation, on the contrary to their male subordinates who support it. “Leadership” also affects innovation development according to De Vries et al. (2016). Moreover, Fernández and Wise (2010), Wise (1999), Wynen et al. (2014) indicated that the bigger the public entity, the more successfully it can develop an innovation, as it is likely to have more resources to devote in this activity (this may be scientific personnel or/and financial resources). There are of

course, researchers that identified that the larger the civil agencies, the slower the way to develop innovation. This may be because the big organizations are not so flexible (Hannan and Freeman 1984; Scott and Davis 2015) and they do not deal with competition (Dunleavy 2014; Walker 2014; Wilson 2000), therefore, there is no motive. Another factor that influences implementation may be “organizational location”. For instance, employees in local agencies may have more agility than larger ones, the financial resources and hierarchy may be different, thus affect innovation development differently, as well the easiness in communicating and cooperating among them (Moldogaziev and Resh 2016; Torugsa and Arundel 2016). The researchers stressed also that the “type of organization” affects implementation and specifically, agencies that gather more knowledge (Egeberg 2007) or have to do with service delivery and do not deal with technical issues (Torfing and Triantafillou 2016), may be more keen on innovation. “Gender”, “education”, as well “tenure” seem also to affect the outcome of the innovation. Walker (2014) and Torugsa and Arundel (2016) mentioned that educated people can contribute more in innovation with their skills. As for the duration of an employee’s service, Fernández and Wise (2010) indicated that new employees are closer to innovation with both skills and technological awareness, on the contrary to Walker (2014) that regard people, who work for a long time, as more experienced and skilled to contribute to innovation. “Hierarchy” may also play a significant role in public innovation, as people that are superordinate may have the ability to decide and choose what resources to use so that they will develop innovation successfully (Fernández and Wise 2010); Torugsa and Arundel 2016). In general, the study comes to its own conclusions from examining data from Australian Public Service (APS) and mentions that size and location do not play a significant role, whereas long tenure, high education, male-gendered and people who belong in the top-management are more directed to successful innovation implementation. (Demircioglu 2020)

Innovation Implementation in Private Sector

Lendel and Varmus (2011) regarded that there is a way to build a model, which will include the necessary elements that lead to accomplishment of innovation strategy implementation in private sector. To this direction, they presented the model of Jakubíko-

vá (2008) that defines in six steps how an innovation strategy would be created, which shortly includes the narration of the strategic elements, the building and applying of the strategy, as well its assessment and monitoring. After identifying the available resources, internal and external knowledge, innovation strategy is ready to be built. In order to be implemented appropriately, there should be forecasted all potential barriers, such as lack of technological skills, resources, knowledge and capacity needed in order to develop the innovation. Moreover, policy and directions should be set, the goals and objectives should be clear and state what the outcomes of innovation will be so that they will be understandable to everyone in the company. The contribution of all employees in implementation of innovation is important, thus they should be given the opportunity to take part on it, providing their ideas and knowledge. (Lendel and Varmus 2011)

Rozgus (2003) noticed that there are many companies that despite that they have decided and adopted an innovation they fail to exploit it due to implementation issues. A case may be that the staff is not qualified or committed enough to be trained over innovation process and does not truly understand its added-value. Also, there may be the case that the company decided to adopt many technological innovations simultaneously that may be problematic and cause delays and troubles on smooth company operation. New technologies or innovation mean that staff has to be trained and learn. This may cause stress and pressure to employees, therefore, they may wish and try to avoid novel procedures, therefore, hamper implementation. Of course, as usually such initiatives are coming from top-management, employees are forced to apply them without being asked and this creates a negative posture on innovation implementation from latter's side. Moreover, an innovative process for the company may mean also that new and skilled personnel may be hired to manage its implementation. This may set existed staff in the background, thus, create unwillingness to join and contribute to the new process. Implementation also, on the contrary with adoption is far slower and more expensive, because it may need staff training, meetings, provision of assistance to the users, control of each stage of the process and evaluation. Eventually, sometimes it is the same the people that adopted the innovation that are rigid, preferring to stay to previous process and feel uncomfortable changing them, thus fail to implement innovation.

In general, it can be stated that implementation is being affected from the regulations that accompany it, the importance given on staff training, the technical support that would be ready to be provided to users, the motivation system to employees and if the same the innovation is user-friendly, accessible and easy to be understood. Moreover, it is essential that employees are positive from the beginning over adopting the innovation so that they will make it a priority. Top-management should be well-prepared, committed and support innovation so that employees would follow. Of course, it is necessary that there should be the financial resources to accomplish innovation implementation. Management should also support learning environment for employees. This means that there would be failure tolerance, acceptance and encouragement on staff to experiment and learn. Also, managers have to understand that usually the expected result may come in a long period after starting the implementation phase of innovation, therefore, they have to remain consistent and committed, assisting their staff till the final successful outcome (Rozgus 2003).

Hittmár et al. (2014) examined innovation implementation as the implementation of innovation strategy in a company. According to this view, the building of successful innovation implementation starts with the creation of a knowledge base regarding innovation procedures, then follows the identification of business strategy and organizational or role changes that should be done so that innovation strategy will be in line with business strategy, and after that the company should find the mode, the tools and methodology, traditional or not, that fit in the innovation project. This is called “lateral thinking”. As a last step, managers have to define all innovation activities and map the procedures so that no failure will occur till fully completion of the innovation.

Klein and Sorra (1996) added to the innovation implementation concept that its success depends on the readiness of company’s internal environment to embrace it, as well from the fit of implementation team’s values with innovation. The last one may depend on team’s characteristics, the benefits it may gain and any experiences it may had. As in the reference of Rozgus (2003), also in Klein and Sorra (1996), the weight is on the managers to identify if employees are ready to work on the implementation of an innovation and are responsible on making clear to them how they will develop it and what the earning for both them and company will be. Moreover, the scholars mentioned “innova-

tion effectiveness” that occur from innovation implementation and concluded that for a company this means “improvements in profitability, productivity, customer service, and employee morale”. Eventually, according to the scholars, innovation implementation is being affected from company’s capacity to train its employees over the innovation (Fleischer, Liker and Arnsdorf 1988), the readiness to support users (Rousseau 1989), the existence of space and enough time for employees to make tests over innovation (Zuboff 1988), the encouragement to employees to work on this project (Klein, Hall and Laliberte 1990), as well as rewarding them with economic motives (Lawler and Mohrman 1991), the possibility of changing a position of employees that cannot follow the innovation process or even dismissal (Klein et al. 1990), the limitation of available financial resources to be used in innovation implementation (Nord and Tucker 1987), and the degree of friendliness of innovation to the user (Rivard 1987). Therefore, if managers affect positively all the pre-mentioned variables and cultivate a strong and satisfying environment for the employees, then it is much more possible that they will accept innovation and implement it willingly. (Klein and Sorra 1996)

Following, Manley (2008) from her experience with Australian manufacturers that essentially regarded as SMEs, learned that there are certain modes to achieve successful innovation implementation. To her knowledge, in private sector, it is of high importance that knowledge regarding innovation would be extracted and gathered, as well that there will be created connections with external partners that would strengthen the innovation implementation. Also, “procurement systems” are significant to manage the relationships between partners, as well “knowledge-flows”. Moreover, before implementation, it is necessary to opt the right innovations for a company, thus the “competency of project actors” to evaluate innovations is too important. If the innovation project is not good enough then the implementation will fail or be poor. Of course, legislation is important on innovation, as well “technical support”.

McAdam et al. (2010) adopted the view of Mosey et al. (2002) that innovation implementation in SMEs is being affected from two general factors, the organizational structure of a company and technological advances. To this direction, researchers mentioned “leadership”, which affects the implementation process due to hiring new employees in management positions or because of the new processes that the current managers have

to adopt. Then, “people and culture” is a very significant variable for innovation implementation. Specifically, Wan et al. (2005) cited that there is great importance in cultivating a supportive innovation environment in every company, so that eventually, innovation will be successful. Also, Jager et al. (2004), Pearce and Ensley (2004) added that grouping employees is a mode that increases participation and mutual acceptance of innovation and creates the culture that will make innovation successful. Following, researchers referred to “product and process” development and focused on the importance of carefully identification of resources. As mentioned in Freel (2000) and Vossen (1999), any lack in resources may mean that innovation will fail to be fully developed. “Total quality management/Continuous improvement” also affects innovation implementation, providing both capacity awareness and direction to the managers (Burgess et al. 2005). Finally, researchers stated “knowledge and information” as factors that affect innovation implementation, as they provide the necessary insights to innovation development. (McAdam et al. 2010)

Drivers & Barriers in Open Innovation in Public & Private sector

Having gathered all the previous knowledge, it is obvious that in both business and public sector the adoption and implementation of open innovation is subjected to various drivers and obstacles that facilitate or hamper its development.

According to the insights from the literature review and in order to facilitate stakeholders to identify them and make use of this knowledge, both drivers and barriers have been classified in categories.

Firstly, and specifically for private sector, there were created five categories of open innovation drivers, namely technological, organizational, operational, environmental and financial. In Table 5 below, the categories of drivers are matched to the content that has been extracted from the literature.

Table 5. Classification of open innovation drivers in private sector

Categories	Content according to above-mentioned literature	References
Technological	<ol style="list-style-type: none"> 1. Access to New Technologies (software & hardware) 2. Access to Human resources (scientific personnel) 	24, 41, 117, 60, 14, 166

Organizational	<ol style="list-style-type: none"> 1. Higher Culture & Structure Agility 2. Collaborative activities to achieve organization's goals in a secure environment (agreements between collaborators) 3. Learning process & experimentation acceptance 4. Access to novel management methods 	23, 24, 117
Operational	<ol style="list-style-type: none"> 1. Shorter time to commercialize 2. Access to Plenty of new skills, capabilities equipment & other resources 3. Gain knowledge regarding use of new tools, methods & processes 4. Ability of mutual brainstorming & new ideas 	23, 24, 86, 117, 176, 113, 60, 14, 114
Environmental	<ol style="list-style-type: none"> 1. Competitive advantages 2. Raise customers' satisfaction (co-creation, participation, personalized products & services) 3. Gain knowledge & Access to new markets, niches, new distribution channels, customer segments 4. Access to new environmental opportunities 5. Networking with academia, industry, technology experts, customers 	23, 24, 72, 86, 183, 117, 14, 42, 56, 94, 33
Financial	<ol style="list-style-type: none"> 1. Higher Sales, Productivity, Market Share & Profit 2. Greater innovation & business performance 3. Economy of Scale 4. Reduced costs (access to more suppliers / pressure on the existing ones for better prices / less expensive to use installations of others) 5. Risk sharing 	23, 24, 41, 117, 38, 113, 14, 60, 166

Furthermore, open innovation barriers in business sector have been also examined. From the evaluation occurred five categories, which are described further in Table 6.

Table 6. Classification of open innovation barriers in private sector

Categories	Content according to above-mentioned literature	References
Cultural	<ol style="list-style-type: none"> 1. Unwillingness to change 2. Knowledge Gaps 	17, 35
Operational	<ol style="list-style-type: none"> 1. Bureaucratic processes 2. Time consuming to align & manage open relationships 3. Weakness to gather information for new markets, products, customer segments, local & global markets 4. Lack in adequate human & knowledge resources 	35, 27
Organizational / Managerial	<ol style="list-style-type: none"> 1. Difficulty of management to forecast 2. Fear of imitation / data security / data leak to competition 3. Risk of failure 4. Difficulties in administrating intellectual property 5. Difficulties in managing innovation & relationships with partners 6. Fear that Leadership of innovation venture may passes to someone else of the allies 7. Differences in vision, mission, goals, objectives, motivation with new partners 8. Different Interests with partners 9. Low perception level of staff to align company's needs with the right valuable partners 	17, 55, 101, 122, 35, 27, 113, 99, 14, 68

	10. Low Trust in potential partners	
Financial	<ol style="list-style-type: none"> 1. Limited or no access to funding 2. Lack in financial resources 3. Small companies may face cost barriers due to organizational changes 	35, 162
Environmental	<ol style="list-style-type: none"> 1. Obstacles that come from external environment: government or market problems 2. Economic crisis 	24, 35

Following, the same classification has been conducted also for public sector. In Table 7 is presented the categorization of open innovation drivers in civil sector according to Cankar and Petkovšek (2013). Specifically, these writers mentioned that there are three types of innovation drivers in public sector, internal, external and political. “Internal” drivers include the solution of problems that occur inside the public agencies. “External” have to do with facilitating the cooperation between public and private sector. “Political” drivers are about politicians and include the level of their support in innovation. In combination with the literature from 3.4.3 the following table has been built.

Table 7. Classification of open innovation drivers in public sector

Categories	Content according to above-mentioned literature	References
Internal	<ol style="list-style-type: none"> 1. Need for new processes. Current strategies and procedures don't follow the changes & users' needs 2. Build new & efficient, citizen-friendly services & products 3. Government need knowledge over social problems 4. Exploit smart city initiatives - Exploit Availability of data, such as data regarding energy consumption, traffic, weather etc. 	86, 112, 183, 172, 35, 43, 113, 48, 114, 184, 57, 187

	<ol style="list-style-type: none"> 5. Exploit ICT, knowledge from competitions/contests & Feedback from users & facilitate community needs 6. Enhance public sector performance 7. Need for better service delivery 8. Assistance in safety & justice decisions 9. Flexible public management 10. Solve management challenges 11. Exploitation of available data for public and private sector 12. Education of public servants and citizens among various issues 	
External	<ol style="list-style-type: none"> 1. Better relationships, trust & respect between users & government 2. Transparency, democracy, participation in public processes (it may also be through social media) 3. Public pressures 4. Motivation for creation of new vacancies 5. Creation of Personalized services, less taxes, more exports & local solutions, building capacity 6. Introduction of new agile services 	86, 20, 172, 35, 115, 113, 48, 114, 184, 140, 57
Political	<ol style="list-style-type: none"> 1. Open innovation a tool for political parties' promotion & voters information 2. Clear processes, less corruption 3. Ability of citizens to vote for policies, regulations 	86, 35, 114

Following, the Table 8 below, performs the classification of barriers of public sector to implement open innovation.

Table 8. Classification of open innovation barriers in public sector

Categories	Content according to above-mentioned literature	References
Financial	1. Lack of funding	5, 57, 86, 35
Cultural	<ol style="list-style-type: none"> 1. No influence or politicians / managers abilities to support such a change 2. No adequate motivation in public servants 3. Fear of transparency & exposure 4. Difficulties in communication with third parties 5. Public servants negative to change 6. Political environment unstable 7. Old-fashioned culture 8. Delays, obstacles & disagreements, because they don't want renewal 9. Public sector doesn't set innovation as priority 10. Limited external competition 11. Risk & accountability avoidance 	5, 57, 164, 112, 18, 154, 29, 151, 86, 35, 48
Operational	<ol style="list-style-type: none"> 1. Lack of resources, competences, skills to grab opportunities (this may happen also in local public agencies) 2. Shortages in tools, structures, educational procedures 3. Technical/ Technological barriers 4. No still developed tools and processes to implement open innovation 5. Need time & level of advancement 6. Unwillingness to cooperate with internal colleagues 	112, 86, 35, 26, 36, 159

	7. Resistance to change	
Organizational	<ol style="list-style-type: none"> 1. No flexibility in policies 2. Risk avoidance 3. Changes doomed to fail, but still adopted 4. Pressure makes employees reluctant to follow the changes 5. Isolated public entities that cannot cooperate 6. No adequate number & no skilled managers 7. Internal competition 8. Administration managers don't know how to implement open innovation 9. Legal Barriers (strict regulations, no flexibility) 10. Difficulties in obtaining knowledge from external sources, because of strict policies, GDPR 11. No defined time to contribute to innovation 	<p>5, 57, 164, 112, 154, 151, 86, 35, 26, 36, 159</p>

In the next chapter, an analysis is being conducted over the above-mentioned results.

Discussion

Having gathered a significant part of knowledge from the available literature regarding innovation in entrepreneurial and public sector, there are some interesting observations to share. First, a quotation of the most discussed issues concerning each sector is being presented and then, follows the analysis of the comparison tables from chapter 5.

Differences of Innovation Strategy context in Public and Private sector

Regarding Table 1, which imprints the differences of innovation strategy context between public and private sector, it is observed that in the public sector, innovation strategy is referred more as a tool to improve service delivery or develop a new service and as a plan to keep all innovative activities in line with users', citizens' and other stakeholders' needs and preferences. Furthermore, innovation strategy is regarded as a tool to boost innovation and creativity internally by motivating public servants, encouraging them to become "innovators", providing them the chance to express their ideas and experiment on them. Of course, as every type of strategy, innovation strategy in public sector includes the management of financial resources, so that there will be no unexpected lack of valuable funding, when needed in order to develop innovation. Moreover, this plan includes the management of organizational structure, policies, processes and methods so that they will be ready to welcome changes due to innovation demands. As civil sector is most of a service field, this type of strategy manages also the knowledge inside it and evaluates it, to bring the expected innovative outcomes. Another aspect of innovation strategy in public sector is that it is a tool to promote open innovation and a plan to monitor the wide relationships of public agencies with third parties, which may be the users, the companies, other governments or civil entities.

For private sector, innovation strategy is considered as a tool to make employees embrace renewal, learn to identify and grab opportunities from the external environment, manage, allocate the available resources and embed new technologies wherever necessary in the company so that innovation development will be facilitated. Many researchers focused on the fact that innovation strategy assists firms to manage their marketing innovation activities, cultivate an innovation-friendly culture and promote the free ex-

pression and dialogue of all the employee flows so that creative solutions will come up. Innovation strategy is regarded also as a plan to define how and which policies of a firm have to be improved, as well the methods and procedures so that innovation will thrive. Moreover, all innovative activities should be in line with the general firm's strategy so that with a solid and creative attitude, the firm, will achieve competitive advantage and thus, sustain its market position and be viable in long-term. Researchers' also highlighted the significance of including in this strategic plan, the continuous re-investing to innovation, as a way to keep the company always sustainable.

Comparing the innovation strategy development between these two sectors, it is observed that there are no or limited references discussing the necessity of innovation strategy as a plan to identify opportunities and manage technological resources in the government sector, on the contrary to private one, where there is an extended literature. Furthermore, it is evident that both sectors differ on the main scope of their existence. Businesses focus a lot on developing innovative marketing activities to handle external competition, achieve competitive advantage, increase firm's performance and viability, while civil agencies care only to improve their structure and change their rigid policies in order to improve service delivery and create new processes and thus, provide added-value to general public. It is quite interesting to mention that in public sector, scholars discuss about internal competition, therefore it seems that innovation in this case may be a mode to manage problems inside the entities. Another difference is the direct influence of political factor in civil sector, which is not an issue in business sector. Moreover, in private sector rewarding is mentioned as a mode to boost innovation, while in public sector there is not such case. Another interesting point is that innovation strategy in civil agencies is regarded as a tool to manage knowledge. Public entities concentrate a lot of valuable data from their core, therefore it is natural that there will be more references regarding this issue. Additionally, it is significant to cite that in public sector innovation strategy is considered as a plan to develop open innovation that is very crucial in order to free the two-sided communication with citizens and engage them to participate in decision-making, while in private sector it seems that it isn't so usual activity. Eventually, it is crucial to mention that literature regarding private sector refers on continual investment on innovation and new technologies, whereas in public

the references are less. This may mean that innovation is not in the same priority as in the business sector.

Innovation types in Public and Private sector

Following, in the Table 2 are gathered all the innovation types found in the literature for both business and public sector and set in parallel. From this comparison occurs that the most usual innovation types for private sector are the service innovation, the process innovation and the most famous is the product innovation. As scholars mention, usually firms opt to produce a new product when they wish to innovate. There are also times that firms may enrich the provision of an existing product with a complementary service that will provide greater added-value for customers. Moreover, organizational innovation has also been discussed a lot. This innovation type is difficult to be imitated, thus it creates a significant competitive advantage to the company that may adopt it. Other interesting types being mentioned in the literature are the marketing and incremental innovation.

As for the public sector, the most usual innovation type seems to be the process innovation. Essentially, one of the most significant goals of public agencies, which decide to innovate, is to improve their service delivery to the users so that the value of service consumption will be greater, as well the facilitation of people' routine. Next to process innovation are the organizational or administrative innovation, as there are a lot of changes that should be applied in such a rigid environment, such as that of public services and then, service and workplace innovation types.

According to the afore-mentioned, it occurs that private sector concentrates its strengths on developing new products in order to satisfy customer needs, while public sector focuses on process innovation and service delivery improvement that is anticipated due to the nature of the sector.

It could be also mentioned that in general, it seems that literature refers to far more identified innovation types in private sector, while in public, the literature is quite limited, therefore there might be space for further research.

Differences of innovation practices in Public and Private sector

In Table 3, the innovation practices of private and public sector are being identified. From this comparison occurred that in private sector the most discussed innovation practices are the open and the organizational. Companies seem to attempt this kind of practices in an effort to create competitive advantages difficult to be imitated, as well create a culture, where all up and down streams of partners and users will participate in innovative activities and all together bring the best solution that fit to everyone in the chain and customers will wish to adopt.

In public sector, open innovation is also the most famous innovation type. It is natural for public entities that in order to develop their provisions, they have to extract knowledge and feedback from every stakeholder that consume their services. Therefore, openness is the most appropriate practice to understand the social needs and adapt the provided services to this direction as much as possible. In this view, another practices that have been referred in the literature are the open data, the e-government, the use of social media and the concept of co-creation with public participation through platforms, living labs or civic hackathons.

As detected also in the innovation strategy comparison between private and public sector, it is the nature and the objectives of each entity that make them adopt different practices in order to innovate. But as identified from the Table 3, there is a common direction to openness and collaborative practices in order to achieve truly innovative outcomes.

Differences of Implementing Innovation in Public and Private sector

In the next table, no. 4, a comparison has been conducted to identify the differences of implementing innovation in both pre-examined sectors. According to the insights extracted from this table, the factors that affect mostly the success of innovation implementation in private sector are the administrative factors, which include the motivation to all employees, the braveness to accept the risks, identify them and find solutions to deal with them if the need occurs, the failure tolerance and ability to experiment so that employees will not fear that any mistake will cost their working position, the internal knowledge management and the learning or training support from managers to subor-

dinates. Moreover, a significant factor for implementation without problems is the degree of preparedness and forecast of potential lacks in capabilities, resources, knowledge and capacity. If these elements are available, then implementation will be smooth. Furthermore, it is of great significance that there will be a clear innovation strategy that will also be in line with the main business strategy, as well define the context into which innovation will be implemented.

Innovation implementation in public sector is being affected from the size and type of organization, the “organizational location” and the degree of skills and commitment of staff. All of them define the available resources needed for innovation development, as well determine the pace in which innovation will be fully developed. The “organizational location” defines also the degree of agility and the cooperation context. Implementation can also be affected from the fact that top-management may opt to hire new and skilled staff or keep the existed and experienced personnel that may be used to manage innovation. Public agencies then, have to identify the degree of dissatisfied staff that was not chosen to participate in this activity, the level of unwillingness to join and contribute to the process and have a scenario also for dismissals of them who won't follow the process if there is need.

From the comparison between the two sectors occurs that in private, the administrative factors (motivation, support, failure-tolerance) affect significantly the successful outcome of the innovation, while in public sector the implementation success is mostly defined from the size and the mode that the same the agency will be organized, as well from the skills and commitment of the staff. In scarce cases, the motivation of civil servants is mentioned.

Classification of Open Innovation drivers in Public and Private sector

Furthermore, in table 5, a classification of open innovation drivers in private sector is presented. From the existing literature occurred that there might be created five categories of drivers. These are the technological, organizational, operational, environmental and financial. Technological includes new technologies and people, who know how to handle them, then, organizational is about culture and structure that either hinders or promotes open innovation and after that are the operational drivers, which have to do

with procedures, methods and tools used in open innovation. Environmental drivers are about external environment, while financial factors have to do with internal economic capability.

As for the table 7, this gathers data regarding open innovation drivers in public sector. The information in this case has been classified in three sections. The first one, internal, is about inside knowledge and identified needs that forces the whole sector to join open innovation. From the other side, there is the external environment that keeps demanding more and more from government and finally, it is the political section. This last one gathers all drivers that have to do with political parties, which push open innovation development as it will benefit their promotion.

Comparing these tables, it is observed that the most essential differences are them of the “political force” as an open innovation driver that is detected only in the public sector and the financial drivers, such as sales, market share and profit, that are met only in the private companies.

Classification of Open Innovation barriers in Public and Private sector

In the same mode, in table 6, the open innovation barriers in private sector can be categorized in four segments. In the first segment, cultural, there are internal barriers that hamper open innovation, then, in the second, organizational or managerial barriers describe the rigidity of management or its fear of trusting an open channel to company’s data. In the third segment, there are the financial barriers that refer to lack of enough economic resources. Eventually, environmental factors refer to obstacles coming from external sources.

In the last table, no.8, there is a classification of open innovation barriers in public sector. In this case, there are four categories. First of all, it is the financial, as most of the times funding is missing, therefore adopting an innovation might be truly difficult. Then, the cultural, which is about old-fashioned employees that do not like renewal. Operational, includes lacks in resources, capabilities, tools and staff’s resistance to change. Eventually, there are the organizational barriers, which are about rigidity, regulations, risk avoidance and isolated agencies that cannot communicate in order to facilitate openness.

From the comparison between private and public sector occurs that environmental barriers exist only in the private sector. All the others more or less are met in both sectors.

In the next chapter, the general conclusions of the current work are being quoted together with a short description of all steps that have been followed in order to reach the fulfillment of the research.

Conclusions

In a constantly changing world, where demands are high, new technologies are continually coming up and the pursuit of survival is more complex than ever, the need of innovation is crucial for all types of organizations. For businesses, innovation is not only a survival determinant, but it is also a concept that can be translated into commercial value. More innovative activities, services or products may mean better financial performance. For public sector, innovation may mean more and contemporary solutions to social problems. Citizens, private sector and all the other users of civil services are the ones who could be benefited from the new and flexible services or processes.

Since innovation concerns and interests all kinds of organizations, the present work has been developed to provide insights and assist in understanding the concept more deeply. Specifically, an holistic view over the mode that both public and private sector incorporate and utilize innovation strategies has been created, the types of such strategies have been analyzed, as well the innovation practices that are being followed from business and governmental entities. Moreover, the drivers and barriers for adoption of a certain innovation type, open innovation, for both sectors have also been discussed. Eventually, there were created eight tables that classify the differences of developing or implementing innovation in both private and public sector, as well the drivers and barriers of adopting open innovation in both cases.

In order to produce this work, a systematic literature review has been conducted, extracting data from formal scientific electronic libraries and using specific keywords or key-phrases. The method that was used to approach this project was first to scan the existing literature, quote the findings, team them, produce classifications of the differences, sum up and discuss the findings and research questions with a critical view. Finally, the project ended up in certain conclusions.

From the knowledge gathered, the work arrived on certain results. Specifically, the issues that have been discussed are the “differences of innovation strategy context in public and private sector”, the “innovation types in public and private sector”, the “differences of innovation practices in public and private sector” and the “differences of implementing innovation in public and private sector”. Furthermore, a classification of

the “drivers in open innovation in public sector” and another of the “barriers in open innovation in public sector” are being demonstrated, as well a classification of “drivers in open innovation in private sector” and of the “barriers in open innovation in private sector”.

The conclusions occurred from this examination are that innovation strategy in public sector is more of a tool or a plan that defines the mode that an innovative solution will be developed and sets all innovative activities in line with stakeholders’ needs and preferences. Innovation strategy also maps the available resources for innovation and includes the management of organizational structure, policies, processes and methods so that they will be ready to welcome changes due to innovation demands. In the private sector, it seems that it is more of a medium to motivate employees participate in innovation process, as well to adopt new technologies, conduct marketing innovative activities and achieve viable competitive advantage. Researchers’ also highlighted the significance of including in this strategic plan, the continuous re-investing to innovation, as a way to keep the company always sustainable.

Furthermore, it was observed that public sector may deal with internal competition, on the contrary to private sector, where there is an extensive competition from all the external companies in the same field. The public innovation strategy may be affected by politicians, while in private sector there is not such issue. Rewarding is a usual mode to boost innovation in private sector, while in public it most usual to engage in open innovation activities and collaboration in order to accomplish innovation. Shortly, it could be stated that it is the nature and objectives of each sector that urge them to follow differentiated innovation strategies. In public sector, it is the users or citizens that essentially boost the innovation adoption, while in the private sector, it is the constant research for greater profits and sustainability.

As innovation types in private and public sector are being concerned, it seems that the most usual types for private sector are the service, process and organizational innovation and the most famous is the product innovation. In public sector, the most usual innovation type seems to be the process innovation.

From the comparison in innovation practices occurred that the most discussed innovation practices in private sector are the open and the organizational. In public sector,

open innovation is also the most famous innovation practice. As being perceived, despite their differences, private and public sectors seem to follow a common direction to openness and collaborative practices in order to achieve truly innovative outcomes.

Moreover, examining the differences of implementing innovation in both pre-examined sectors occurred that the factors that affect mostly the success of innovation implementation in private sector are the administrative factors, the degree of preparedness and forecast of potential lacks in capabilities, resources, knowledge and capacity. Public sector is being affected from the size and type of organization, the “organizational location” and the degree of skills and commitment of staff.

Essentially, in the private sector, it is the responsibility of the company to motivate employees, while in public sector, as it seems from the mentioned literature, the positive outcome is based on the willingness of civil servants themselves. Naturally, the existence of necessary resources is also a great issue. Private sector needs to forecast, while for the public it depends on the size of agency to have these resources.

Furthermore, from the classification of open innovation drivers in private sector occurred that there are five categories of drivers. These are the technological, organizational, operational, environmental and financial. In the same mode, the open innovation barriers in private sector can be categorized in four segments: cultural, organizational or managerial and environmental barriers.

Following, open innovation drivers in public sector has been classified in three sections. Internal, external and political drivers, whereas the open innovation barriers in four categories: financial, cultural, operational and organizational barriers.

Briefly, it is observed that the differences in open innovation drivers are that the public sector may be pushed from politicians, whereas in the private sector, there are always the financial drivers that urge companies to innovate constantly. As for the barriers, the difference is mainly on the environmental factors that a company cannot surpass.

The contribution of this research is essentially, the creation of a map of the existing literature about innovation concepts that can be used both from scientific community and public or private organizations. This way, organizations would be able to recognize their own innovation patterns, identify innovation types as suggested from literature and practices and be motivated to re-adjust their innovation tactics with others quoted in

the current work that would be more efficient in conjunction with their existing business model.

As in all works, this one has its own limitations. The most significant were the limited time resources, due to the fact that I was a sole researcher and literature over innovation concept is quite extensive.

To conclude, this work is mainly a literature review over innovation that tries to bring light to this concept focusing both on public and private sector innovation. In the effort to accomplish the scope of the research, it was observed that recently an extensive research is being done for innovation concept in both sectors. Despite that, there is still limited bibliography regarding innovation implementation in business, as well in public sectors that is a very essential issue, therefore, further research is recommended in order to enrich this knowledge. In addition, another area that may be further developed and explored is this of the innovation types in public sector, as it still seems far more limited than in the business sector.

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Appendix

In the table below are being demonstrated, in an alphabetical row, the references used in the chapter “5. Results”.

Rank	References used in “Results” section
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