LUISS

Department
of Business and Management

Course of Health Care Management

Organizational Sustainability in the Pharmaceutical Industry. The Case of Novo Nordisk.

Prof. Daniele Mascia
SUPERVISOR

Dr. Sara Lombardi
CO-SUPERVISOR

Silvia de Lucia
ID 717821
CANDIDATE

Academic Year 2020/2021

TABLE OF CONTENTS

INTRODUCTION *6*

CHAPTER I *7*

ORGANIZATIONAL SUSTAINABILITY AND SUSTAINABLE BUSINESS MODEL INNOVATION (SBMI) *7*

1. Literature Review on Sustainability *7*

1.2 Sustainable Development Goals and U.N. Directions **9**

2. Shared Value Creation Vision *12*

3. The Triple Bottom Line and a Strategic Framework for Sustainability *14*

3.2 Sustainable Innovation **18**

4 Natural Capitalism as Forerunner of Sustainable Business Model *20*

4.2 Business Model Innovation (BMI) as a Premise for Sustainable Innovation **21**

5 Sustainable Business Model Innovation (SBMI) *23*

6 Internal and External Barriers to Business Model Innovation *30*

7 Conclusion Remarks on Sustainable Business Model Innovation *34*

CHAPTER II *35*

THE PHARMACEUTICAL INDUSTRY AND THE QUEST FOR A SUSTAINABLE BUSINESS MODEL INNOVATION *35*

1. The Pharmaceutical System *35*

1.2 The Pharmaceutical Industry **36**

2. Challenges for the Pharmaceutical Sector *38*

2.2 The New Pharmaceutical Strategy for Europe **40**

2.3 Traditional Drug Development Model, and Opportunities Towards a New Inter-organizational Business Model **41**

3. Business Model Innovation Concept into Pharmaceutical Industry *45*

4. Historical Path to Pharmaceutical Sustainability *46*

5. Integration of Sustainability in the Pharmaceutical Industry *49*

5.2 Key Drivers to Embody Corporate Sustainability Practices into Pharma Businesses **51**

5.3 Barriers to Pharmaceutical Sustainability Integration and Performance Indicators **53**

6. Drivers for Business Model Innovation in the Pharmaceutical Industry *55*

6.2 Different Degrees of Business Model Innovation Applications **58**

7. Open Innovation in the Pharmaceutical Industry as a Model to Achieve Growth *59*

7.2 Open Innovation Models **61**

8. The Quest for a More Sustainable Business Model in the Pharmaceutical Industry *63*

8.2 The Circular Economy as Approach to a More Sustainable Business Model **66**

9. Conclusion Remarks on Sustainable Business Model Innovation in the Pharmaceutical Industry *67*

CHAPTER III *69*

THE NOVO NORDISK BUSINESS CASE *69*

1. Data and Methods *69*

1.2 Research Design and Literature Review **69**

1.3 Case Study **70**

1.4 Data Collection **71**

1.4.1 Case Company Selection 71

1.4.2 Semi-structured Interview 72

1.4.3 Secondary Data 73

2. Research Context and Case Company *74*

3. Novo Nordisk Introduction and Analysis *76*

4. Novo Nordisk Interview: Discussion and Implications *83*

5. Conclusion Remarks on Novo Nordisk Corporate Sustainability and Innovation *89*

CONCLUSIONS *91*

SUMMARY *94*

ACKNOWLEDGEMENTS *107*

REFERENCES *108*

SITOGRAPHY *117*

LIST OF FIGURES

FIGURE 1. UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS (UN SDGS). (SOURCE: AVAILABLE AT <WWW.UN.ORG/SUSTAINABLEDEVELOPMENT/NEWS/COMMUNICATIONS-MATERIAL>) 11
FIGURE 2. STRATEGIC SUSTAINABILITY MANAGEMENT PROCESS. (SOURCE: PERROTT, B.E. (2015) BUILDING THE SUSTAINABLE ORGANIZATION: AN INTEGRATED APPROACH, IN JOURNAL OF BUSINESS STRATEGY VOL. 36, NO. 1, PP. 45) 15
FIGURE 3. SUSTAINABLE VALUE PROPOSITION FRAMEWORK. (SOURCE: BALDASSARRE, B., CALABRETTA, G., BOCKEN, N.M.P., JASKIEWICZ, T. (2017) BRIDGING SUSTAINABLE BUSINESS MODEL INNOVATION AND USER-DRIVEN INNOVATION: A PROCESS FOR SUSTAINABLE VALUE PROPOSITION DESIGN, IN JOURNAL OF CLEANER PRODUCTION VOL. 147, PP. 177)..... 16
FIGURE 4. PROCESS FOR SUSTAINABLE VALUE PROPOSITION DESIGN. (SOURCE: BALDASSARRE, B., CALABRETTA, G., BOCKEN, N.M.P., JASKIEWICZ, T. (2017) BRIDGING SUSTAINABLE BUSINESS MODEL INNOVATION AND USER-DRIVEN INNOVATION: A PROCESS FOR SUSTAINABLE VALUE PROPOSITION DESIGN, IN JOURNAL OF CLEANER PRODUCTION VOL. 147, PP. 183)..... 17
FIGURE 5. CONCEPTUAL FRAMEWORK FOR BOUNDARY WORK IN SBMI. (SOURCE: VELTER, M.G.E., BITZER, V., BOCKEN, N.M.P., KEMP, R. (2020) SUSTAINABLE BUSINESS MODEL INNOVATION: THE ROLE OF BOUNDARY WORK FOR MULTI-STAKEHOLDER ALIGNMENT, IN JOURNAL OF CLEANER PRODUCTION VOL. 247, PP. 11) 28
FIGURE 6. LOCATION OF THE ORGANIZATION'S GENERAL, TASK, AND INTERNAL ENVIRONMENTS. (SOURCE: DAFT R. L. (2010) FROM MANAGEMENT, SOUTH-WESTERN CENGAGE LEARNING, NINTH EDITION, PP.64) 30
FIGURE 7. BARRIERS TO SENSING, SEIZING AND TRANSFORMING FOR SBMI. (SOURCE: BOCKEN, N. M.P., GERADTS, T. H.J. (2020), "BARRIERS AND DRIVERS TO SUSTAINABLE BUSINESS MODEL INNOVATION: ORGANIZATION DESIGN AND DYNAMIC CAPABILITIES" IN LONG RANGE PLANNING VOL. 53, PP. 8)..... 33
FIGURE 8. TIMELINES AND ATTRITION IN DRUG DEVELOPMENT. DMPK , DRUG METABOLISM AND PHARMACOKINETICS. (SOURCE: HUNTER, J. (2011) "CHALLENGES FOR PHARMACEUTICAL INDUSTRY: NEW PARTNERSHIPS FOR SUSTAINABLE HUMAN HEALTH" IN PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY A, VOL. 369, P. 1820) 42
FIGURE 9. BUSINESS MODEL CONCEPT. (SOURCE: OSTERWALDER, A. AND PIGNEUR, Y. (2010), "BUSINESS MODEL GENERATION: A HANDBOOK FOR VISIONARIES, GAME CHANGERS, AND CHALLENGERS" HOBOKEN, USA: JOHN WILEY AND SONS)..... 45
FIGURE 10. INTERRELATIONS BETWEEN BUSINESS MODEL AND BUSINESS CASE DRIVERS. (SOURCE: SCHALTEGGER ET AL. (2012) "BUSINESS CASES FOR SUSTAINABILITY: THE ROLE OF BUSINESS MODEL INNOVATION FOR CORPORATE SUSTAINABILITY" IN INTERNATIONAL JOURNAL AND SUSTAINABLE DEVELOPMENT, VOL. 6, NO. 2, P. 107) 57
FIGURE 11. MATRIX ON THE DEGREE OF CHANGE IN THE VALUE PROPOSITION AND BUSINESS MODEL ELEMENTS. (SOURCE: PERSONAL CREATION OF A MATRIX INCLUDING THEORETICAL MODEL DERIVED FROM SCHALTEGGER ET AL. (2012), "BUSINESS CASES FOR SUSTAINABILITY: THE ROLE OF BUSINESS MODEL INNOVATION FOR CORPORATE SUSTAINABILITY" IN INTERNATIONAL JOURNAL AND SUSTAINABLE DEVELOPMENT, VOL. 6, NO. 2)..... 59
FIGURE 12. TYPES OF INNOVATION MODEL. (SOURCE: RETRIEVED FROM SCHUHMACHER ET AL. (2013), "MODELS FOR OPEN INNOVATION IN THE PHARMACEUTICAL INDUSTRY" IN DRUG DISCOVERY TODAY, VOL. 18, NO. 23/24, P. 1135) 62
FIGURE 13. ADDING VALUE TO SOCIETY AND TO FUTURE BUSINESS. (SOURCE: NOVO NORDISK ANNUAL REPORT, 2020, P. 11)..... 82
FIGURE 14. TYPES OF INNOVATION MODEL, NOVO NORDISK CASE. (SOURCE: RETRIEVED FROM SCHUHMACHER ET AL. (2013), "MODELS FOR OPEN INNOVATION IN THE PHARMACEUTICAL INDUSTRY" IN DRUG DISCOVERY TODAY, VOL. 18, NO. 23/24, P. 1135, WITH NOVO NORDISK INTERVIEW DATA ADAPTATION.)..... 88

LIST OF TABLES

TABLE 1. THE MODIFIED RESOLVE FRAMEWORK. (SOURCE: HORVATH, B., KHAZAMI, N., YMERI, P., FOGARASSY, C. (2019), "INVESTIGATING THE CURRENT BUSINESS MODEL INNOVATION TRENDS IN THE BIOTECHNOLOGY INDUSTRY" IN JOURNAL OF BUSINESS ECONOMICS AND MANAGEMENT, VOL. 20, P.68) 48

TABLE 2. DETERMINANTS OF FIRMS' POSITIONS ON ENVIRONMENTAL AND SOCIAL SUSTAINABILITY. (SOURCE: RETRIEVED FROM VAN LEEUW, F. AND SCHEERLINCK, I. (2011), "WHAT SHAPES COMPANIES' CORPORATE SUSTAINABILITY? BELGIAN PHARMA BUSINESSES' VIEWS ON GLOBAL SUSTAINABLE DEVELOPMENT" IN INTERNATIONAL BUSINESS & ECONOMICS RESEARCH JOURNAL, VOL. 2, NO. 12, PP. 67-71)..... 52

TABLE 3. ADDITIONAL BUSINESS VALUE THROUGH PRACTICES AIMED AT TBL POLICIES. (SOURCE: PERSONAL ADAPTATION RETRIEVED FROM LEONARD, T. AND SCHNEIDER, J. (2004) "INTEGRATED SUSTAINABILITY IN THE PHARMACEUTICAL INDUSTRY" IN CORPORATE ENVIRONMENTAL STRATEGY: INTERNATIONAL JOURNAL FOR SUSTAINABLE BUSINESS, VOL. 11, PP. 126-127)..... 54

TABLE 4. INTERRELATIONS BETWEEN CORPORATE SUSTAINABILITY STRATEGIES AND BUSINESS CASE DRIVERS. (SOURCE: PERSONAL ADAPTATION RETRIEVED FROM SCHALTEGGER ET AL., (2012) "BUSINESS CASES FOR SUSTAINABILITY: THE ROLE OF BUSINESS MODEL INNOVATION FOR CORPORATE SUSTAINABILITY" IN INTERNATIONAL JOURNAL AND SUSTAINABLE DEVELOPMENT, VOL. 6, NO. 2, P. 104) 56

« *Animum debes mutare, non caelum.* »
Seneca,
Epistulae ad Lucilium, Liber Tertius, Epistula XXVIII

INTRODUCTION

Our present external environment is becoming highly challenging and there are more and more pressures on the behave of organizations. The external background, in which a company operates, has always been a critical driver for success or fail, and nowadays, the constant and purposeful adherence to that is becoming a key factor to gain competitive advantage. Businesses are indeed called upon to innovate their business model, to address sustainability issues and adopt actions to make innovation possible.

The purpose of this research is to investigate how and if, specifically, pharmaceutical companies innovate their business model to answer the sustainability call.

The first step to derive an answer to this research topic, is to provide a literature review and theoretical background on concepts as the Business Model Innovation (BMI), its subsequent declination in Sustainable Business Model Innovation (SBMI), that fully integrates into its mission sustainability goals, and then, the role that innovation has, together with the latter, in enhancing a new business model type that companies may adopt.

The second objective of this thesis is to investigate empirically the theoretical assumptions into a company's daily business practices. The method is the one of an interview with semi-structured questions, to a Danish company, the Novo Nordisk, leader in diabetes care and well-preforming in terms of sustainability and innovation. With this practical evidence it will be possible to derive some conclusions and in-depth insights of real-life business processes.

The research hope to inspire other pharmaceutical companies to pursue a sustainable development program, by making Business Model Innovation adjustments, so as to arrive to a new competitive landscape, in which financial purposes are balanced and integrated with social and environmental ones.

CHAPTER I

ORGANIZATIONAL SUSTAINABILITY AND SUSTAINABLE BUSINESS MODEL INNOVATION (SBMI)

1. Literature Review on Sustainability

The word sustainability[1] from its ancient origin takes us back to Latin tradition, indeed, *subteneo*, which meant 'to uphold', is nowadays a word of trend.

Indeed, according to the prediction of a study by Capgemini Research Institute, on the impacts that sustainability has on consumption habits, is clear how the pandemic has broadened the expectations of companies on this topic. Pandemic has increased consumer awareness and engagement with the concept of sustainability. Otherwise, the slow pace of sustainable transition is also evident, according to Federici E., Manufacturing, consumer product, retail & distribution director of Capgemini Business Unit Italy; he points out that "until now, many organizations have considered sustainability to be only an accessory element, while if it is included in the organization's mission, sustainability has instead the potential to completely change the relationship between the company and its customers and partners"[2] (Capgemini Research Institute, 2020).

If we think of sustainability, we have in mind green production, ecological products, process that are trying to reduce toxic emissions and wasting. Sustainability can be seen as an entrenchment of perspectives, but what is really significant is that undermine most of all processes, products and businesses. Indeed, there is an incredible shift of attention by organizations from a short-term focus to a longer-term one. This shift has come in response to turbulence and rapid changes that have

[1] In 1987, the United Nations Brundtland Commission defined sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs." Today, there are almost 140 developing countries in the world seeking ways of meeting their development needs, but with the increasing threat of climate change, concrete efforts must be made to ensure development today does not negatively affect future generations.

[2] Capgemini Research Institute (2020) "Consumer Products and Retail: How sustainability is fundamentally changing consumer preferences". (See: <www.capgemini.com/wp-content/uploads/2020/07/20-06_9880_Sustainability-in-CPR_Final_Web-1.pdf>)

occurred in the global economy (Perrott, 2015), and even more amplified by this Covid-19 pandemic issue. The pandemic has indeed intensified the global desire for authenticity and accountability, especially for large organizations, pushing companies to focus on sustainable change.

Signs of climate change, increased rate of species extinction and growing irreversible changes mean that our current production and consumption habits are no more sustainable. Sustainability has so the potential to affect many aspects of an organization's activities and worldwide configuration too. What sustainability highlights is the need of giving answers to social, environmental and ethical questions. What individuals, and organizations as aggregation of human beings have to do, is to jointly face those issues. Moreover, some authors identified also sustainability as an emerging megatrend, that force organizations to adapt and innovate or they will be swept aside by the forces of change (*ibidem*, p. 42). From a literature perspective on which is the best profit maximation way that organizations can implement, we have two main theories, the shareholders' value creation[3], and the stakeholders' one[4]. Although companies attempt to embrace these sustainable patterns, they still use traditional innovation routines, aiming prevalently at financial objectives (Baldassarre *et al*., 2017). What organizations are asked to do, is to balance the stakeholders' interests with economic purpose, and focus their effort on the improvements of existing technologies in avoiding waste and environmental damages. Indeed, even from a financial perspective, sustainable actions are now a meter of judgement for organizations' performance.

Among authors and scientific community, the interest in sustainability has grown systematically in the last 15 years. According to that, not only managers are trying

[3] The Friedman Doctrine is also referred to as the Shareholder Theory. American economist Milton Friedman developed the doctrine as a theory of business ethics that states that "an entity's greatest responsibility lies in the satisfaction of the shareholders". The business should, therefore, always endeavor to maximize its revenues to increased returns for the shareholders.

[4] Stakeholder Theory is a view of capitalism that stresses the interconnected relationships between a business and its customers, suppliers, employees, investors, communities and others who have a stake in the organization. The theory argues that a firm should create value for all stakeholders, not just shareholders. In 1984, R. Edward Freeman originally detailed the Stakeholder Theory of organizational management and business ethics that addresses morals and values in managing an organization.

to implement structural changes but also customers are now posing pressure in order to see reinforcement on the implementation of sustainable practices, monitoring processes and outputs. Given that, customers and stakeholders are increasingly demonstrating interest in sustainable business, the actions that have to be done are necessarily to be in line with sustainable innovation. Innovation so, beside ensuring competitive advantage, has to provide environmental benefits and produce social well-being (Cillo *et al*., 2019). The upcoming necessity to integrate sustainable measures into business model[5], has pointed out how those practices can be effectively measured financially. We would probably also need a total shift of mindset, about what we consider to be financially profitable, if there is still a consistent believe that corporations pursue just economic success and are profit-oriented, at the expense of all stakeholders' interests. For years, commonly, the competitiveness of nations has been generally assessed in terms of the capability to maintain a position of surplus in the international trade balance (Boons *et al*., 2013).

1.2 Sustainable Development Goals and U.N. Directions

The United Nations in September 2015 adopted and prescribed a global sustainable plan, the 2030 Agenda for Sustainable Development, which includes a framework of goals to be achieved by corporations by that date. This global plan is common recognized as Sustainable Development Goals (SDGs), including 17 goals with 169 targets. The 2030 Agenda provides so a shared programme for peace and prosperity for people and the planet, now and into the future. This implies strategies that aims at improving health and education, reducing inequality, and to boost economic growth meanwhile tackling climate change and working to preserve oceans and forests[6] (United Nations, 2015). In a literature research emerges how some authors also identify four different perspectives about the contents of those goals: exploring the (a) planet's boundaries, to act in a (b) safe space, where a new type of (c)

[5] Business model is seen as a market device to embrace stakeholders and their expectations from non-business areas, to become a mediator for innovation (Boons *et al*., 2013).
[6] United Nations 2030 Agenda for Sustainable Development. (See: <www.sdgs.un.org/goals>)

energetic society can grow thanks to a (d) greener competition (Cordova and Celone, 2019).

These goals aim at solving some major sustainable development challenges and problems. In order to integrate these sustainable development goals into practice, companies have also included into their annual reports, sustainability's information and the degree of involvement and progression for each year. Indeed, companies are giving more and more importance to corporate sustainability reporting, adopting self-report on ESG practices and subscribing to GRI[7] initiative. The range of action of the SDGs is not only related to environmental practices, but on a broader scale to societal issues and unmet needs. To efficiently assess the involvement and the actions to reach SDGs, van der Waal (*et al*., 2021) in its work pointed out how sustainability-oriented innovation can be also measured by the presence in the European Patent database of some "green" or "blue" patents. The former, refers to cleaner production and ecological efficiency procedures, while the latter relates to unmet sustainable development needs.

The interplay indeed, between SDGs and innovation is clear, scholars recognize this close relationship from the idea generation to marketing phase, but what is crucial is that to survive and stay competitive in this globalized market, is necessary to fit with SDGs goals, thus, to prepare business model according to the sustainability objectives that a company wants to achieve. Moreover, the degree to which companies make adaptations is also measured on a scale of three possibilities, a defensive behavior, an accommodative or a proactive one. This lead us also to recognize which organizations can be seen as followers, leaders, innovators or pursuers, by analyzing the sustainable strategy that they have adopted (Cordova and Celone, 2019).

[7] GRI: Global Reporting Initiative is the independent, international organization that helps businesses and other organizations take responsibility for their impacts, by providing them with the global common language to communicate those impacts. It provides the world's most widely used standards for sustainability reporting, the GRI Standards. (See: <www.globalreporting.org/about-gri>)

Figure 1. *United Nations Sustainable Development Goals (UN SDGs).* (Source: available at <www.un.org/sustainabledevelopment/news/communications-material>)

As illustrated in Figure 1, the SDGs represents 17 interrelated development goals, which common aim is to balance the economic, social and environmental dimension, so to provide a holistic approach to a future sustainable development. Nevertheless, even if the achievement of SDGs can be favored by CSR[8] actions, according to Schönherr *et al*. (2017) is focused on a business-centered perspective, rather than by a system-wide dimension, that would be better integrated into the core business by recognizing the shared value creation model.

[8] CSR: the European Commission has defined CSR as the responsibility of enterprises for their impact on society. Therefore, companies can become socially responsible by integrating social, environmental and ethical concerns into their business strategy and operations. (See: <www.ec.europa.eu/growth/industry/sustainability/corporate-social-responsibility_en>)

2. Shared Value Creation Vision

To see this transformation happens it is required a fundamental shift in the purpose of business, and moreover, since are globally rising sustainability pressures, collaboration among firms and other stakeholders is becoming significant. Value is no more created by firms autonomously, but by acting together with external parties (Bocken *et al*., 2014). Going along with this perspective, in contrast with a classical view of economic balance, Porter and Kramer suggested us a modern vision of capitalism: the shared value creation. The concept of shared value[9] can be defined as policies and operations that enhance the competitiveness of a company, while simultaneously pursuing economic and social conditions into their communities (Porter and Kramer, 2019). All along the sustainability journey, indeed, the collective values and corporate culture of an organization would have a powerful role in deciding how to perform. The creation of shared value indeed, embeds the social mission of a corporation and challenges its resources for innovations' development that can solve social issues (Pfitzer *et al*., 2013). To reinforce this social purpose, seems to be necessary for managers to quantify and define the opportunities and problems to solve in a global challenges' landscape. Moreover, it is evident how organizations are interconnected in a network system with other players, and so, how these relationships have a significant impact on sustainability outcomes, supply chains and stakeholder's engagement. More and more businesses are adopting cooperation strategies in terms of sustainability, since is a common issue for organizations, and this portray an opportunity to create a new community of value. Thus, shared value vision goes beyond corporate social responsibility, by creating new ways of achieving economic success in the global economy (Porter and Kramer, 2011). Moreover, according to Porter and Kramer[10], there is a strong interdependence between a company and its society as driver for responsive

[9] Shared value: Porter, M.E. and Kramer, M.R. (2019) "Creating Shared Value" in Managing Sustainable Business, pp.323 – 346.

[10] Porter, M.E. and Kramer, M.R. (2006) "Strategy & Society: The Link Between Competitive Advantage and Corporate Social Responsibility" in Harvard Business Review. In this paper authors highlight the powerful role that CSR has in representing more than a cost or a constraint, a source of opportunity and competitive advantage.

Corporate Social Responsibility[11] measures. Corporations have so to highlight the intersections that can be source for shared value, as the inside-out linkages (a company's impact on society) and the outside-in, that sees how the competitive and social context influences corporations' performance. For this reason, a symbiotic relationship between company and society declares success in this mutual commitment to behave and develop solutions that would benefit society (Porter and Kramer, 2006). Therefore, for authors organizations must reconceive their intersection between society and performance so to allow the creation of shared value. According to them, indeed, often companies lack of identifying the overall external environment, not considering the broader business environment that comprehend its major activities and operations (Porter and Kramer, 2019).

There are indeed, three layers that companies can adopt to create shared value opportunities, by reconceiving products and markets, redefining productivity in the value chain and in the end, by enabling local cluster development (*ibidem*, pp. 325). Enlarging the cluster will enable a broader procurement for the supply chain, new products or services will need a reshape into production and distribution process, and lastly, a new overall value chain configuration will require some procedural adaptations and technological innovations. This will lead to a sustainable long-term success and competitive advantage, causing so economic profits and benefits for society, recognizing that also the societal context defines our competitive market.

Additionally, to compute the effective contribution that shared value has on financial statements, the Sustainability Accounting Standards is trying to create a scorecard for balancing and comparing firms' environmental and social impacts (Pfitzer, 2013). For this reason, is critical to assess how a degree of change will drives profits or reduces costs, and aligns resources needed to achieve this innovation (*ibidem*), so as to identify new areas in which operate additional investments. To create so social and business value, Pfitzer propose us a model in which five pillars must be met, a social purpose, a defined need, use of a specific measurement tool, the right innovation structure and co-creation.

[11] Corporate Social Responsibility: is a self-regulating business model that helps a company be socially accountable. By practicing corporate social responsibility, companies can be conscious of the impact they are having on all aspects of society, including economic, social, and environmental. (See: <www.investopedia.com/terms/c/corp-social-responsibility.asp>)

Considering so this new type of shared value profit, there is an evident connection between economic and societal value thus to create a new driving force for competitive advantage. Hence, we can define the creation of shared value as the advancement from the CSR concept, since it is more comprehensive and interrelated with the business's strategy.

3. The Triple Bottom Line and a Strategic Framework for Sustainability

In literature has acquired more attention the process of integration of social dynamics with environmental ones, many authors referred to this phenomenon as the 3P[12] approach, the Triple Bottom Line, that is how an organization should combine standard metrics of financial success with those that measure environmental stewardship and social justice (Perrott, 2015). Therefore, the author who coined in 1994 the Triple Bottom Line term, J. Elkington, was already aware of the inevitable expansion of the environmental agenda and so, explored the field with this concept. The Triple Bottom Line focuses not only on how the economic value is achieved, but also how corporations add or destroy value in their environment. It seems so crucial for organizations to effectively realize and understand how external and internal factors can be integrated, in order to plan a sustainable strategic plan that will cover different perspectives. Many organizations started their sustainable revolution by adapting smaller actions to provide changes in their structure, but what is evident is that incremental innovation often is not sufficient, and so organizations require to plan disruptive capabilities and radical innovations. A holistic vision is also required to understand and combined a broader range of interests, including stakeholders, shareholders, employees, society and environment (Bocken *et al*., 2013). Considering that, an organization must follow a strategic process to deal with sustainability issues; Perrott (2015) introduced a strategic sustainability management framework, thus, to conduct a linear plan throughout the sustainable journey.

[12] 3P approach is based on three sustainable cornerstones: people, planet and profit. Thus, contributing to an economic and environmental equity.

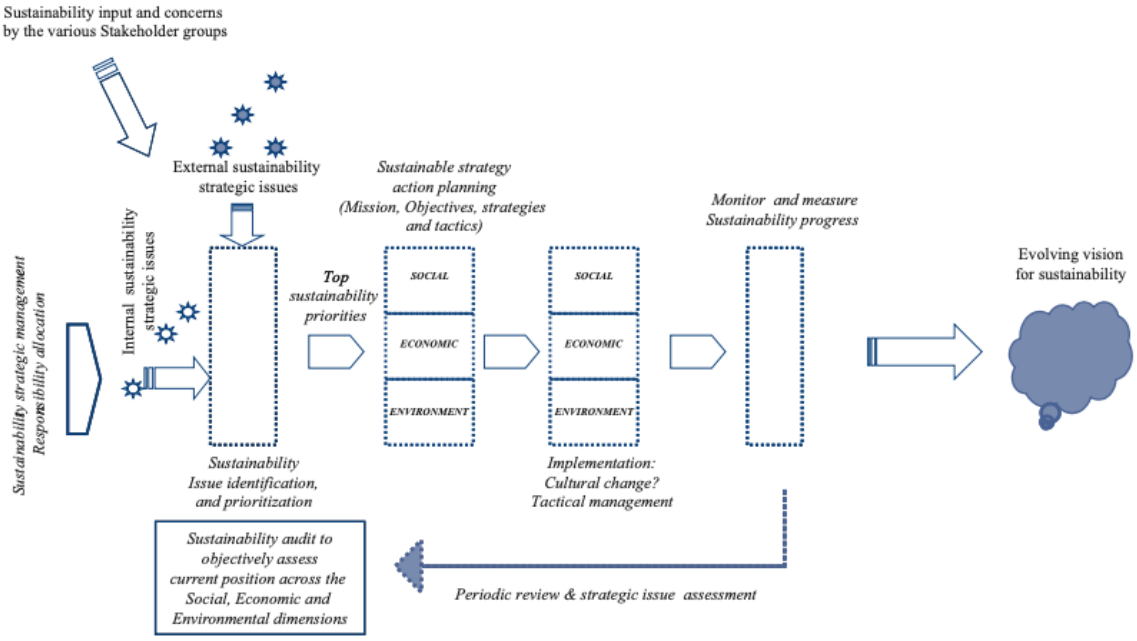

Figure 2. *Strategic sustainability management process.* (Source: Perrott, B.E. (2015) Building the sustainable organization: an integrated approach, in Journal of Business Strategy Vol. 36, No. 1, pp. 45)

Starting from an audit phase, in which the organization conducts test to see which sustainable strategic issue to address, considering both internal and external threats, the procedure moves forward by collecting information and making evaluations. In the end, the assessment of priority, according to the type of urgency and potential impact, takes place to set the final sustainability vision for the firm. It is important that a shared vision is spread among all level of the organization, in order to reach effective outcomes and a clear sense of direction, starting from the top management to the down base.

Relating so the international competitiveness to sustainable business model, a shift in the entrepreneurs and governments' mind is necessary. Starting so from a national level, and then on global scale, a critical attempt to design and promote specific policies and *ad-hoc* framework to support and exploit the sustainable business model would be the solution to make this green translation possible. Managing indeed, several and different purposes across a network of multiple stakeholders, requires a deeper understanding and a propension to effectively create

shared value. A systematic approach to sustainable innovation can be emphasized by the role of actors, networks and institutions too, and we can see organizations as promoters of new technologies and innovations in the market. Lastly, a sustainable value proposition has to address three different building blocks (Baldassarre *et al*., 2017).

Figure 3. *Sustainable Value Proposition Framework.* (Source: Baldassarre, B., Calabretta, G., Bocken, N.M.P., Jaskiewicz, T. (2017) Bridging sustainable business model innovation and user-driven innovation: A process for sustainable value proposition design, in Journal of Cleaner Production Vol. 147, pp. 177)

This value proposition tool proposes us a framework that consists in the combination of three different dimension: (1) stakeholders' network, (2) a sustainability problem and for last, the creation of (3) a product or service. As first step, the identification of what are the needs and objectives of the stakeholders' network will be a practical tool to identify what kind of value the organization wants to achieve and generate. Secondly, understand which is the sustainability problem that the firm wants to address, is the first move to adequately adopt a sustainable value proposition and strategy. This may require incremental innovations, or even radical, it would be a process of stages and it may also require some iterations of problems and solutions. Innovations to implement a sustainable development required, indeed, to move beyond incremental adjustments, since this may lead to further gradual improvements, but in the end, not sufficient for a global optimal system configuration (Boons *et al*., 2013). Having in mind the real stakeholder's network and the issue to solve, the firm can proceed with the design and development of its offer, a product or service. To deal with the problem, also

product or service needs a process of iteration and market interactions to find how it has integrated into its core value the stakeholders' interests and sustainability's objective. According to Baldassare (*et al*., 2017) vision on the lean startup's development, it provides an iterative process to have customer feedback by three steps: build, measure and learn. This can be applicable also to our sustainability value proposition and development case. Firstly, we have to define a sustainable strategy, creating a simple prototype of solutions to environmental issues, measure with specific metrics feedbacks and evaluate its effectiveness, and lastly, learn from what can be improved or changed, integrating suggestions to solve errors. This would be a gradual process, starting from a formulation phase, then experimentation and in the end with its possible validation. Since solutions are so developed iteratively, with involvement of stakeholders and potential users, the use of creativity is also critical to validate the viability and desirability into community (Baldassarre *et al*., 2017).

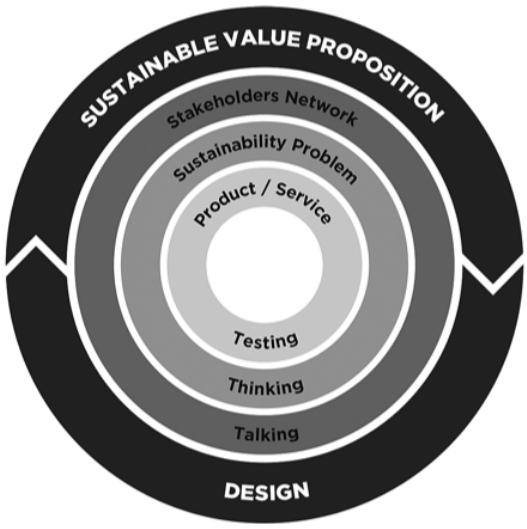

Figure 4. *Process for sustainable value proposition design.* (Source: Baldassarre, B., Calabretta, G., Bocken, N.M.P., Jaskiewicz, T. (2017) Bridging sustainable business model innovation and user-driven innovation: A process for sustainable value proposition design, in Journal of Cleaner Production Vol. 147, pp. 183)

Ending to this point our literature review on the different perspectives on the concept of sustainability, we see how this evolutive process started years ago and

find now major applications at organizational level, with practical frameworks and tools. Starting from Freeman[13] (1984) and his effort in including the stakeholders' interests, by understanding the society and the natural environment that businesses impact. The sustainable development definition (World Commission on Environment and Development, 1987) which addresses economic, environmental and social issues, to the Triple Bottom Line definition (Elkington, 1994) that looks at the broader set of stakeholders that organizations are affecting, shedding light also on circular economy considerations, that pose the attention not to the end-of-life of products, rather on a product lifecycle scheme. Those concepts can be resumed into the more recent Corporate Social Responsibility policies and programs but, being opened to see upcoming opportunity to include innovations into their business model framework and to approach network ecosystems.

3.2 Sustainable Innovation

As we have affirmed previously there is a close relationship between the concept of sustainability and innovation that organizations can implement. To address global challenges and changes, firms need to move beyond their actual knowledge, processes and technical innovation. Therefore, sustainable innovation is generally defined as the development of new products, processes, services and technologies that contribute to the development and well-being of human needs, while respecting natural resources and regeneration capacities (Cillo *et al*., 2019).

The underlying impulse to plan sustainable innovation doesn't applicate just to one part of the business, but mainly, at the overall level of an organization. For this reason, sustainability issues need to be integrated in the whole company process, starting from idea generation to the outcome's distribution. Companies that undertake sustainable innovation, are instead rewarded by the market with an increase in their value[14]. So, this make clear how the external pressure and

[13] Freeman, R.E. (1984) "Strategic Management: A Stakeholders Approach".

[14] Sustainable practices ensure sustainable rewards: rating's agencies indeed, are increasingly posing the attention on sustainability outcomes, considering so into their evaluations ESG practices. Incorporating these considerations into its ratings methodology and analytics, agencies enable an

perception is fundamental to acquire competitive advantage, if internally there is coherence in the sustainability strategy. What characterizes a sustainable innovation, is not only a product or process change, but it can be also, in the type of management system too. In fact, sustainability-oriented innovation involves realizing purposeful changes to an organization's culture and values, as well as to its production processes, so to add and create social and environmental utility, overcoming the exclusive economic value (Adams *et al*., 2016).

To address this upcoming scenario, organizations must modify and rely on new type of standards and guidelines, let so flourishing an ethical and environmental management system. There is so the possibility to upfront the transition by identifying the capabilities required, taking into account a collective commitment for a future responsible establishment. Another interesting perspective offered by Cillo (*et al*., 2019) is that sustainable innovation relies in an ecosystem, so is formed by continuous interactions among economy, society and other dimensions. It is also necessary to understand to which degree an innovation is worthy or not, if its establishment will favor an increase in value and foster solutions.

For this reason, according to the study of Boons (*et al*., 2013) emerged a practical scheme thus to have clear in mind which aspects and requirements, an innovation has to deal with. Firstly, the also mentioned above (1) value proposition provides measurable ecological or social value in accordance with economic one. For the (2) supply chain it involves suppliers that take the same amount of responsibility as well as its organizations' stakeholders. This is also at the basis of the frequently used by corporations 3P Standards (a code of business conducts and ethics for third parties), which is a supply chain management[15] (SCM) tool for which suppliers need to comply with, applicating the same legal and regulatory requirements in matter of Environmental Social and Governance (ESG) aspects. Indeed, the Green

analysis of factor in short-, medium- and long-term impacts, both qualitative and financial. (See: <www.spglobal.com/ratings/en/products-benefits/products/sustainable-finance>)

[15] Supply chain management is the handling of the entire production flow of a good or service, starting from the raw components all the way to delivering the final product to the consumer. A company creates a network of suppliers that move the product along from the suppliers of raw materials to those organizations that deal directly with users.

Supply Chain Management System[16] (GSCM) is increasingly adopted by organizations that are trying to better integrate it internally.

As companies are trying to meet all the interest and needs of their stakeholders, so the (3) customer interface[17] does, it motivates customers to take responsibility for their consumption habits. Lastly, from a financial perspective we have the (4) financial model, that embeds the equal distribution of costs and benefits among the actors involved and, estimates so the company's ecological and social impact.

4 Natural Capitalism as Forerunner of Sustainable Business Model

Already in 1999, many researchers and authors highlighted the importance of sustainable practices in our environmental landscape, to protect our biosphere with innovative techniques. Indeed, in those years it was called *Natural Capitalism*[18] where ecosystem is adequately valued, even if the model remains primarily theoretical. By some authors the definition of this phenomenon complies with some simple changes to the way we carry out businesses' operations, by adopting advanced techniques for making resources more productive, so to spread value both for today's shareholders and for future generations (Lovins *et al*., 1999). According to this vision organizations must implement changes in four different practices: (1) increase the productivity of natural resources and reducing wasteful consumption, (2) shift to a biological production model to eliminate, rather than reduce, harmful materials; (3) move also to solutions-based business model so to deliver value as a stream of services and meeting customers' expectations, and then, concluding this

[16] Green Supply Chain Management integrates eco-friendly aspects into conventional supply-chain management practices, in order to make every activity of the value chain (designing, procurement, processes, final product delivery, and end-of-life product management) environmentally conducive.

[17] According to Boons *et al*. (2013) vision, to overcome organizational barriers that often relies in the dependence in the supply chain, the customer interface can be addressed on a broader scope, as a mean for a process of value co-creation or co-production with customers, intensifying so the relationship among business and users.

[18] *Natural Capitalism*: Any economic system that incentivizes profit based on proper care of the environment. It assigns an economic value to stewardship of the planet and assumes that goods and services have a value apart from their potential sale price on the market. (See: <www.financial-dictionary.thefreedictionary.com>)

process by (4) reinvesting in the natural capital asset. Indeed, this last business practice is very crucial to sustain our natural capital base as mean of sources for our daily business's operations. The result of those actions would be an economy in which we grow and get richer by using less and become stronger by being leaner and more stable (Lovins *et al*., 1999).

For this reason, to deal with an increasingly dynamic and interconnected global economy, corporations need to make some evaluations on the three main pillar on how a business is done. Analyzing so the company's business model, managers have to align drivers for the sustainable value creation, delivery and capture. Hence, for value creation we think of *what* value is created according to the value proposition of the company, *how* it is delivered through the strategy, and lastly, *why* is captured by aligning profits and relative stakeholders' engagement (Madsen, 2020).

4.2 Business Model Innovation (BMI) as a Premise for Sustainable Innovation

"A mediocre technology pursued within a great business model may be more valuable that a great technology exploited via a mediocre business model" those are the words of Chesbrough, H.[19] (2010). According to him a technology acquires value once it is commercialized by a business model, for this reason a business model fulfils the following functions: (a) articulates the value proposition, (b) identifies a market segment, (c) defines the structure of the value chain and (d) details the revenue mechanisms, (e) estimates the cost structure and potential profit streams and in the end, (f) establish a competitive strategy by which innovating a business model's firm will gain advantage over other competitors (*ibid*., p. 355). Relatedly, what a business model innovation implies, is to overcome barriers and experiment with alternative models' way of conducting business so to gain

[19] Chesbrough, H. (2010), "Business Model Innovation: Opportunities and Barriers" in Long Range Planning, Vol. 43, pp. 354-363.

competitive advantage. Before taking action on changing business model reality, managers have to map their value chain and clarify on which components should focus more, this would lead to an experimental process of combinations. Indeed, an organizational problem would be the coexistence of two different business model at a time, since the new one often requires time and experimentations before being adopted. As the author affirms, it is a delicate process of balancing previous resources to shift to new objectives. Changes to business model are so recognized as fundamental approach to enact innovations for sustainability. In this way, BMI represents a potential mechanism to integrate sustainability into business (Evans *et al*., 2017), however, among research academics there is a lack of clarity and of an established theoretical grounding for business studies.

Considering business models as vehicle for innovation and necessary means to the commercialization of technology, as also Chesbrough stated, organizations must deal with the search for adaptative capacity and sustainable ways of doing business. To this point, what characterize a Sustainable Business Model Innovation, is the capability to integrate and reconfigure different business aspects (*e.g*., capabilities, stakeholder relationships, knowledge management and internal culture) to generate a new multidimensional and comprehensive model. Moreover, since business model needs adaptations and adjustments to make change possible, according to Joyce and Paquin[20] (2016) there are two approaches organizations can implement to BMI. They distinguish an outside-in approach and then, the inside-out model, the former involves exploring opportunities for innovation by looking at different organizational archetypes, thus, to explore innovations which may result from adaptations of current business model to new organization model. While, the latter involves starting with the current elements of the organization, analyzing thanks to the visual tool of the business model canvas (BMC) the potential interconnections among business elements, so as to facilitate discussion and exploration of potential innovations to the underlying business model itself.

[20] Joyce, A. and Paquin, R.L. (2016), "The triple layered business model canvas: A tool to design more sustainable business models" in Journal of Cleaner Production, Vol. 135, pp. 1474-1486.

5 Sustainable Business Model Innovation (SBMI)

A sustainable innovation is a process where sustainability considerations are integrated into company systems from idea generation through R&D and commercialization (Boons *et al*., 2013). For this reason, a business model needs to combine several elements in order to give a coherent mix of actions. A common definition for business model is the ability to design and coordinate how value is created, delivered and captured by an organization. Business model innovation instead, is about creating new value proposition, delivery and capturing by generating superior economic value (Baldassarre *et al*., 2017). Overcoming the classical definition and framework of the business model, from a work of Boons (*et al*., 2013) emerged the interrelation among the business model and sustainable innovation development, thanks to three elements of value configuration. The first step is the common value proposition design, that makes evident the relationship between what the firm offers and what customers need. This relationship is basically built on the exchange of value and should be critically assessed. By focusing on the balance between economic, social and ecological value, needs and functions would emerge for a sustainability analysis. Then, the value creation highlights the relationship among the firm and its operations on a wider and broader scale, posing the attention to the essential attributes of the system. Lastly, the critical objective of organizations is to efficiently translate all this model into action, and so gaining profitable rewards. For this reason, the revenue model shows how the distribution of costs and benefits affect the firm, and how it is needed a coherent evaluation of the welfare they create for involved actors and communities. Business model for innovations has so the potential to overcome institutional, organizational and external barriers. Moreover, integrating thus into their business model concepts as innovation, dynamism and network of ecosystems we can refer to external barriers as sources for innovative development. This would lead organizations to have a broader base for idea generation and creative perspectives deriving from different ecosystems. Handling together so, dynamic network and ecosystems for innovations (Madsen, 2020) businesses can manage complexity with more effective use of resources and responses, enabling also a synthesis of proposals for coherent

solutions. A wholistic vision of the ecosystem is a useful mean to identify unforeseen risks and delays, so to provide novel solutions and explore innovations (*ibidem*).

Facing nowadays so many global challenges, our society is called to action, overcoming those barriers and integrating into ordinary business model innovation the sustainability framework, as to benefit society and the environment itself. Generating value in a sustainable way led us to see how companies are increasingly challenged on the achievement of social and environmental objectives, indeed, they have to integrate as part of their capability of doing business the Sustainable Business Model Innovation[21] (SBMI). Sustainable business model innovation, indeed, is an emerging research stream that attempt to strengthen companies' ability to pursue sustainable goals (Baldassarre *et al*., 2017). While, business model innovation (BMI) is about innovating the value creation, delivery and convert this value into profits. It is a key activity to remain competitive for multinational corporations, and since there are increasingly sustainability challenges, to face that, corporate interest has recently expanded to embed societal issues into BMI, so to have sustainable business model innovation (SBMI) (Bocken *et al*., 2020). If a system of interdependent activities can be seen as business model, what expands the focal firm and extend their boundaries of actions, can so be called Sustainable Business Model. Therefore, there's a growing importance of sustainability as key driver for innovation (Adam *et al*., 2012). What is necessary for a sustainable development seems to be a deeper integration and improvement of environmental and social issues into business activities. Authors focused also on the different definitions of sustainability, and in the work of Varadarajan (2017), he tried to solve the questions for what stands sustainable innovation or sustainable innovations orientation. For Boons (*et al*., 2013) a sustainable innovation is characterized by systemness and radicalness, including social objectives and its link to a long-term

[21] SBMI: explores business model innovations by applying a combination of modular transformations to address limits and leverage potentials. In this way, strategy and sustainability are jointly considered and become mutually reinforcing. The idea builds on Porter's concept of shared value unifying sustainability efforts in a methodology applied at enterprise and global level. (Young, D. and Reeves, M. (2020) "*The quest for sustainable business model innovation*" in BCG Henderson Institute, Boston Consulting Group)

process of sustainable development. In addition to that, Adams (*et al*., 2012) grouped eight major categories of sustainable design strategies: (1) new concept development, (2) selection of low-impact materials, (3) reduction of material usage, (4) optimization of production techniques, (5) optimization of the distribution system, (6) reduction of impact during use, (7) optimization of initial lifetime, and (8) optimization of end-of-life system. Analyzing so the usual configuration of a business model, with the Sustainable Business Model Innovation we have a higher and integrative attention in including not only economic objectives, but also, social and environmental perspectives. SBMs have so a broader scope of action, trying to generate positive or eliminate negative impacts (Velter *et al*., 2020) and be a medium to gain competitive advantage. Integrating multiple dimensions in its definition, they exceed the customer and profit orientation, considering value creation as a broader scope of stakeholders, society and the natural environment (*ibidem*). A sustainable value proposition can be defined as a business model that incorporate pro-active multi-stakeholder management, the creation of monetary and non-monetary value for a broad range of stakeholders and longer-term perspective (*ibid*.).

What SBMI represents is a new way of combining the firm value's proposition, with stakeholders' interest and environmental attention. Moreover, SBMI can lead to direct business benefits, improving organizational resilience, reputation and employee attractiveness (Bocken *et al*., 2020). Stakeholders have not to be seen as passive bearers of interest, but on contrary, as proactive actors that can contribute to the sustainable value proposition. This led us to think that there is an extensive need and effort in balancing and combining such different type of interests and actions. What Velter (*et al*., 2020) analyze in its study, is how boundary work[22] can be useful to understand the efforts needed to create and maintain challenging boundaries, that would allow processes of exploration and disruptive capabilities at

[22] Boundary work theory investigates the practices that enable conversation, interaction and coordinated action between the focal organization and other actors. Therefore, it can be defined as the attempts of actors to create, shape and disrupt boundaries. Taking into account the multilevel value creation, boundary work is a key activity and a theoretical perspective to explore how organizations deal with boundaries (Velter *et al*., 2020).

organizational level. Indeed, one of the main questions is, how organizations can innovate their value proposition and business model in order to be sustainable. Therefore, sustainable market orientation focuses on four different approaches: objectives, strategies, processes and benefits (Varadarajan, 2017). The interactions that happen between a company and its external environment, including stakeholders, are crucial to understand what type of relations they have on monitoring their firm's resources, capabilities and activities through their value creation. What boundary work suggest us, is to define which type of relationships exist with partners, suppliers, shareholders and others, since internal change are quite often not sufficient, and it is necessary a realignment with stakeholders. Since this interdependency is a critical key in the development of dynamic capabilities and knowledge sharing, organizations must ensure strong ties through repeated interactions, in order to build relationship outside the firm with other network's players (Madsen, 2020).

What catch my attention is indeed the delineation of a precise interaction among three different dimensions, that need to be analyzed and conceptualized into organizational level. As we have stated before on the shared value creation vision, here we have similarly the possibility to denote a value network that is defined by the mutual exchanges, among organization and stakeholders, that explore different issues with value creation, fairness and efficiency (Velter *et al*., 2020). The three dimensions presented by Velter are the normative, strategic and instrumental one. Starting from the first dimension, the sustainable shift needs a normative alignment that share a foundation for decision-making at strategic level. At the strategic dimension we have to think about the positive or negative role of externalities and understand which one can be outsourced or performed internally. In here the role of stakeholders can be enhanced, since they can be embedded in the shifting of roles in the value proposition to capture mutual value. Finally, sustainable business model innovation requires a change in the organizational path and processes, so to have an instrumental dimension that entails the activities of change. All these three dimensions involve the presence of stakeholders and includes changes in the efficiency of boundaries (as new organizational activities), competence boundaries (as new knowledge and skills) and identity boundaries, that offer the new purpose

of the firm (*ibidem*, p. 2). Without doubt, multi-stakeholder involvement needs extra efforts, and know-how capabilities to efficiently coordinate and create a cooperative environment. Business model changes can happen in a simpler way rather than, a sustainable business model change. Innovation wouldn't affect just one small process, or activity, but to be efficiently implemented and performing, more than an incremental innovation, organizations require radical sustainable business model innovations. The core of SBMI relies in the development of a sustainable value proposition, that simultaneously connect multi-stakeholders value creation. The stakeholder's engagement can improve the presence of different interest and perspectives in the company, but there is the need for the organization to be effectively proactive to guide and lead the change internally and externally, in order to be not swept away by empirical facts. A collaborative arrangement is needed to provide innovative solutions, by being open on new opportunities, remaining agile and proactive and, in the end, let the innovation process growing and capturing value from the whole network of actors (Madsen, 2020).

Also, the role of resources and capabilities of the organization in case of similarity or dissimilarity would lead company to greater or weaker synergies in adopting new business model system. When there's not a clear alignment of boundaries, capabilities and value frames, this would lead to a collusion between models and expectations. Boundary dissonance so, implies a lack of alignment of organizational boundaries between stakeholders for sustainable business model innovation (Velter *et al*., 2020). Indeed, when dissonance occurs, the SBMI can be potentially hindered. This urges us to think of how to deal with relevant dissonances and barriers.

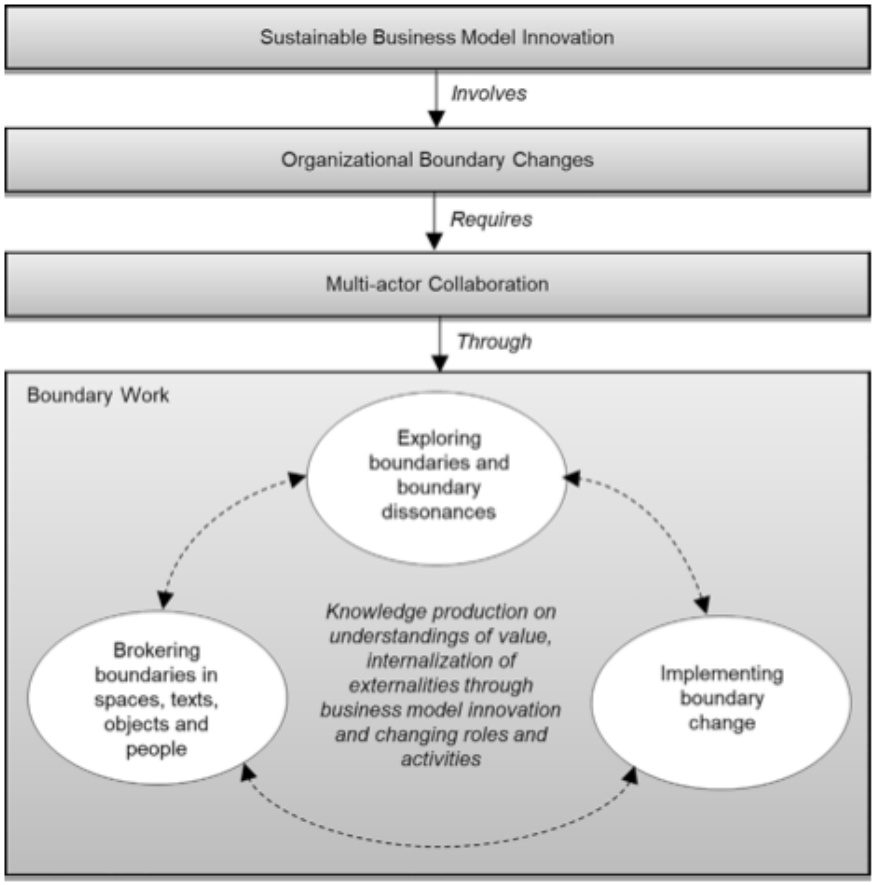

Figure 5. *Conceptual framework for Boundary Work in SBMI.* (Source: Velter, M.G.E., Bitzer, V., Bocken, N.M.P., Kemp, R. (2020) Sustainable business model innovation: The role of boundary work for multi-stakeholder alignment, in Journal of Cleaner Production Vol. 247, pp. 11)

Organizations often lack this sustainable business model adoption, and lack of the importance of dynamic capabilities to innovate. Since change affects dynamic capabilities, they are critical to refine and transform business models. Thus, SBMI can also be defined according to Bocken *et al*. (2020) as the ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments. So, to face dissonances and organizational barriers to sustainable innovation, dynamic capabilities can be useful lens to enable companies to adjust, recombine and create ordinary capabilities (*ibidem*, p. 2). Ordinary capabilities allowed corporations to build a competitive advantage over time and depend on a firm's existing strategy, structure and resources. According to the work of Bocken (*ibid.*, p. 6) thanks to the identification of institutional, strategic and

operational levels, they can enable sensing, seizing and transforming for SBMI. For this reason, dynamic capabilities can assess new opportunities (*sensing*), mobilize resources to address opportunities and capture value (*seizing*), and *transforming* with a continuative process of organization's renewal (*ibid*.). Doing so, business models have a longer-term perspective, indeed, if they cooperate with long term contract with some partners and stakeholders that provide also renewable resource management and disposal, they can both benefit from a good economic performance and a proactive societal and environmental attitude. If SBMI target correctly societal or environmental needs, they can catch real profitable business opportunity and gain competitive advantage. Providing thus a solution to global challenges, such as climate change or poverty, SBMI can shape markets and society, even if transformation process of business models is quite complex and significant (Bocken *et al*., 2020). Hence, sensing involves companies becoming aware of emerging sustainability issues and appraising the potential business opportunities, while for seizing, is about adopting resources to address emerging opportunities and capture value from that. At last, to become a sustainable organization, there is the need for continuous renewal process by transforming organization's capabilities. Thereby, business models, dynamic capabilities and organizational design are interlinked according to Fjeldstad and Snow[23] (2018). Indeed, the dynamic dimension of a business model is connected with its capacity to change and adapt over time. In this adaptive cycle, organizations constantly align elements of their business model that have to fit with the environment in which they are. So, business model innovation occurs when organizations are improving their existing capacity and introduce new models (*ibid*em, p. 34), since the global challenges that we are facing urges us to develop a business model that is interrelated with environmental threats and opportunities.

[23] Fjeldstad, D., Snow, C. (2018), "Business models and organization design", in Long Range Planning Vol. 51, pp. 32-39. There is the necessity to study business models at the ecosystem level, in order to understand how firms with different business models competitively affect each other, and how business model is a system rather than a collection of parts.

6 Internal and External Barriers to Business Model Innovation

Going further with our analysis, it is critical to notice that beyond all our considerations about what organizations can do, which integration process and sustainable strategy to adopt, there are some evident obstacles that have to be considered. Internal and external barriers to innovation exist, and often collide with our sustainable innovation business model implementation. When introducing a new technology, or modern processes and mechanisms, innovations face internal and external barriers according to the degree of the novelty. Indeed, before adopting or introducing changes at the organizational level, we have to evaluate which type of innovation is it, and in which degree this would affect our business model structure. If we are introducing an innovation that fits with the existing know-how and business model, we would probably face minor obstacles, rather than, for an innovation that doesn't fit at all with our structure, in this case then, we will have to deal with some internal and external barriers. We have to think of our organizations as it is surrounded by an internal environment and then by an external one.

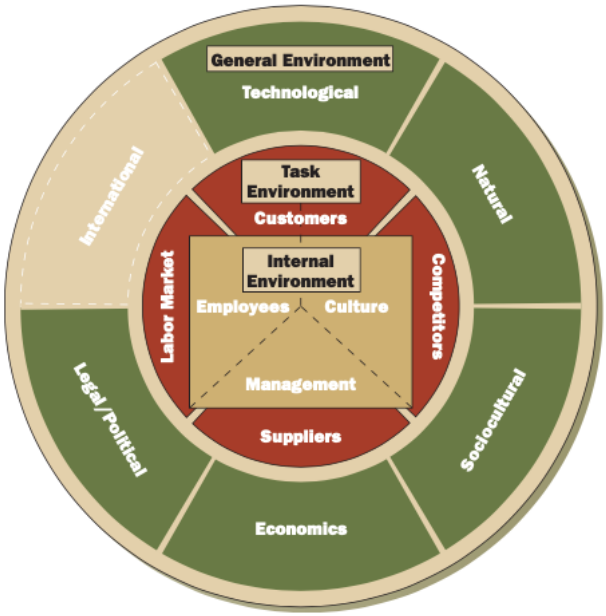

Figure 6. *Location of the Organization's General, Task, and Internal Environments.* (Source: Daft R. L. (2010) from Management, South-Western Cengage Learning, Ninth Edition, pp.64)

As we can see from the above figure, Richard Daft elaborate this scheme to show how organizations are currently influenced by the external environment, forcing us to not comply with adjustments just internally within our business, rather taking into account all external variables that can influence our performance. Moreover, the external environment has the potential to influence corporate culture, for this reason there is a growing importance in matching external needs with internal culture. The organization's external environment can be further conceptualized as having two layers: general and task environments, as we see in the figure above. The general environment is the outer layer that is widely dispersed and affects organizations indirectly (Daft, 2010). It includes indeed two factors that are interesting for our purpose, the natural and technological ones, which mainly affect our firm. While considering the task environment, it is closer to the core of organization and includes sectors that conduct day-to-day operations and directly influence them (*ibidem*, p. 65). About the internal environment, Daft (2010) affirmed that it includes elements within organization's boundaries. It defines how corporate culture will fit with external environment and issues, for this reason the environment in which business operates is seen as a dynamic force. External environment influence so organizations to build adaptative capabilities, to deal with unexpected changes and execute a new thinking attitude towards unforeseen events. According to our two previous scenarios, when our organization doesn't present the correct configuration to internalize innovation, institutionalized organizational and external barriers may arise (Boons *et al*., 2013). Organizational rules, codes and guidelines, once a business is well established, are difficult to change and revise, hence there are potential inhibitors to the introduction of business model innovation. In the external environment, especially for high capital intensity industry (*ibidem*, p. 13), a disruptive capacity or technology is not often well appreciated, since this would lead to major investments and corporate responses for its acceptance within the organization and the market itself. To this purpose, institutionalizing social and natural needs as driver for sustainable business development, the work of Stubbs and Cocklin[24] (2008) seems to be coherent with

[24] Stubbs, W., Cocklin, C., (2008) "Conceptualizing a sustainability business model", in Organization & Environment Vol. 21, pp.103-127. According to their view, organizations can make significant progress towards sustainability through their own internal capabilities, but organizations

our evaluations, which assumption declared that sustainable business model development is built upon sustainability concepts from the non-economic sphere, and then translated into organizational level. Their model is based upon the distinction between structural and cultural attribute as first categories of drivers, and then, by identifying a socioeconomic environment which include the internal organizational capabilities. Thus, this distinction can provide us a scheme on how to address internal and external barriers and consider business model as bridge to integrate changes and needs, pursuing a sustainable business development. This led us to understand how approaching changes at company level must be accomplished taking also into account the external environment and its barriers.

These strategic barriers affect so the ability that a firm has to correctly address some opportunities for the development and transformation of SBMI. Focusing on the three main value network dimensions, (a) institutional, (b) strategic and (c) operational, Bocken *et al*. (2020) have identified some major barriers which can be overtaken by positive drivers to mitigate their effect (Fig. 7). About the institutional barriers we know that they are part of the organizational design and internal structure, indeed, they are all those well-established norms, rules and processes that guide an organization, hindering so the transformative innovation process. The core set of an organization's actions, are what constitute strategic barriers in pursuing its own strategy and direction, often concerned by a short-terminist priority. In the end, operational barriers too, hinder the sensing, seizing and transforming actions for SBMI. Operational barriers are those best practices, standardized processes and fixed resources that contribute to the core firm's objectives. On the other hand, drivers for each different level affect the corporations' capability to sense and evaluate opportunities to mitigate barriers, and influence firms in case of opportunities to renew its business models (Bocken *et al*., 2020). As exhibited before, and in the following figure, institutional drivers can mitigate negative effect thanks to a balancing relationship among stakeholders and shareholders' interest,

can effectively perform only if the whole system in which they are, is sustainable. Changes in the socioeconomic system, both structural (such as redesigning transportation systems and taxation systems) and cultural (such as attitudes to consumption and, economic growth and wellbeing), are required to facilitate firm-level and system-level sustainability.

valuing business sustainability opportunities and embracing differences to develop dynamic capabilities. In the case of strategic drivers, seems to be crucial the collaborative landscape for amplifying innovations' sources, and regarding the operative drivers, those have to enable and encourage the execution by including people capability development and *ad-hoc* performance metrics including also sustainable efforts.

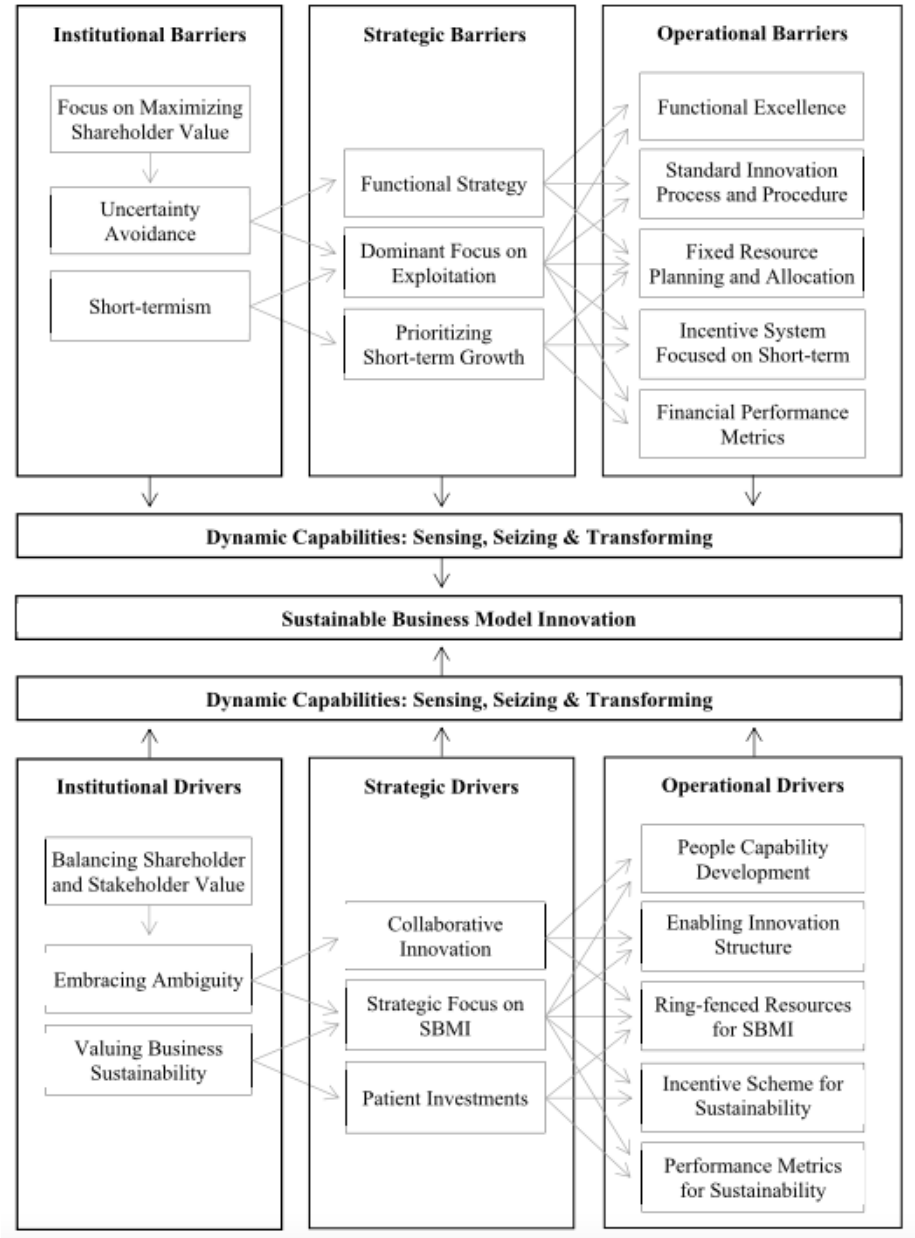

Figure 7. *Barriers to sensing, seizing and transforming for SBMI.* (Source: Bocken, N. M.P., Geradts, T. H.J. (2020), "Barriers and drivers to sustainable business model innovation: Organization design and dynamic capabilities" in Long Range Planning Vol. 53, pp. 8)

7 Conclusion Remarks on Sustainable Business Model Innovation

To conclude our analysis, from a literature perspective we can declare that there is a growing interest in research field in giving a common definition and framework for the sustainable business model innovation concept. Often called in brief business model innovation, or sustainable business, it is recognized as the medium to deliver greater social and environmental value in the industrial system. Business model innovation scope is to provide a novel approach to deliver the required change, through redesigning the firm's purpose and value creation, by preserving the environment in the meanwhile capturing economic value for itself.

This is due to the upcoming need for a sustainable future and the pressing challenges of our age, which see as driver for new competitive advantage the role of sustainable innovations, that imply moving beyond the individual firm's perspective to a network system vision to generate value. Indeed, as Lüdeke-Freund (2010) stated, a sustainable business model creates competitive advantage through higher customer value and contributes also to a sustainable development of the company and the society. To create a sustainable business a holistic approach is needed, by understanding potential conflicts and positive or negative aspects of the value proposition, aligning so opportunities to convert into business model innovations. In the end, we can consider sustainable business thinking as a constructive force thus to re-imagine the role that a firm has, integrating concepts as TBL and shared value creation, into the way business does business (Bocken *et al*., 2015). This implies a coevolutionary process with technologies, social practices and institutions to make the change towards sustainability possible.

CHAPTER II

THE PHARMACEUTICAL INDUSTRY AND THE QUEST FOR A SUSTAINABLE BUSINESS MODEL INNOVATION

1. The Pharmaceutical System

Keeping in mind the previous theoretical background on the state-of-the-art of sustainable framework at organizational level, we have to move beyond, and conceptualize it into a specific industry: the pharmaceutical system. Since a sustainable health system has to deal with constant change, it would be interesting to investigate the pharmaceutical system's response to sustainability call. The system's response to a disturbance depends also on the capacity to handle change and unexpected events, so to show three different attitudes: an absorptive capacity, adaptative and transformative ones (Hafner *et al*., 2017). Moreover, pharmaceutical companies should increase these types of capacity to effectively react, and should execute the *sensing*, so as to identify the right innovative capabilities (Teramae, 2020). For this reason, we have to take into account that every intervention on the system, affect each part of it, requiring so more resilience and sustainable improvements.

We can provide the definition of pharmaceutical system as it consists of all structures, resources and people management, processes and their interactions within the broader health system (*ibidem*), taking also into account key stakeholders and furthering goals. Pharmaceutical system is made up by goals, product, guidance principles, processes and system components, the context and its related stakeholders. All the functions carried out by pharmaceutical system are regulated by norms, laws and policies, so as to provide the better-quality outcomes, in a timely and effective way. In this view, according to authors, pharmaceutical system has some performance goals, intermediate and ultimate. The former are efficiency,

quality and equitable access to medicine, which represents the scope of the firm, while the latter, are means for ultimate performance goals as ensure a health status, financial protection and citizen satisfaction (*ibid*., p. 579). Considering the complexity of the system, we can cope with this by identifying sustainable innovations and improvements as driver for resilience and competitive advantage. Therefore, if the ultimate aim of a pharmaceutical system is to improve health outcomes, in order to do that, firms have to deal with some urgencies as the availability and affordability of a pharma product, its quality and safety, being combined with the use of health technologies to promote health and to prevent diseases or side effects.

To this point, we see how sustainability could be a driver for strengthening the pharmaceutical system and sustain improved performance.

1.2 The Pharmaceutical Industry

In the last decade, pharmaceutical companies have been facing an urgent call to improve and keep their performances under strict control. Indeed, the pharmaceutical industry is a highly regulated sector and innovation contribute to its effectiveness, even although it is a high capital-intensive market for the research and development. It is characterized by frequent innovation and intense international competition. Moreover, operating in a highly internationalized industry, pharmaceutical companies have a growing interest into globalization and the related issue of sustainability, considering that organizations cover both developed countries and the less ones (Van Leeuw and Scheerlinck, 2011).

The rising speed for new product development, the intensity of generic presence, the exposure to loss of revenues following patent expiration and the highly regulatory barriers, indicate us how this industry has to deal to some issues for future profitable growth (Schiraldi, 2014). Relatedly, stringent requirements for new drugs approval and R&D expenditures on complex pathologies, have led to higher costs and the internationalization of some activities (Capo *et al*., 2014).

The industry is indeed composed by some major Big Pharma companies and a large number of smaller ones. As a matter of fact, there is a necessity to approach a

sustainable growth through a new business model, able to fulfill unmet healthcare needs. The business model of the pharmaceutical companies involves primarily investing into R&D, delivering safe products and then collecting their return on investments as profits (Teramae, 2020).

The business activities of pharmaceutical industry are characterized by several elements, the R&D department, regulatory submission and launch, sales and marketing and investment collection.

In this competitive landscape it is relevant to say that to sustain a strategic advantage, companies must fit with innovative solutions, novel products and their differentiation. To overcome this industry-specific attitude, some pharma companies are increasingly outsourcing their research practices, or also, by strategic alliances to catch research-based innovations.

Since the pharmaceutical industry, involving also chemical and biotechnological industries, is a sector that has a high impact on environment and society, it is commonly recognized as a carrier of pollution and non-safety behaviors. To this point, the pharmaceutical sector has to deal with some fundamental global issues in matter of environmental contributions.

For this reason, I think that nowadays is critical to assess the role that sustainability has in this type of industry, and how, leveraging on that, corporations could meet some competitive advantages and financial rewards. Thinking of a SWOT analysis, we can say that sustainability for the pharmaceutical sector represents an opportunity to drive change and moving beyond the typical scheme of innovation, considering so not only the internal R&D capacity, but being open to external environment. While regulations and normative legislation could be seen as a threat, if they wouldn't support this wave of sustainable change with agreements, legislations and incentives' policies. This regulation aspect could be a *stimulus* to reform and see companies be proactive in their sustainable development process. Therefore, the pharmaceutical sector efforts related to sustainability are held up by companies as indicative of their ethics, as they primarily represent the role of health providers to community (Schneider *et al*., 2010). Big pharma companies have indeed redesigned their strategies to remain competitive in this new business environment. Most of them have diversified their product line, with a mix of

diagnostics, medical devices and animal health business, while on the other hand, we have companies that remained stable and focused on their primary outputs (Gautam, 2016). Implementing so different competitive strategies, pharmaceutical companies are in a continuous quest for business model's improvement.

In sum, we recognize how the pressure from international competition and regulatory environment, have a positive influence on the company's sustainable behavior. Fierce competition so, can be an incentive to improve business performance, and drive this industry towards a higher involvement in corporate sustainability.

2. Challenges for the Pharmaceutical Sector

With regards to our previous analysis on the pharmaceutical industry, we note as there are some potential challenges that need to be met, and opportunities to be exploit. From the literature work of Milanesi *et al*. (2020) emerge challenges also for future research areas on sustainability in pharma industry; as the social sustainability in terms of market access to medicines, or on the adoption of innovative solutions to waste management and the relationship among innovation and sustainability. Indeed, according to Hunter J. (2011) the healthcare burden is increasing all over developed and developing market, and that the pharmaceutical business model is no more considered sustainable.

For this reason, seems critical to observe how the linear value chain of pharmaceutical business has not consistently changed over years, and how the R&D costs have risen. Besides that, the pressures on the industry as the need for new outcome measures, comparative effectiveness and constrained government budgets (*ibidem*) did not stopped the push towards a sustainable business model to incentivize innovation.

In mature markets, pharmaceutical and biotechnological firms are experiencing this type of pressure, restructuring their supply chain with the aim of reducing costs and increase profitability (Capo *et al*., 2014). Additionally, they have transformed the prospects and processes of drug discovery and development (*ibidem*).

This industry has so to prove how it can deliver higher returns on investment, by changing and making adaptations on the traditional aspects in which operates. Pharmaceutical companies have so to align challenges as cost reduction, without loss of quality, simultaneously pursuing the introduction of new products.

Changes in the regulatory environment, moreover, led to the introduction of additional inspections that a new drug must encounter prior to market launch, focusing more on preapproval safety evaluations and post-approval systems to monitor its reliability (Ahrensbach Rasmussen and Foss, 2014). Indeed, pharmaceutical organizations have to adopt risk evaluation and mitigation strategies, and after the regulatory approval, monitor the clinical studies on products' safety (*ibidem*). As we have recently experienced for Covid-19 vaccines, we see how there is a global cooperation among countries, when there is a need to control and evaluate the safety of new drugs before entering the market.

The quest to address those challenges, shed light on the necessity to renewed pharma value chain, modifying its business model. The presence in such competitive markets, urges pharma businesses to look for solutions that will enable the strengthening of their presence, as optimal healthcare providers. The way through this type of industry may survive, is to realize and legitimize the external environment and network in which operates, and proactively manage their business ecosystem mutations. So, to deal with this issue, business model has to complement each other in a value network and survive the industry's transformations.

Therefore, is quite often a common practice for pharmaceutical companies, to outsource activities and processes, so as to answer the call for innovative production, being surrounded by flexible and reliable network of partners. To this purpose, interorganizational collaborations is complementary to the presence of internal capabilities to be exploited, according to existing knowledge and resources. The coordination among different actors can enhance each contribution to the scope of the firm, providing personal and technological competences (*ibid.*, p.4). however, it is critical to empower trust across all levels of the organization, and in-between external actors, so to foster a resource-sharing mechanism that will lower uncertainty about resources exchanges.

As a result, a change in the business model towards sustainable innovation management may be the solution to overcome the highly R&D expenditures and exploit the network resources and capabilities for novel products and processes.

To answer this research question, we take into consideration sustainability as driver to this integration process and to reap novel economic benefits. In fact, innovation will be critical especially in the search for new business models, so to include new collaborative models within and without the pharmaceutical companies and reshaping the internal value chain (Hunter, 2011).

2.2 The New Pharmaceutical Strategy for Europe

Adopted on 25 November 2020, the new EU Pharma strategy[25] aims at creating a future proof regulatory framework and at supporting industry in promoting research and technologies, in order to fulfill patient's needs and addressing the market failures, even due to this Covid-19 pandemic issue. It is mainly based on four principal pillars: (1) ensuring access to affordable medicines for patients, addressing so unmet medical needs, (2) supporting competitiveness, innovation and sustainability of the pharmaceutical industry, (3) enhancing also crisis preparedness and response mechanism thanks to diversified supply chains, and lastly (4) ensuring a high level of quality of the EU Commissions.
Based upon the reflection of the European Commission, it is clear how medicines play a key role in this regard, and how the Europe's pharmaceutical sector is a major contributor to the EU economy in terms of creation of innovation (Pharmaceutical Strategy Report, 2020). The Coronavirus pandemic also demonstrated how it is critical to have a crisis-resistant system and ensure availability of medicines under different circumstances (*ibidem*), to this extent is also essential to define and re-imagine a business model able to adapt to different scenarios and externalities.

[25] Pharmaceutical Strategy Report, 2020 (See: <www.ec.europa.eu/health/sites/health/files/human-use/docs/pharma-strategy_report_en.pdf>)

The EU's open strategic autonomy idea in the field of medicines requires actions to identify strategic dependencies and to propose measures to reduce them, so to avoid medicines shortages. This process would be difficult, considering the complex system of pharmaceutical manufacturing and supply chains, increasingly globalized and not sufficiently diversified (*ibid*., p. 24). Even before the Covid-19 pandemic there were concerns about the resilience of pharmaceutical manufacturing chains in Europe, to this scope, it is critical to learn what pandemic showed, thus, to operate an appropriate change in the pharmaceutical business model and organizational system. Additionally, is essential to have high standard on good manufacturing and distribution practices so as to ensure the compliance with an effective regulatory system. The European Green Deal indeed, and its zero-pollution ambition aims at protecting both public health and ecosystems (*ibid*.), thanks also to the coordinated action of the circular economy plan and the chemicals strategy for sustainability, in order to establish a framework for generating an overall shift to an equitable production and consumption system.

The Pharmaceutical Strategy for Europe complements so those measures, identifying as driver for the EU pharma industry innovation for environmentally sustainable and climate-neutral pharmaceuticals and manufacturing.

2.3 Traditional Drug Development Model, and Opportunities Towards a New Inter-organizational Business Model

Analyzing the traditional way of drug development (Fig. 8) is a useful task to critically conceptualize how new models should be designed and how sustainable development will be vital for the pharmaceutical industries of the next decades.

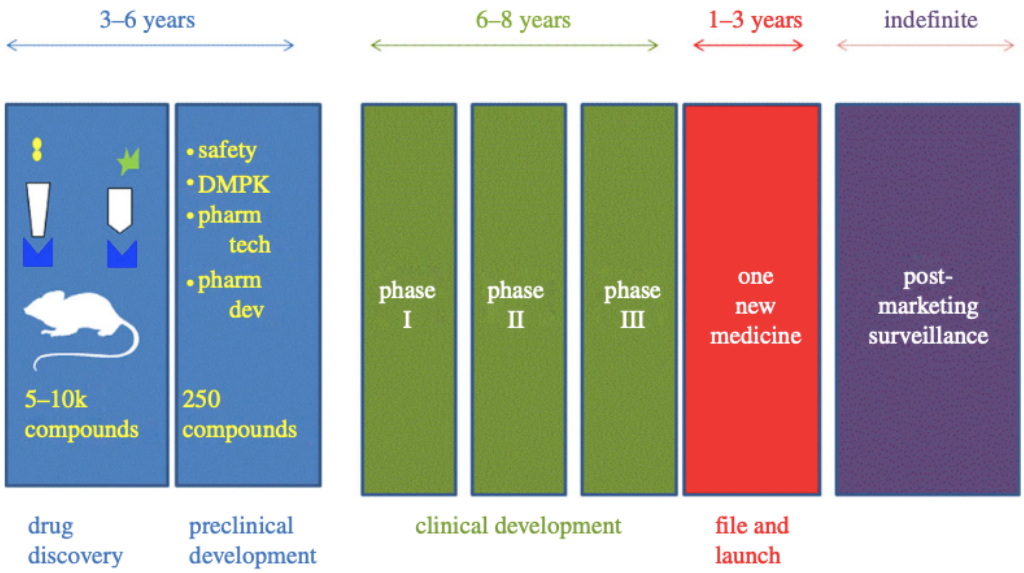

Figure 8. *Timelines and attrition in drug development. DMPK*[26] *, drug metabolism and pharmacokinetics.* (Source: Hunter, J. (2011) "Challenges for pharmaceutical industry: new partnerships for sustainable human health" in Philosophical Transactions of the Royal Society A, Vol. 369, p. 1820)

In accordance with the scholar, over the last years there have been many M&A within the pharmaceutical industry, and to access new knowledge and competences organizations seek novel expertise and assets outside the company at reduced cost and risk (Hunter, 2011). In this view, now the time is profitable for this type of collaborations among pharmaceutical companies and external actors, as biotechnological companies and academia environment, thus, to be more successful.

In order to effectively implement external knowledge and expertise, there is the need for a new type of business model, so as to manage flexibly the interrelations among parties which have to accept a compromise between a potential loss of control and an increased trust level to the optimal functioning of the collaboration. To this extent, a more open-innovation model will ensure a collaborative attitude

[26] Drug metabolism and pharmacokinetics (DMPK) is a core discipline in drug development that considers the biotransformation of a drug compound and other pharmacokinetic properties to assess drug safety. DMPK studies allow drug developers to experimentally evaluate intrinsic properties of a drug candidate to validate that it can and will be cleared from the body, when administered to a patient, without producing harmful byproducts, reaching dangerous exposure levels, or causing adverse side effects. (See: <www.xenotech.com/blog/what-is-dmpk-and-how-does-it-fit-into-drug-development>)

among academia, biotech companies and pharmaceutical established industry, so to favor the sharing of complementary resources and expertise. Moreover, firms have to collaborate to address the complexity of new products, overcoming the traditional manufacturing process and so using also external contributions, thus, to adopt an inter-organizational business model (Eppinger and Kamprath, 2011). This type of coevolution of pharmaceutical business development must face some challenges in this new way of doing-business.

It would be essential to have a strong commitment and communication among all level of the organization by the senior management, as it is supposed to define and declare values and support the internal and external activities. The business organization has to be conscious of the sustainable and innovative development, so to spread collaboration towards more open R&D architecture (*ibid*., p. 1823) and allow the knowledge exchanges among the firm and academics institutions. What is critical to delineate is also how the value created is measured, therefore, there is the need for a new kind of metrics so to track and evaluate this novel type of business model innovation. To effectively do so, pharmaceutical companies should categorize the type of alliances that occur, so as to manage the complexity at managerial level and financial too. As Hunter said, companies need to incorporate into their measurement system, new tools aimed at evaluating how the additional value is captured and how partners contribute to the model (2011).

In line with this reasoning there is an evident increasing importance of inter-organizational business models in the pharmaceutical industry. Furthermore, as the industry suffered a diminishing profitability of research investment, hardly any firm holds all the expertise in-house (Eppinger and Kamprath, 2011) as the role of technology also has evolved over the years and has become more differentiated by providing special expertise according to the need. To this point, organizational design actions highlight the trend towards horizontal and vertical collaboration across different kind of partners, and the necessity for a new business model innovation system.

According to Moors et al. (2014) instead, the increased societal concerns shed light on medicines' safety issues, that led to an increasing regulatory requirement on the approval of new medicines. For authors there are three major barriers for pharmaceutical innovation, that are related to their regulatory environment: the cost of drug development, the time involved in drug development itself and its regulatory restrictions. Pharmaceutical organizations overcome this situation by increasing their size thanks to merger and acquisitions, and the end result was a negative trend that amplified each other (*ibid*., p. 1715). It appears clear to scholars how the market share increase by mergers, marketing efforts, the extension of patent life and political pressures, urges a general awareness on how to model a sustainable drug development. To change the traditional blockbuster[27] model, they suggest operating reform measures in different business and regulatory areas, but we will focus on the literature study they made on organizational changes. Their work shows indeed, how M&As have substantial negative effect on drug innovation and on its access, rather how positive would be the impact on innovation by enabling public-private collaboration, open-access drug development or within academia and research institute.

In conclusion, we can affirm that just a balanced combination of reforms in different organizational areas would lead to a sustainable drug development model. Actually, a sustainable drug innovation system requires novel forms of cooperation, within and across the value chain, an open exchange model for information, and innovation through different knowledge providers.

[27] Blockbuster drug is an extremely popular drug that generates high annual sales. They are commonly used to treat common medical diseases, as cholesterol, diabetes, asthma, etc. Since R&D expenses for pharmaceutical companies are very high, once a drug is proved to work successfully, organizations can sell them at high price to recoup the R&D expenditures. (See: <www.investopedia.com/terms/b/blockbuster-drug.asp>)

3. Business Model Innovation Concept into Pharmaceutical Industry

Taking into account our previous considerations on the pharmaceutical industry, its challenges and drivers for innovation, seems useful to define how business model innovation can occur within a firm.

As we have affirmed that inter-organizational capabilities, and contributions from external actors are a key role to business model innovation and translation, we have to transform products and services in profitable innovations which sustainably generate value (Hunter, 2011). To this extent, a business model innovation will create higher value by exploiting the business opportunities.

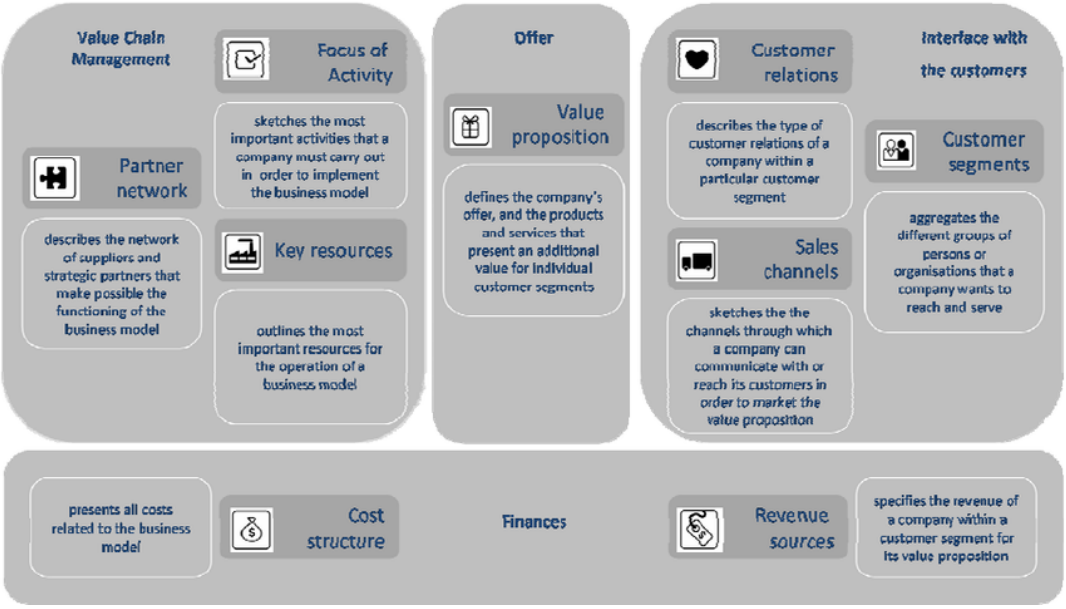

Figure 9. *Business Model Concept.* (Source: Osterwalder, A. and Pigneur, Y. (2010), "Business model generation: a handbook for visionaries, game changers, and challengers" Hoboken, USA: John Wiley and Sons)

Therefore, there are several specific drivers that will allow the pharmaceutical industry to reap benefits from the reconfiguration of their business model concept, as firstly, establishing trial and error methods in order to foster organizational learning effect and evaluate in which degree and which reasons, are found behind success or failure. Relying on best-practice and experience, an innovation process has to include an analyzing and exploratory phase, followed by a planning and implementation strategy then. The business model innovation provides the use of

external sources for information and innovative ideas, as provider of open culture attitude. To correctly manage this novelty, organizational actors have to balance the exploitation of established capabilities, by simultaneously exploring new opportunities to drive innovations.

Due to this collaborative model and openness to external elements, it is critical to establish a complex protection system, considering the potential loss of control and the dependency of the firm on other external players. For this reason, a potential threat or barrier in the pharmaceutical industry is the protection of central and core competencies of an organization, so the role of intellectual property rights (IPR) is a tool to protect innovation efforts by imitation (*ibid*.).

4. Historical Path to Pharmaceutical Sustainability

As we have conceptualized in the first chapter, the road towards sustainability started years ago with some initial theoretical concept and see nowadays major applications. Indeed, over the years sustainability efforts has broadened their scope and players' contributions. The integration process of sustainability, into corporate level in the pharmaceutical industry, started initially by including in the vision statement a sustainable concept and including also key stakeholders and interest to be met. Mutually sustained by frameworks and management systems aiming at improving sustainability initiatives, with the addition of monitoring tools (Schneider *et al*., 2010).

Since pharmaceutical industry is facing a society that expects more from its corporate behavior, especially related to social health and wellbeing (*ibidem*) pharma business can better prove their impacts thanks to two mechanisms according to authors. Firstly, by constantly tracking and demonstrating to which degree the company is performing according to a benchmark system, and then, thanks to a transparency and integrity principle which aims at managing properly resources and generate value by a clear communication with stakeholders. Although that, it is also evident how this sector is constantly urged to face new issues, challenges and has to demonstrate its progress in addressing sustainability in an

ongoing process of improvements. Often this concern has led pharmaceutical companies to face financial loss and also ethical mistrust.

As a result, the European Commission (2015)[28] has released also its action plan that forces the transition to a circular economy (CE). The CE concept indeed, rejects the traditional framework for economic growth, instead offers innovative solutions to preserve the natural capital and enhance the social wellbeing. As emerges from the report, its priority is to achieve the lowest possible material and energy usage, avoiding so leakages. To appropriately implement CE practices, this implies a business model adaptation as well. Some scholars underlined how this circular business model mustn't create and capture value alone but would better perform through a collaborative network of businesses. New business model would facilitate this shift, since the circular system is by its nature, more resource efficient than our current linear system (Gower and Schröder, 2016).

Nevertheless, thanks to the work of Horvath (*et al*., 2019) it offered a conceptual framework for building a circular business model, retrieved by making some adaptations to the ReSOLVE[29] (regenerate, share, optimize, loop, virtualize, exchange) model developed by The Ellen McArthur Foundation.

[28] European Commission (2015), "Closing the loop and EU action plan for the Circular Economy" in European Commission, Brussels, BE (See: <www.eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52015DC0614>).

[29] The ReSOLVE framework is made up by six action areas for businesses and countries wanting to move towards the circular economy, by simultaneously reducing the economy's environmental footprint and providing opportunities for business.

Activity	Description
Regenerate	use renewable energy and materials
	reclaim, retain and regenerate health of ecosystems
	return recovered biological resources to the biosphere
Share	enhancing product utility by sharing the use, access or ownership
	extending product life through reuse, maintenance (e.g. repair, refurbish) or design for durability
Optimize	optimisation of resource use through increasing performance or outsourcing activities
	remove waste in production and supply chain
Loop	close material loops by remanufacturing, repurposing, recycling or recovering
Virtualize	dematerialize products or services through digital appliances
Exchange	employ new technologies, materials or processes

Table 1. *The modified ReSOLVE framework.* (Source: Horvath, B., Khazami, N., Ymeri, P., Fogarassy, C. (2019), "Investigating the Current Business Model Innovation Trends in the Biotechnology Industry" in Journal of Business Economics and Management, Vol. 20, p.68)

Especially for the *share*, *optimize* and *exchange* phase the spread of an open business model would benefit the sharing of knowledge, even if in the pharmaceutical sector the protection of intellectual property is crucial. To this point, according to authors, the presence of shared innovation and collaboration is essential to the existence of the new business model, complemented with the application of IT that allow a rapid flow of information and feedbacks.

Moreover, sustainability related practices are commonly related to Environmental Health Safety (EHS) management system, which defines policies for an organization that clearly outline roles and expectations on EHS matters. Evolving from that practice, corporations are now more and more adopting voluntary standards to facilitate the sustainability management and support benchmarking activity. Additionally, pharmaceutical companies submitted their practice to the external control of Sustainability Rating Agencies, among which the most common are FTSE4Good Index and Dow Jones Sustainability Indices, that evaluate and review the action of corporate governance in terms of sustainability practices.

Thus, many investors that are looking for socially responsible companies can see how companies are performing in its industry average. This ranking reflects a good corporate governance behavior providing a stable basis for long-term growth and profitability. In this manner, since accountability transparency also plays a key role in the evaluation of businesses emerged a particular attention to corporate reporting. To this extent indeed, many companies report in theirs Annual CSR Report or Sustainability Report apart, their achievements in matter of sustainable practices and the goals that still have to be met.

Concluding this analysis, we see how CSR is an evolving trend from EHS system, and how the pharmaceutical sustainability is expanding continuously the scope of its action and the depth of related activities. Moreover, the specificity of sustainable practices strictly depends on the type of industry and sector in which the business is based. Pharmaceutical corporations are so maturing their participation in corporate citizenship, by addressing with intensive attention issues and needs, by also protecting their brand value. Sharing so the value creation among stakeholders and community, the next stage for CSR is to enhance competitiveness of a company while simultaneously advancing social and economic conditions with a proactive attitude (Smith, 2013).

5. Integration of Sustainability in the Pharmaceutical Industry

Integrating sustainability is increasingly recognized as an important business driver that adds value to pharmaceutical companies (Leonard and Schneider, 2004). As the authors affirmed, among scientific community sustainability can be seen as a positive and profitable mean, yet, the definition is not univocally understood, and it is unclear how effectively it can bring value to companies. Businesses require so to be adaptative and flexible, in order to manage external disturbances and goals. To this purpose, as already mentioned above, in addition to the Dow Jones Sustainability Group Index, also the Sustainable Asset Management (SAM) Group has highlighted how pharmaceutical industry's

economic, environmental and social performance are interconnected, giving a rate both on investment position and corporate sustainability.

Pharmaceutical industry is moving ahead to face those urgencies by adopting some sustainable initiatives that pursue long-term objectives with short-term immediacy. To successfully integrate sustainable actions, the authors (*ibidem*) suggest taking into account four layers: (a) articulating a sustainable concept in the vision statement, (b) appoint the top management to lead and support activities, (c) involving and empowering all stakeholders and by (d) effectively measure the degree of improvement.

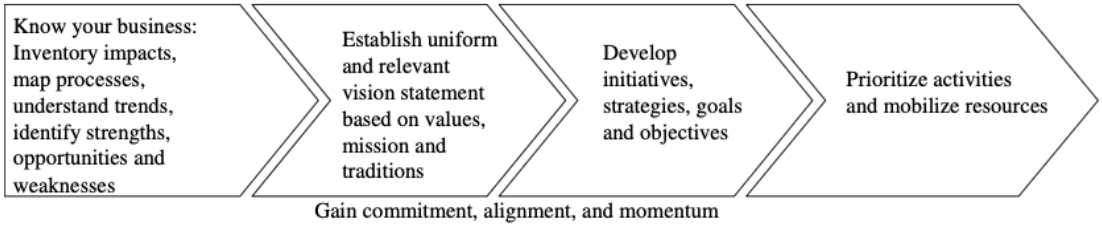

Figure 8. *Integration Process.* (Source: Leonard, T. and Schneider, J. (2004), "Integrated sustainability in the pharmaceutical industry" in Corporate Environmental Strategy: International Journal for Sustainable Business, Vol. 11, p. 5)

Starting to integrate sustainable processes into the firm strategy and value chain is not a rapid procedure, rather it implies that compliance is present across the organization, and that there is also a proactive willingness to implement this type of change. Integrating so sustainability requires a long-term attention on the step and goals to achieve, and it encompasses the market, social, financial and regulatory dimension (*ibid*., p. 123).

Relatedly to the Figure 8, it is presented how organizations relate to sustainability by aligning their impacts, identifying opportunities and weaknesses, addressing this aims by establishing a clear vision statement and how this will end by developing *ad hoc* initiatives and determine a specific usage of resources and capabilities throughout the company's process. Therefore, is critical to establish a tight adherence and coherence between the corporate sustainability practices and the corporate business strategies itself. Since the top management is the one to lead the ultimate decisions about the business' strategies, is relevant also to denote a clear

interdependence and align the commitment of the down-base of a firm, so to spread communication and values, by creating a sense of engagement and motivation through the common scope of sustainable development.

To this purpose, the sustainable management team should align a clear corporate sustainability thinking, continuously reporting and monitoring the sustainable business performance, including in this ongoing process the various firm's stakeholders.

5.2 Key Drivers to Embody Corporate Sustainability Practices into Pharma Businesses

According to scholars (Van Leeuw and Scheerlinck, 2011) there are some fundamental determinants that can influence, positively or negatively, the pharmaceutical corporate sustainable performance. In their work, they notice how, facing fierce external competition, pharmaceutical companies favor corporate sustainability, showing thus, that the perceived competitors' action is an incentive that stimulates companies to gain competitive advantage, and take the lead in the sustainable development. Waving so towards pharmaceutical sustainability, authors (*ibidem*) identified key drivers to embody corporate sustainable practices into their business model plan.

Environmental-Sustainability Determinants	***Social-Sustainability Determinants***
Competition from Other Pharmaceutical Companies	Competition from Other Pharmaceutical Companies
Research and Development (R&D)	Research and Development (R&D)
Foreign Activity	Foreign Activity
Net Return on Shareholder Funds	Net Return on Shareholder Funds
The Role of the Government	The Role of the Government
Iso 14000 Norms	n/a
The Role of Stakeholders	The Role of Stakeholders

n/a	Training
n/a	Homework

Table 2. *Determinants of Firms' Positions on Environmental and Social Sustainability.* (Source: retrieved from Van Leeuw, F. and Scheerlinck, I. (2011), "What Shapes Companies' Corporate Sustainability? Belgian Pharma Businesses' Views on Global Sustainable Development" in International Business & Economics Research Journal, Vol. 2, No. 12, pp. 67-71)

In order to give a description of each determinant, we begin from describing how competition is a powerful driver for sustainable development and improvement, allowing so pharmaceutical companies to pursue R&D strategies to implement environmental solutions, in front of intensive investments. Investments that may lead to a shareholders' supremacy, and so affect negatively the company sustainable strategy, or instead, influence positively a good and healthy research and development action. Relatedly, high level of financial performance can favor companies with more financial possibilities to implement sustainable policies, but on the other hand, it may also reflect a shareholder priority in pursuing economic benefits.

As we stated before, the international presence of pharmaceutical companies leads them to consider also their foreign activity, operating on a global scale. Doing so, they are subjected to more critical assessment of quality, behavior and compliance with different regulatory systems. To this extent, the role of Government plays a triple mission, as a legislator, controller and provider of social security. Indeed, the U.E. has endeavor of giving a harmonizing regulatory system base. Authors highlight how strong environmental regulations lead to competitive advantage, and attempt to comply with legislative policies in accordance with sustainable development.

Additionally, to the rating agencies mentioned in the previous subchapter, the ISO 14000 certifies how companies implement good environmental strategy, thus, to improve their position in local and global markets. Information that are critical for business' stakeholders, record and evaluate how their interest are pursued, taking into account social, environmental and economic dimensions. The latter determinants present in the Table 2, are the one that focus their attention on the

human resources management, as the training of employees so to improve their labor skills, and the provision of homework, so as to allow them to work in a more flexible way.

5.3 Barriers to Pharmaceutical Sustainability Integration and Performance Indicators

If we think of corporate sustainability strategy as a mean to achieve environmental, social and economic profits, we cannot ignore the barriers that this novel practice may encounter, considering that there is not a clear and unique sustainability definition and measuring unit.

The absence of an established unit of measure implies that businesses face obstacles in achieving economic profit and making evaluations on quantitative data. Finding ways so to effectively measure sustainability makes it a meaningful concept, for the purposeful integration in the pharmaceutical companies (*ibid*., p. 126). Furthermore, since a sustainable business model innovation faces several barriers, conflicts often arise with the prevailing and existing model and the top management current leading strategy. As a consequence, the current asset configuration and allocation presents a decision-making related issue, especially when there is no clear communication and clarity on how resources can be exploited by novel configurations. To this extent, a possible solution to sustainable integration process resistance could be a gradual procedure of experimentations and shifts of organizational schemes, so to achieve a systematic creation of sustainable businesses. Accordingly, some indicators of performance can align and better explain the role of corporate sustainability. Some principal characteristics, as the observability of phenomenon, the reliability and availability of measurements, the possibility to compare data, are all relevant information for making possible the sustainable integration process. In this way sustainable management would have tools to make conscious decisions for best corporate practices, addressing the TBL policies, and providing solutions to measurable goals. Performance indicators are so crucial in helping pharmaceutical companies to track objectives, drive

performance and ensuring a higher value production, redesigning a more efficient business model configuration. In light of the overall sustainability framework, which intrinsically involves a comprehensive vision, it is clear how competitive advantage is achieved by considering and posing attention to the interdependence of dimensions and not focusing the corporate actions on isolated business unit.

People purpose	***Planet purpose***	***Profit Purpose***
Addressing social and community issues.	Addressing habitat, biodiversity and other ecological issues.	Increasing efficiency, productivity, competitiveness and advantage.
Attracting and retaining employees and customers.	Reducing and controlling consumption and resource use.	Improving strategic planning, prioritization and decision making.
Building and strengthening relationships with stakeholders.	Reducing or controlling disruptions or shutdowns.	Increasing innovation and new business opportunities.
Enhancing reputation, differentiation and brand value.	Reducing or controlling waste.	Increasing resiliency, preparedness and responsiveness.

Table 3. *Additional business value through practices aimed at TBL policies.* (Source: personal adaptation retrieved from Leonard, T. and Schneider, J. (2004) "Integrated sustainability in the pharmaceutical industry" in Corporate Environmental Strategy: International Journal for Sustainable Business, Vol. 11, pp. 126-127)

6. Drivers for Business Model Innovation in the Pharmaceutical Industry

To overcome the challenges and barriers mentioned above, the pharmaceutical industry must address drivers as the increasingly payer pressure, the regulatory stringent environment, and moreover, the declining technological pace of innovations (Ahrensbach Rasmussen and Foss, 2014) to stay competitive. Implementing business model innovation in the pharmaceutical system requires alignment between organization' elements, so to allow leveraging of network knowledge and the generation of competitive advantage through sustainable innovation.

Engaging in business model innovation aims at unfolding the full potential of traditional way of doing and make proactive contributions to sustainable development. Sustainability potentials are overseen due to a lack of integration with strategy formulation and lock-in effects of established business models, which pose limits to variations on the corporate behavior (Schaltegger *et al*., 2012).

Therefore, the drivers that can affect the economic success of a business model innovation are indirect or direct variables that can influence the corporate actions, the former often relates to costs, while the latter to the influence of corporate sustainability. To this aim, the work of Schaltegger *et al*. (*id*.) provides us a range of six drivers for sustainable business model that links so clearly how they have an impact on the sustainability-oriented strategy, and how finally they lead to a novel business model adaptation. The authors highlight how there are three different degrees of implication in corporate sustainability strategy: a defensive, accommodative and proactive strategy. We focus our attention on the latter one, since we believe that by taking inspirations from the best practice to adopt, we can delineate a theoretical model which will deliver superior value and competitive advantage for businesses that want to adopt sustainable business model.

Hence, the proactive, or fully integrated sustainable strategy, embodies environmental and social objectives as part of the core business logic, in order to contribute to the sustainable development of the industry. Thus, all the business models will be focusing on the achievement of sustainable goals in different business dimensions, addressing as well as customer issues, sustainability-oriented innovation capabilities and societal nonmarket issues (*ibid*., p. 103).

Core drivers of business cases for sustainability	***Corporate sustainability strategy: Proactive***
Costs and cost reduction	Cost and efficiency-oriented activities created to achieve sustainability goals; cost concept include external social costs
Risk and risk reduction	Sources of high risks are largely removed
Sales and profit margin	Market-oriented strategies to gain competitive advantage by making sustainability-oriented products/services become the core of the company's portfolio
Reputation and brand value	Sustainability is actively communicated and is a driver of reputation and brand value; the company engages in boundary-spanning and stakeholder integration
Attractiveness as employer	Continuous education, innovative positions, social attention; increase attractiveness to highly skilled workforce
Innovative capabilities	Sustainability-oriented process, product and organizational innovations transform business logic; sustainability problems and stakeholders are recognized as key source of innovation

Table 4. *Interrelations between corporate sustainability strategies and business case drivers.* (Source: personal adaptation retrieved from Schaltegger et al., (2012) "Business cases for sustainability: the role of business model innovation for corporate sustainability" in International Journal and Sustainable Development, Vol. 6, No. 2, p. 104)

Accordingly, when a company decides to change its existing business model framework, considering the not immediateness of the process, it needs to map all the interrelations that occur between the external environment and the business itself. Thus, in relation to the specific industry, in our case the pharmaceutical sector, businesses can choose among different corporate sustainable strategies to implement. Sustainability-oriented business model innovation integrates so drivers, corporate sustainability strategy and in turn, requires different degrees of business model innovation (*ibid*., p. 106), as shown in the figure below (Fig. 10).

	Generic business model pillars			
Core drivers of business cases for sustainability	*Value proposition (VP)*	*Customer relationships (CR)*	*Business infrastructure (BI)*	*Financial aspects (FA)*
Costs and cost reduction	Products and services with lower energy or maintenance costs for customers	Cost-efficient contracting relationships, closed-loop service systems	Costs of new products and services can be lowered through partnerships	Balancing cost reductions for customers and cost structures of new products and services to increase profitability
Risk and risk reduction	Lowering societal risks through products and services can create value to certain customer segments	Service-relationships reducing sustainability risks for customers result in higher customer loyalty	Resources, activities, and partnerships set-up in order to minimise internal and external risks	Improved risk and credit rating resulting from lowered sustainability risks
Sales and profit margin	Environmentally and socially superior products and services require modified or new VPs to turn into sales and profits	Higher customer retention and customer value as a result of sustainability-oriented, service-intense relationships	New products and services may require strategic partnerships (e.g., coopetition) to overcome market barriers	New products and services and/or new customer relationships contribute to diversified revenue streams
Reputation and brand value	Sustainability as distinctive element of good corporate reputation	Sustainability as marketing feature of the brand increasing customer loyalty	Strategic partnerships with sustainability leaders can increase reputation and brand value	Sustainability performance leading to a good rating and the consideration in sustainability indices and funds
Attractiveness as employer	A companies' offerings and VPs allowing for personal identification to attract employees	Better customer service as a result of higher employee motivation	Attractiveness as principal can enhance the quality of activities, resources, and partnerships	Reduced costs for HR acquisition, less fluctuation costs and lower compensation costs
Innovative capabilities	Unfolding the full sustainability-potential of innovations enables modified or new VPs	Innovative products and services creating solutions to sustainability problems, improving customer retention	To allow for innovations to unfold may require new activities, resources, and partnerships	Higher innovation potential and expectations for profitable innovations leading to an increase of shareholder value

Figure 10. *Interrelations between business model and business case drivers.* (Source: Schaltegger et al. (2012) "Business cases for sustainability: the role of business model innovation for corporate sustainability" in International Journal and Sustainable Development, Vol. 6, No. 2, p. 107)

This forementioned business model choice represents four general pillars that, in our case pharmaceutical companies, can address to introduce sustainable model innovation. The first type relates to the *value proposition* that a firm can offer to customers, while the second is based upon the relationship that a business creates with its own *customer base* in order to generate for them sustainable value. Thereafter, the *infrastructure* and the network of partners are key drivers to maintain and create value in close relationship with stakeholders, and lastly, the *financial view* affects all previous dimensions by adopting the correct scheme of costs and benefits' balance.

In conclusion, we can affirm that there is an increasing interest in the role of business model innovation so to change the future of the economic system itself. This is due to the necessity to investigate how business models can extend their value proposition towards social and environmental dimensions. Relatedly to the pharmaceutical industry, there is a need to discover new ways of providing health-services and products, in a patient-centered way (Horvath *et al*., 2019).

6.2 Different Degrees of Business Model Innovation Applications

According to our previous explanations on the interrelationship that occurs between business drivers, sustainable corporate strategies and business model innovation adaptations, we can provide an additional framework on their degree of implication. Indeed, since organizational changes cover a wide range of novelty, we can distinguish two major extremes of innovation, incremental and radical one.
In this case, we can delineate four stages of business model adjustments, taking inspiration from authors (Schaltegger *et al*., 2012). In their work we have the definition of four different possible situations, that are differentiated in the following way: (a) Business model adjustment refers to changes of just one business model elements, without impacting on the value proposition; (b) Business model adoption, instead, directly impact the value proposition by making changes to match competitors' standards; (c) Business model improvement takes place when substantial parts of the business model elements are changed, with the value

proposition unaltered; lastly, (d) Business model redesign takes the lead when a structural and total value proposition change is pursued, thus, a real redesign replaces the underlying business logic and offers new products, services and systems.

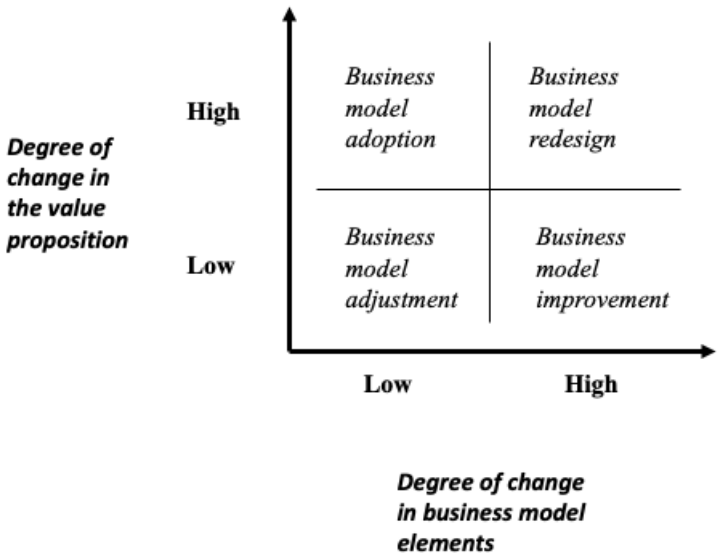

Figure 11. *Matrix on the degree of change in the value proposition and business model elements.* (Source: personal creation of a matrix including theoretical model derived from Schaltegger et al. (2012), "Business cases for sustainability: the role of business model innovation for corporate sustainability" in International Journal and Sustainable Development, Vol. 6, No. 2)

7. Open Innovation in the Pharmaceutical Industry as a Model to Achieve Growth

In the pharmaceutical industry a key driver to achieve growth is indeed innovation. Since this sector is facing higher competition and steadily R&D discoveries, a useful tool to manage and allow a business model innovation, could be the adoption of an open innovation model.

The concept of open innovation was introduced by Chesbrough, H. (2003)[30] as, he stated, "a paradigm that assumes that firms should use external ideas as well as internal ideas, and internal and external access to market, as the firms look to advance their technology". Later on, the author has amplified this description by redefining the concept as a purposively managed knowledge flows across organizational boundaries (2014)[31].

Actually, pharmaceutical companies are among the top investors in R&D activities worldwide (Schuhmacher *et al*., 2013), and especially in the twentieth century faced how globalization fostered a process of acquisitions and strategic alliances in different stages of the value chain (Martinez-Grau and Alvim-Gaston, 2019). Also, the growing advance of personalized medicine shed light on the declining traditional business model built on blockbusters (Schuhmacher *et al*., 2013). To be out of this productivity crisis, pharmaceutical companies already started to outsource stages of their production, making strategic alliances and partnerships, and significantly, changing their actual business model. Thus, appears also on the literature arena the role of open-innovation model, that could be a promising driver to advance and increase productivity in the pharmaceutical industry (Martinez-Grau and Alvim-Gaston, 2019). For authors indeed, to stay competitive in this pharmaceutical market, it is necessary to efficiently address today's regulatory, economic and political environment, by reducing production development time and cost, terminate unpromising discoveries, boost their design process and increase productivity through quality standards and novel business models (*ibidem*).
A shift in the innovation paradigm may be the new competitive advantage driver for generate higher customer value, while respecting the increased complexity of the pharmaceutical industry, the presence of new technologies and experts that are located outside the company itself. As Capo *et al*. (2014) point out, there is a close relationship between the company and its own environment, what surround the

[30] Chesbrough, H.W. (2003), "Open innovation: the new imperative for creating and profiting from technology" in Harvard Business School Press.
[31] Chesbrough, H.W., Bogers, M. (2014), "Explicating open innovation: clarifying an emerging paradigm for understanding innovation. New Frontiers in Open Innovation" in Oxford University Press, pp. 3-28

company and the industry is a key driver to understand and overcome barriers and catch opportunities. To this point, embracing external determinant with internal organizational schemes seems to be the way to gain competitive advantage, environmental and social benefits, by addressing unmet needs in a sustainable innovative direction.

Therefore, to implement open innovation is also necessary to build a culture of innovation across organizational boundaries, in order to be sure to have established an environment that fosters creativity, innovation and a generative process for novelty. In the pharmaceutical industry indeed, there are already collaborations, specifically with academic institutions, so to have access to external expertise in matter of research for innovations.

Major pharmaceutical companies started to access external knowledge and know-how by outsourcing and must continue to invest in collaborative models where multiple partners can create innovation.

7.2 Open Innovation Models

Many companies have started their organizational translation to innovation openness; however, each different company decide in which extent adopt open innovation models and allow external collaborations to generate novel ideas. In this environment, as Martinez-Grau and Alvim-Gaston (2019) affirmed, each pharmaceutical company has implemented its own open innovation configuration, according to the degree of maturity, scope and access.

Schuhmacher *et al*. (2013) conceptualized a theoretical model with four different types of open innovators, which are represented below (Fig. 12), based on the proportion of externally acquired R&D projects and the preference for innovation management. However, even if this model classifies the innovation according to the compounds externally acquired for clinical development phases, their theoretical description is useful to understand to which degree companies can adapt external knowledge to their business.

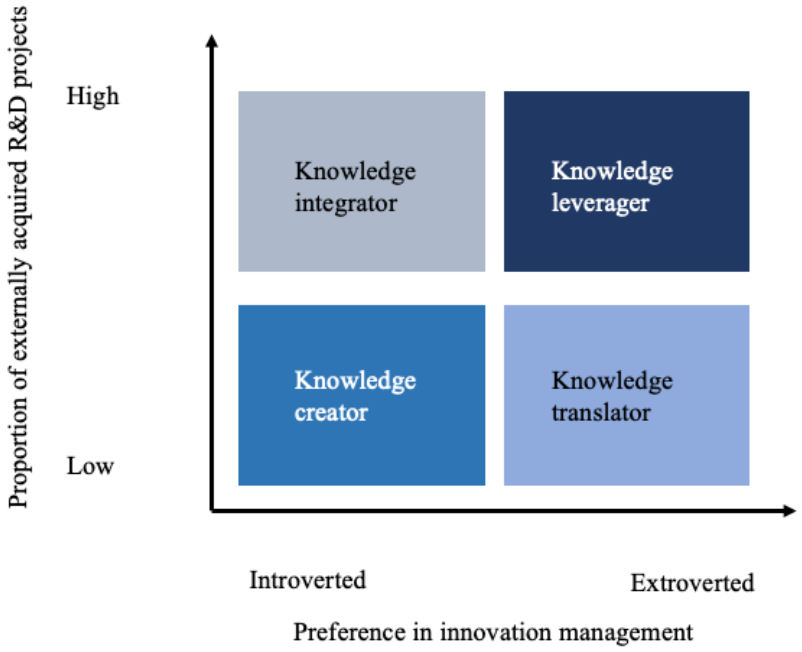

Figure 12. *Types of innovation model.* (Source: retrieved from Schuhmacher et al. (2013), "Models for open innovation in the pharmaceutical industry" in Drug Discovery Today, Vol. 18, No. 23/24, p. 1135)

The innovation model of *knowledge creator* is defined as an inbound preference in innovation management combined with a low level of external product acquisitions. Indeed, innovation management rely on internal resources and know-how. The *knowledge integrator*, instead, describes the preference of using external generated innovation using their internal resources and capabilities. The third model, the *knowledge translator* is based upon external resources and know-how, to proceed internally generated innovation. In this way, they complete the internal action of R&D, while outsourcing collaborations and partnership to manage it efficiently. Lastly, the *knowledge leverager* depict a focus towards externally generated innovation in combination with extroverted innovation management. It combines external generated ideas with both external and internal competences and resources. These models provides so a framework to efficiently manage possible attrition, by conceiving the organization in a more flexible way.

However, even if the adoption of open innovation model seems to be an efficient attempt to become more profitable in the pharmaceutical industry, also barriers appear, indeed, pursuing this strategy include a high level of visibility of strategy

and processes, with a high competition over licensing of drugs (*ibid*. p.1136). Once the collaboration in an open innovation model is established, both parties have to accept the uncertainty and related risks and have to develop and improve communication systems and spread trust among organizational levels (Martinez-Grau and Alvim-Gaston, 2019). For instance, is what a relationship with biotechnological companies is made up, mutual involvement and effort in developing innovation, with their potential benefit and risks. Indeed, the wider is the portfolio from which can extrait potential solutions, larger would be the products' diversification.

In sum, beside the advantages that an open model innovation could bring to pharmaceutical companies, in terms of R&D and not only, is necessary to simultaneously develop systems that encourage collaboration, communication and flexibility.

8. The Quest for a More Sustainable Business Model in the Pharmaceutical Industry

Given the challenges and issues that pharmaceutical industry face, the result is a decline in the importance of the traditional blockbuster business model according to Ahrensbach Rasmussen and Foss (2014), thus there is a quest to discover a new profitable business model.

The current pharmaceutical model indeed, is transitioning to a leaner and more focused entity on research for innovation (Reinhardt et al., 2020), where novel revenue streams come from specialty products and where regulators play a key role, increasingly their attention on patient safety on new drugs' entrance in the market.

Furthermore, among different perspectives on the topic, emerges also how innovation, rather than production, would be the driver to gain advantage in the pharmaceutical landscape (Fondazione Symbola, 2017). As it is showed in the Next Generation Pharma[32] Report, a survey conducted on major international

[32] Next Generation Pharma Report (2017), in Fondazione Symbola for Farmindustria

pharmaceutical groups presents that today, in 80% of cases, the most efficient innovation comes from the acquisition of projects born in small biotech companies or centers of excellence. For this reason, is critical to establish a new system to break down fragmentation, create new synergies and equip ourselves with enabling structures to create innovation ecosystems. Another trend that arises, is the recognition of medicines' future that would affect pharmaceutical sector, as the convergence towards a 4P drug development. The 4P model presented in the report (*ibidem*) starts from the traditional viewpoint of "one drug fits to all" to a more personalized paradigm, which sees how new technologies will make it possible to implement *predictive*, *preventive*, *personalized* and *participatory* medicine. Thus, to enable better treatment strategies, always considering the interconnections among individual habits and environment, which influence directly our health.
Therefore, a key role in promoting the spread of open innovation model passes also through Institutions. The regulatory agencies, indeed, are aware of the potential of open innovation (EY for Farmindustria, 2017) and are committed to stimulate best practices to transfer and share knowledge and technologies in strategic health areas.

Relatedly, a study of PWC (2007) had forecasted how pharmaceutical industry would have been in 2020, by presenting the main challenges that this sector has to deal with, and with the design of new business model capable to adapt to the new external landscape. Some largest pharmaceutical companies will collaborate with other organizations to develop effective new medicines and ensure that products and services provide a real health benefit. Big Pharma traditional business model is linked indeed, with the ability to identify promising new molecules, test them on a large clinical trials base and then commercialize them with extensive marketing actions. Due to the fact that this business model fails to meet the effective market's needs, the role of disruptive capabilities in this industry seems to be predominantly. Innovations enable new players to take action and target novel profitable segment. This led to a reconfiguration of the industry architecture, and to a collaborative concept of "profit together", as already expressed by the shared value creation vision.

Several pharmaceutical companies started already to implement more collaborative models (*ibidem*), by transforming their traditional business into a more interconnected network. Therefore, since new technologies are providing new sources for innovation, to take advantage of that and enable changes, pharmaceutical companies will be forced to adopt model that allow mutual collaboration, require new skills and channels. Broadening their value proposition and partners, pharmaceutical industry will survive and end the increasingly potential gap with complementary industries (*ibid.*).

Considering so the importance that sustainability has within the global pharma industry, also the Environmental Protection Agency (EPA) provides a related definition for sustainability: to "conserve, protect, restore and improve the supply and quality of natural resources and environmental media over a long-term perspective". To pursue sustainability is to create and maintain the conditions under which humans and nature can exist, in productive harmony, to support present and future generations[33].

In conclusion, at organizational level a healthy organization is open to challenges, and so focusing on making the organization a more efficient place to work and be more competitive in a global perspective (Di Fabio, 2017). Aiming so at creating an open culture, the process is sustained by creativity and innovation, by promoting an organizational climate that supports the empowerment of the organization itself. Indeed, the adaptability and capability of the organizations to be the foundation for innovation management, taking into account the organizational environment, the participative attitude and incentives for innovation, will lead managers to organize and act organizational innovation (Singh *et al*., 2020). Is crucial to maximize value by adopting sustainable innovation strategies, which links sustainable development, innovation strategy and business model together.

[33] US EPA definition on sustainability. (See: <www.epa.gov/sustainability/learn-about-sustainability#what>)

8.2 The Circular Economy as Approach to a More Sustainable Business Model

A Circular Economy is a regenerative system, which aim is to achieve a better balance and harmony through economy, environment and society. The European Commission since 2015 pursues measures aimed at transforming the EU economy into a more sustainable and competitive one. A circular approach is indeed an opportunity for the pharmaceutical industry to ensure access to sustainable supplies of raw materials and energy, and to drive new opportunities for growth thanks to the adoption of sustainable business model (EPFIA, 2020). The CE concept is based on three main principles, preserving and enhancing natural capital, and optimizing resources' usage by fostering system effectiveness (Manninen *et al*., 2018). For this reason, circular economy can be a driver for sustainability, but has to be enhanced thanks to new and innovative business models, so to embody those propositions along the value chain. Consequently, this conversion isn't possible without the cooperation among industry's players to establish a specific framework to realize synergies and collaboration.

As presented in the previous subchapter, the Ellen McArthur Foundation indications together with the UN Sustainable Development Goals provide a circularity model, against the traditional linear economic model, focused on the maximization of resources across the value chains and on the reduction of unnecessary waste to minimize environmental impacts (EPFIA, 2020). Thus, a circular economy approach promotes a global and sustainable model, moreover green investments are gaining more prevalence since investors are focused on environmental performance and rates. In this way, also regulatory systems are providing more clarity on their operating models, thus, to enhance principles that will benefit economy, environment and assist a resilient and competitive pharmaceutical industry.

Considering so Circular Economy as practice to deliver a more sustainable business model, the EPFIA Circular Economy Report (2020) provides a vision of a circular pharmaceutical industry and examples of circular practices that will help the flourishment of innovation in the sector. Accordingly, the Agency shows which are

the opportunities available to the pharmaceutical industry, and which are the actions that aims at addressing the circular economy at industry level.

Such common activities undertaken by the pharmaceutical companies are the (a) focus on disease prevention, thanks to successful cures rather than long-term treatment, (b) create awareness among key stakeholders to search for opportunities for circular innovation, lowering the environmental impacts by novel (c) product design, and minimizing waste by prescribing the appropriate (d) dosage to cure patients. Ending this circular economy principles with the (e) Life Cycle Assessment (LCA) tool, that help identify where the pharma industry should invest and innovate to improve environmental performance of drugs and choosing specifical elements that are critical in the manufacturing of medicines, and so (f) using secondary or renewable raw materials. Is vital for companies, to ensure a sustainable consumption in a long-term perspective, by developing commercially successful products, sustainable solutions and stimulate innovation (WBCSD, 2011).

As a result, even if CE would provide multiple value-creation, together with the achievement of the 2030 Sustainable Development Goals, there is no clear verification of its positively impact on the environment (Manninen *et al*., 2018). This is due to complex value chains, the lack of precise data and absence of a unique assessment method of improvements.

9. Conclusion Remarks on Sustainable Business Model Innovation in the Pharmaceutical Industry

Ending our analysis on the applicative scenario of business model innovation into pharmaceutical sector to be more sustainable, we notice how due to the forementioned challenges to stay competitive in the market some organizational changes need to be done.

Reinforcing thus, the inter-organizational contributions to enable an open system to knowledge creation, will drive new perspectives and capabilities to the established know-how of pharmaceutical companies. As a result, to effectively implement

sustainable practices into the way of doing business, pharmaceutical companies must adopt an integration process aiming at comprehending business model innovation to reap a new kind of value and to ensure a profitable long-term presence in the industry. Sustainability actions are not seen as separated dimensions, but rather, as a holistic approach to drive innovation inside a firm and to allow an equitable development for a novel pharmaceutical strategy. Besides the several positive drivers that business model innovation can bring to pharmaceutical industry, more literature and empirical research have to be done to close the gap between theory and practice, as to minimize the skepticism and barriers to undergo for a sustainable organizational strategy.

Therefore, to strengthen sustainability vision, pharmaceutical companies must start implementing incremental innovations and planning a long-term strategy to redesign their business model in order to be more resilient to external pressures. An open-innovation model so, can take the lead to initially transform and translate a network vision of collaborations among companies in this industry, waving thus towards a new definition of business model framework, integrating and recognizing sustainability as future driver for competitive advantage.

CHAPTER III

THE NOVO NORDISK BUSINESS CASE

This third practical chapter examine a business case through an interview about how a company and its top management changed the organizational design of their firm in order to facilitate and encourage sustainable business model innovation and reap higher benefits.

1. Data and Methods

The present chapter encompasses a theory-based analytical framework to answer the research question which sees as driver for competitive advantage, the adoption of sustainability, thus leading to business model innovations.
My overall research interest is to assess how pharmaceutical companies innovate their business model in response to sustainability call. In accordance with the UN directions and the SDGs goals, the top management seeks to foster sustainable development, so to achieve a business model more resilient and adaptative to external pressures.
Thanks to the postulation of several propositions, the aim is to identify the applicative major opportunities and barriers that an organization must meet to establish this innovative process of sustainable improvement.
This chapter aims at providing an overview of the methodological choices, including the research design, the data collection and the data analysis.

1.2 Research Design and Literature Review

A literature review is the analysis, critical evaluation and synthesis of existing knowledge on a specific research problem (Hart, 2018). Literature review so, is an efficient way to summarize research findings so to explore evidence and uncover areas in which more research is needed (Snyder, 2019). Indeed, for a research

question a literature review may be a useful methodological tool to provide answers. Therefore, it is recognized as basis to knowledge development (*ibidem*) and ensure a guideline for empirical practice.

To find a relevant theoretical basis for this work, I have reviewed literature on the definition of a new kind of value, recognized in the shared value creation perspective as new definition of economic scope of an organization. Then, I have explored the literature on contents as Business Model Innovation, sustainable innovation and lastly, the Sustainable Business Model Innovation as ultimate finding and comprehensive framework to establish a new business model for corporations. Accordingly, this seems to be the more accurate description of an ideal sustainable business model, so to include the environmental, social and economic viewpoint.

Nevertheless, there are some research gaps due to the limitation that nowadays sustainable practices have in manner of monitoring and evaluation of effectiveness, and of a clear and unique empirical adoption.

Moreover, the literature review serves me to set the basis for theoretical propositions, so as to identify concepts into real business practice.

As a result, the data gathering and analysis, is structured by proposition and results from literature evidence.

1.3 Case Study

To answer the research question, this study adopts a case study approach, so to investigate effectively how pharmaceutical companies are exploring opportunities towards sustainable development. Therefore, the purpose of a case study is to use empirical evidence to make contribution to existing knowledge.

The general definition of ‘case’ expresses it as a phenomenon that can be an example of a more general category, describing so a particular situation that can be used to draw some general conclusions. Relying on an analysis of a business case we would so provide some empirical examinations on the phenomenon within the real-life context. Research case study indeed, can be used in the exploratory phase

of a research topic (Myers, 2019), so as to discover relevant features and factors that can be applicable in other similar situations. Case study research, as the author affirmed, is also useful to test theory as well (*ibidem*) and develop so connections among elements and compare results.

In our case, we will use a research case as explanatory tool, in order to test our theoretical assumptions in an empirical way, to better understand and evaluate the practicability of a Sustainable Business Model Innovation. As Myers (2019) also stated, a case study research aims at defining 'how' and 'why' a business decision is taken, and 'how' and 'why' a business process way-of-doing works. Indeed, there is no possibility in case study to separate the research case from its real-life related context.

So, by examining how an organization implement sustainable strategies and business model innovation, we aim at recognizing a framework of approach to the research question.

1.4 Data Collection

According to Yin (1994) the data collection process can be described as a comprehensive tool of six elements: documentation, archival records, interviews, direct observation, participant observation and physical artefacts.

The underlying principle that connects those six dimensions according to the author is the process of using multiple sources of evidence, triangulating data and using theoretical propositions to guide the research case (Yin, 1994; Myers, 2019).

1.4.1 Case Company Selection

The company selection was led by an information-based approach, and by some relevant variables that can influence the potential of measurement (Seawright and Gerring, 2008).

The aim was to identify a European company that have adopted the SDGs, decisive sustainable practices and environmental engagement, by also adopting an open innovation model to foster knowledge. Actually, according to the Sustainable Development Report 2020[34] the top five countries performing better than others are ranked: (1) Sweden, (2) Denmark, (3) Finland, (4) France, (5) Germany. From that, the decision to concentrate my attention and personal interest on the second classified with a score of 84.6, Denmark.

Nevertheless, from my previous knowledge and interest I found that a particular Danish company can be seen as a model for our empirical research: the Novo Nordisk company.

The strategic selection of this type of company was based upon the reflection of providing an inspirational model of business in matter of sustainability and innovative practices.

In conclusion, additionally to these principles that guided the case company selection, there is also the ESG Rating score. Indeed, the company holds the best rating score of AAA[35] (considered so a leader in the industry in its management of ESG risks), according to the MSCI ESG Index, which remains unchanged since September 2018.

1.4.2 Semi-structured Interview

Qualitative research method is commonly recognized as the more efficient tool for in-depth analysis and to investigating areas of novel research (Myers, 2019).

This present study aims at describing how sustainability practices and business model innovation, can bring to competitive advantage and long-term profitability.

[34] The Sustainable Development Report 2020 presents the SDG Index and Dashboards for all UN member states and frames the implementation of the Sustainable Development Goals (SDGs) in terms of six broad transformations. It was prepared by teams of independent experts at the Sustainable Development Solutions Network (SDSN) and the Bertelsmann Stiftung foundation. (See: <www.sdgindex.org>)

[35] Novo Nordisk A/S, MSCI ESG Rating. (See: <www.msci.com/our-solutions/esg-investing/esg-ratings/esg-ratings-corporate-search-tool/issuer/novo-nordisk-a/s/IID000000002135404>, accessed on 4th June 2021)

To approach this research question, I would like to investigate this new phenomenon by collecting theoretical background information, proposing assumptions and evaluations to be verified into empirical level, within an organizational perspective. To do that, this analysis will proceed by taking inspirations from my previous literature review thus to postulate questions, validating them into corporate level by an interview. Secondly, the information acquired thanks to this questionnaire procedure, will be integrated with the formal and official texts and documents of the company, as annual reports, articles and ratings.

Through a semi-structured interview, some aspects hadn't been foreseen, and this highly depend on the involvement of the interviewee. The interview will be submitted to a relevant representative from the company selected.

The structure of the questionnaire is made up by three main blocks, the first one is on introductive information of the company and a general overview of sustainability practices and achievements; later, the second part will investigate the role that networking and open innovation model to acquire external knowledge is pursued to gain advantage in the pharmaceutical industry, and lastly, how effectively the company has made some changes to the business model to integrate sustainability concept.

The aim of the interview is to empirically test and have a deeper organizational knowledge of the phenomenon of sustainable business model innovation, so as to, moreover, provide a model of how and which are the possible ways to integrate sustainability into business model, and ensure thus, a novel kind of profitable value for the environment and the society.

1.4.3 Secondary Data

In addition to the interview, I collected some secondary data on the company.

This includes annual reports, sustainability reports, company information and newspaper articles and literature review on other research works about the company. Complementing and integrating so the data obtained by the interview,

with secondary data, we applied the so called 'data triangulation' (Yin, 1994) mentioned above, thus realizing a more detailed and from different perspectives analysis. Secondary data provides me so, a critical and complementary viewpoint to build a more comprehensive study on the topic.

2. Research Context and Case Company

Denmark sustainable performance is a key competitive attitude since the 30 percent of all energy used already comes from renewable resources, and produces almost twice as much wind energy per capita, as the runner-up among industrialized countries in OECD. They also generated half of their electricity from wind and solar power in 2019 and have a goal of being completely independent of fossil fuel by 2050. Denmark has also strong clusters for biotech and life science, based on robust public-private partnerships.

From an economical perspective, Denmark is a free-market capitalist economy with a strong social welfare safety net for its citizens, indeed, in recent survey the World Bank calls Denmark first in Europe and fourth in the world for ease of doing business (Denmark Official Website, 2021)[36].

From the Sustainable Development Report emerges also how, compared to the rest of the world OECD countries perform better on goals related to socioeconomic outcomes, as SDG 1[37], SDG 3[38], SDG 6[39] and SDG 7[40].

From the report, OECD countries have to accelerate progress in particular relatedly to SDG 12 to 15, on climate mitigation and biodiversity protection.

Moreover, thanks to the advances in science and technology, the pharmaceutical industry is entering into a new era in medicines development. The innovative

[36] Society and Business, Denmark Official Website. (See: <www.denmark.dk>, accessed on 4th of May 2021)
[37] SDG 1, No Poverty
[38] SDG 3, Good Health and Well-Being
[39] SDG 6, Clean Water and Sanitation
[40] SDG 7, Affordable and Clean Energy

pharmaceutical sector, indeed, aims at turning fundamental research into innovative treatments that are broadly available and accessible to patients (EPFIA, 2020). The research-based pharmaceutical industry can play a crucial role in restoring Europe to growth and ensuring future competitiveness. In 2019 the E.U. invested an estimated €37,500 million in R&D in Europe (*ibidem*), however, the sector faces some challenges, among which, the impact of fiscal austerity measures introduced by governments across large part of Europe since 2010. Additionally, a strong U.S. market dominance led to a shift of economic and research activity towards U.S. during 1995-2005, while now, Europe is facing increasing competition from emerging economies. Thus, the geographical balance of the pharmaceutical market, is likely to shift gradually towards emerging countries for R&D base.

Nonetheless, Covid-19 highlighted how our health systems were vulnerable, forces us to strengthen their resilience and effectiveness. Thus, while these challenges interfere with the industry, the pandemic also point out how Biopharma companies and regulators are exploring opportunities to work together to review the drug development processes, that could lead to the creation of new business models (Deloitte Insights, 2020). According to the study of Deloitte, emerges also how pharmaceutical companies identify as priorities the R&D phase, the global market presence expansion and the transformation of functions using digital and IT, as top three priorities.
Relatedly, the respondents of their survey, shed light on words as “business model”, “collaboration” and “growth”.
In sum, we can derive that, since the pharmaceutical industry is under stringent pressure, pharma leaders may need to commit a cultural change to incentivize risk-taking, and business model innovation so as to survive in today’s market and be prepared for next market disruption (Deloitte Insights, 2020).
Pharmaceutical companies should so identify in which areas their business model is underperforming or laggard in creating innovation, thus, to enact a response to the ongoing market evolution.

3. Novo Nordisk Introduction and Analysis

Novo Nordisk A/S[41] is a global healthcare company headquartered in Denmark, engaged in diabetes care, covering the discovery, development, manufacturing and marketing of pharmaceutical products. The company's share capital is divided into A share and B share capital. The Novo Nordisk Foundation represents the principal owner; indeed, the fully owned private limited liability company Novo Holdings A/S held all the A shares. As of 27 April 2021, the total ownership held by the Novo Holdings represents 28.5% of share capital and 76.9% of votes.

The Company operates into business segment as diabetes and obesity care, and biopharmaceuticals. The Company's diabetes and obesity care segment covers insulin, GLP-1, other protein-related products; while the Company's biopharmaceuticals segment covers the therapy areas of hemophilia care, growth hormone therapy and hormone replacement therapy.
The company so is pledged to expand the access to their medicines and work to prevent the diseases they treat, by marketing their products in 169 countries.
They count 16 production sites in nine different countries and 10 research and development centers in China, Denmark, India, U.K. and U.S. (Novo Nordisk[42], 2021).

As they show in their official website, the company covers proactively the three major areas descripted in this thesis: sustainability strategy plan, innovation and shared value creation. Novo Nordisk worked strategically with environmental and social responsibility, and their engagement in stakeholder dialogue and sustainability is extremely important, since the company also believes in the Triple Bottom Line as imperative approach (Morsing and Oswald, 2009).

[41] Company overview retrieved from: <www.reuters.com/companies/NVO/profile>, accessed on 11th May 11, 2021.
[42] Novo Nordisk website (See: <www.novonordisk.com/about/who-we-are>, accessed on 11th May 11, 2021)

The Triple Bottom Line is used to measure the progress of the company towards sustainability and links a set of key targets to be achieved. This approach can also be seen as a tool that the company uses, to ensure Novo Nordisk takes the right actions consistently in line with the idea of operating in a sustainable way.
Indeed, already before the introduction of SDGs the company was adopting an independent environmental unit in 1975. Moreover, after the Rio Earth Summit in 1992 the Novo Nordisk company strengthened their focus on sustainable development, in fact, it was one of the first company in the world to provide an environmental separate reporting, while it also started publishing their corporate social responsibility report in 1993. To ensure an efficient and inclusive integration also at operational level of the Novo Nordisk's strategic ambitions, the Novo Nordisk Way of Management was introduced in 1997. Additionally, the company became a member of the UN Global Compact[43] since 2002 and joined the LEAD[44] Initiative in 2011.

Starting from 2004 the company's top management decided to undergo the Triple Bottom Line approach, thus, to continuously perform their business in a financially, environmentally and socially responsible way; indeed, they also adopted an integrated reporting system, providing a single annual report document that offer a more comprehensive overview of their performance, progress and strategic objectives.
According to the Sustainable development Goals, Novo Nordisk work with its partners across multiple goals. Their approach is based upon three major principles: (1) universality, indeed, the pursue of SDGs has to be done in every nation and sector; (2) integration, since SDGs are interconnected in a wider system; (3) transformation, which will allow the achievement of fundamental changes to our daily working mindset (Novo Nordisk, 2021). Thanks so to an SDG Self-

[43] The UN Global Compact seeks to mobilize a global movement of sustainable companies and stakeholders to create a new business environment. To do so, the Global Compact supports companies to take strategic actions towards broader societal goals and sustainable development. (See: <www.unglobalcompact.org/what-is-gc/mission>)
[44] Global Compact LEAD companies are identified annually for high levels of engagement as participant to the UN Global Compact. The Initiative aims at advance sustainability leadership through innovation and practices. (See: <www.unglobalcompact.org/take-action/leadership/gc-lead>)

Assessment Tool, the company recognize where to maximize their positive impact, thus, Novo Nordisk performs better in the achievement of Goal 3 (Good Health) and Goal 12 (Responsible Consumption and Production).

Nowadays, the company pursues the Zero Environmental Impact strategy; indeed, they use 100% renewable power in all their global production facilities, and according to their Circular for Zero plan they are strongly involved in achieving zero environmental impact in all their business activities. They recognized in the role of partnering with other actors in their industry the power to explore innovations and knowledge. They collaborate with leading universities, biotech companies and are continuously involved in looking for new skilled partners. The mutuality of interests that intercourse among those players provides the company complementary capabilities aiming at discovering novelty products and openly sharing knowledge. A key element is the possibility they gave other to have free access to their high-quality compounds to allow scientists' research works.
In 2017 (Novo Nordisk Annual Report, 2017) they set the Biopharm Operations, which exhibit the potential for leveraging their core strengths with external partners, so to extend their portfolio of marketed products. In this way, the company moved its strategy towards external innovation and opportunities, pursuing complementary acquisitions, where Novo Nordisk can leverage its core biopharma capabilities to support new growth ambitions. To allow and foster this process, the operational structure of the company must enhance the level of collaboration across partners and the global organization. Subsequently, in 2018, as showed in their Annual Report (2018), the initiative Partnering for Innovation took place, in order to continue delivering life-changing treatments. The Novo Nordisk's Research and Development organization embraces so, new ways of working together and invites to join the initiative more external partners.

Moreover, what underlies all the strategical and operational company's practices, is the Novo Nordisk Way, a set of ten main principles which directs every managerial and organizational action in the company. A sort of code of conduct that

highly depicts and highlights the goals, and the ways practices are held by the company along their value chain, as a value-based company[45].

In past years the Way of Management was composed by three major methodologies, which with years sees constantly modifications from annual reporting, balanced scorecard and facilitation triad; into financial and non-financial audit, facilitation, organizational audit and quality audit. In the Annual Report of 2010, there was a strong wish to reinforce the existing business values, and thus, unifying the corporate culture and guiding behaviors at all organizational' levels. Since the values were not changed, and the company continues to grow, the components of The Novo Nordisk Way were simplified, in order to be more understandable and accessible, valid for the next decade (Novo Nordisk Annual Report, 2010).

A list of ten Essentials principles were described, together with a follow-up methodology, named facilitation, as previous years, that would have helped in managing the degree to which The Novo Nordisk Way is effectively put into practice. Facilitations[46], hence, ease organizational learning and support align projects with business targets. This measure is made up by a team of people with long-standing managerial experience, they evaluate how the Novo Nordisk Way of Management[47] and the commitment to the Triple Bottom Line is embedded into the organization.

Relatedly to the Management System, both Novo Nordisk and Novo Nordisk Pharmatech are regularly audited by other pharmaceutical companies and examined by the Danish Medicine Agency (DMA).

[45] A value-based company is a culture shaped by a set of rules and guiding principles which aims at decision-making, actions and sense of community. Management processes and systems encourage managers and employees to behave in a way that maximizes organization's value. (See: <www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/what-is-value-based-management>)

[46] Facilitation's mechanism involves the review of documentation, interviews with managers and employees, external stakeholders and analysis of relevant business practices. This method acts as a 'health check' of the TBL approach (Novo Nordisk Annual Report, 2004), and underpins the performance management and incentive programs (Novo Nordisk Annual Report, 2020).

[47] In 2020, 26 facilitations were conducted; each issue is addressed locally, and comprehensive insights are provided to the executive Management and the Board of Directors (Novo Nordisk Annual Report, 2020).

The company possesses ISO 9001[48] (QMS) Certificate, GMP[49] Certificate and Quality Management System (QMS); and provides Customer audits, Declarations and statements, Process flowchart and Packaging details. Novo Nordisk quality management system is in compliance with DS/EN[50] ISO 9001 in all business activities, including production, QA/QC, sales and marketing, R&D, shipping and customer services. About environmental issues, as toxic emissions and waste generation, the company implemented an Environmental Policy and is DS/EN ISO 14001[51] (EMS), ISO 45001[52] (OH&S) certified.

As already introduced, Novo Nordisk firmly believe in the role of partnerships, especially in the research and development field, since external partners are useful source for complementing their own expertise. Relatedly, often some discoveries are done thanks to open collaboration model. Indeed, Novo Nordisk is undergoing several attempts towards open innovation model, this challenge according to the company, will then provide a new innovation ecosystem, thus, to accelerate new medicine discoveries and digital health solutions (*ibidem*). Integrating so the partnership vision with the open innovation model, Novo Nordisk is a leading company in terms of sharing knowledge and data, as to foster future innovation, and timely address unmet medical needs with innovative solutions.
Moreover, the company recognize that the role of partnership is also vital to meet other Sustainable Development Goals. For this reason, they introduced the Cities Changing Diabetes[53] (2014) partnership program with more than 100 local partners,

[48] ISO 9001 specifies the requirements for quality management system in providing products and services in line with statutory and regulatory requirements. (See: <www.ec.europa.eu/eip/ageing/standards/general/general-documents/en-iso-90012015_en.html>)
[49] Good Manufacturing Practice (GMP) describes the minimum standard medicines manufacturer must meet in their production processes. (See: <www.ema.europa.eu/en/human-regulatory/research-development/compliance/good-manufacturing-practice>)
[50] According to the DS/EN Dansk Standard and European Norm
[51] ISO 14001 specifies the requirements for an environmental management system that an organization can implement to develop its environmental performance. The standard contributes to the environmental pillar of sustainability and helps a company to achieve the expected outcomes for Environmental Management System (EMS). (See: <www.store.uni.com/catalogo/uni-en-iso-14001-2015>)
[52] ISO 45001 specifies the requirements for an occupational health and safety (OH&S) management system and provides guidelines for its use to enable the organization to ensure a healthy workplace. (See: <www.iso.org/standard/63787.html>)
[53] Cities Changing Diabetes is a program launched by the Steno Diabetes Center Copenhagen, University College London and Novo Nordisk. The program is designed to address social and

so to touch also Goals 11 (Sustainable Cities and Communities), 13 (Climate Action) and 17 (Partnerships for the Goals). This interconnection of interests and actions will provide companies to map and analyze root causes of urban diabetes and provide efficient solutions, in order to address health issues that can derive from living in cities.

Novo Nordisk business model is in line with their mission: *Driving change to defeat diabetes and other serious chronic diseases* (Novo Nordisk Annual Report, 2020). As emerges from their Annual Report 2020, the company is highly involved in guiding its business according to a financially, environmentally and socially responsible way. The company is so creating a sustainable organizational model, trying inspirations also by its main resources, as insights from healthcare experts, patients and partners, by partnering with public and private institutions and combining financial resources with diverse talent and skilled expertise.
To correctly address our changing environment, competitive landscape and to effectively match their capabilities with purposeful aims, Novo Nordisk introduced in 2019 a comprehensive framework of future growth objectives: The Strategic Aspirations 2025. These goals cover four major areas, firstly, the purpose and sustainability dimension, the innovation and therapeutic focus, commercial execution and lastly, financials determinants.

cultural factors that can enhance types 2 diabetes vulnerability, for people living in certain urban environments. (See: <www.citieschangingdiabetes.com/about-us/programme.html>)

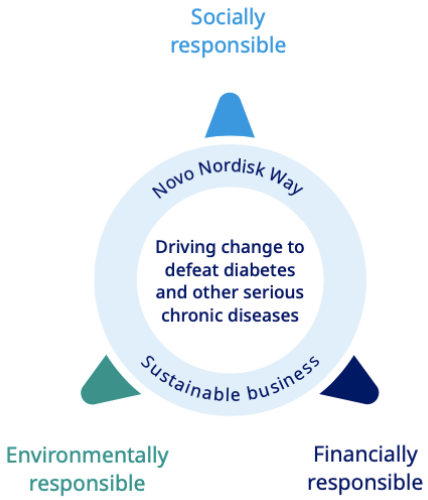

Figure 13. *Adding value to society and to future business. (Source: Novo Nordisk Annual Report, 2020, p. 11)*

Relatedly to the four main dimensions, the 2025 Strategic Aspirations have specific focus and targets for each dimension. Regarding the purpose and sustainability area, the company aims at being respected for adding value to society and making progress towards zero environmental impact, ensuring along their business model distinct core capabilities and evolving culture. Secondly, Novo Nordisk is pledged in prioritizing a pipeline for serious chronic diseases, furthering innovation bar for diabetes and providing solutions for obesity. Pursuing thus high level of innovation, platforms with different patients and partners can help in strengthen and progress the biopharma pipeline and extend their presence also on other chronic diseases' areas. What Covid-19 also highlights is how ensuring timely life-saving medicines is vital to reach patients and ensure a reliable health providers system. Therefore, the commercial execution aspirations aim at strengthening the company presence in diabetes and obesity leadership, secure also a long-term growth for biopharma. In conclusion, since an increasing importance is also recognized to sustainable rating and performance, the financials aspirations for 2025 are to deliver solid sales and operating profit growth margin, establishing operational efficiencies across the value chain and attractive future capital allocation.

4. Novo Nordisk Interview: Discussion and Implications

To effectively investigate and understand the theoretical background of this thesis, and have an in-depth knowledge about the company's process, having so an empirical evidence, I had the opportunity to lead an interview directly to an official member of Novo Nordisk.

The discussion had covered four main areas: the company's business model, the attempts to innovate the business model and the adoption of the Open Innovation model, and finally, the concept of sustainability and its declination at organizational level.

The interview was conducted adopting the approach of semi-structured questions, so in addition to a list of questions, the rest of the interview had proceeded spontaneously depending on the answers of the interviewee. The interview took place on May 2021, and it lasted about one hour.

My interviewee partner, the Communication Manager, Dr. Arianna Baroni, had provided me additional information and empirical explanations of what and how the company behaves in matter of sustainability and innovation.

The Italian Novo Nordisk office is mainly focused on commercial area, product distribution and selling, scientific information, practitioners' relationship and promotion campaign.

Starting our discussion on the business model of the company, I had the confirmation of the core guiding principle of Novo Nordisk, which is the Triple Bottom Line approach. Although my theoretical literature was to identify which potential path to follow, in terms of sustainability, Novo Nordisk is a pharmaceutical company already engaged for years in the adoption of a sustainable business model. The interviewee highlighted how the balanced integration of the three different corner of the triangle, social, environmental and financial responsibility, is pursued in every action of the company, not allowing one area to be predominant on others. This is so the key for a successful integration of perspectives, and although the company has to ensure dividends and profit to shareholders, as any other organization, this does not prevent the company from

pursuing CSR projects. Giving power to these three dimensions, in the same way, allow the company to have higher company value and financial advantage.
The balance between social profit and economical one is so possible, and thanks to the adoption of this Triple Bottom Line approach the company can ensure shareholders higher return on investments (ROI), investing at the same time, in social and environmental causes. Among some drivers for business sustainability emerges that, Novo Nordisk succeed in balancing cost containment and profit maximization, alongside with CSR investments, indeed, the company hasn't faced some reduction or cuts on the possibility to spend for social responsibility actions.
Since those CSR measures provided the Novo Nordisk evidence of advantage, it is clear how this sustainability attention is the way to follow to create the pharmaceutical business model of tomorrow, integrating so external environment into internal business one.
Nevertheless, organizational culture[54] has, in the Novo Nordisk's way of integrating sustainability into business practice, a relevant role, since it facilitates the development of an internal environment aimed at proactively implementing the corporate strategy (Morsing and Oswald, 2009).

Thereafter, the business model needs to be redefined, and since we are currently in the southern Europe, we may affirm that we are still behind compared to northern Europe country, which, as the Novo Nordisk country of origin, Denmark, is a step forward especially for their cultural attitude and background. This cultural dimension can be seen as a potential barrier to a business model innovation, since there is still not an intensive sustain and support to accomplish this change by encouraging organizations. In order to overcome this barrier, the interviewee suggests that the most feasible strategy for Italian pharmaceutical companies, is to start implementing the Triple Bottom Line approach. Therefore, organizations must go forward, not relying only on additional improvement, which can be the adoption

[54] Organizational culture can be defined as a pattern of shared assumptions, well-established way of solving external problems, so as to be considered valid also by teaching them to new members as the correct way to think, act and feel. (Source: Morsing, M and Oswald, D. (2009), "Sustainable leadership: management control systems and organizational culture in Novo Nordisk A/S", Corporate Governance International Journal of Business in Society, Vol. 9, No. 1, p. 85)

of green technologies and sustainable infrastructure, but on planning to achieve a radical transformation of the business model itself.

In addition to their Triple Bottom Line principles, last year Novo Nordisk launched its new corporate strategy, Circular for Zero. This represents not only their environmental attention, or an amplified concept of CSR, but constitutes their organizational transformation from a traditional and linear business, to a circular one. This process is not simple, it means to totally disrupt the organizations in order to change their way of being.

Circular for Zero is not only focused on production, but on every step of the company value chain, and what underpins this strategy is to convert wastes into resources for others. To this strategy the shared value creation vision perfectly fits. Thus, we can say that Novo Nordisk differs from competitors for their engagement in changing their business model to efficiently address the external trends and urgencies, at the principal level as the headquarter, as local level for all the affiliates, and in their production sites. In 2020 they achieved the zero-production impact goal, while other competitors will get the target by 2030 or more.

In sum, we can say that Circular for Zero represents the Novo Nordisk ambition to drive competitive advantage with a totally new business model in relation to the actual trends and expectations. This strategy has been designed by the company as a brand itself, with its own strategy, plan, brand image and value, budget and funds. Nevertheless, while addressing some major SDGs, Novo Nordisk hasn't performed any kind of change to the business model, but rather has amplified their scope of action by tackle also the Sustainable Cities and Communities (Goal 11) thanks to their Cities Changing for Diabetes program, which is a patient-centered prerogatives, that doesn't imply to change cities into smart cities, but relying on the daily lifestyle. It is a useful program to identify and address the cause of urban diabetes in major cities worldwide, with the ambition to improve people's lives.

In this way to reconfigure also the healthcare assistance, make prevention and investigate which impact has the city on the quality of life and health. Moreover, we can say that for Novo Nordisk conducting business in a sustainable way,

accordingly to the SDGs, is a company's identity prerogative, rather than a commercial parameter.
In order to make possible all those sustainability actions, Novo Nordisk at the headquarter, implicate people at horizontal level, covering so all business functions, and for their affiliates it has been required to develop an own sustainability plan. So, at the affiliate side, they have implemented trans-functional plans and create a board of green ambassadors. This process was carried forward not by going top-down, but bottom-up, so to truly understand the planning for the Italian affiliate, and to define the path and change to take, which in this case, is cultural.

Shifting our attention on another key driver for competitive advantage for pharmaceutical companies, we have also discussed about the role of innovation and the recent adoption of the Open Innovation model by Novo Nordisk.
Indeed, we can easily affirm that Novo Nordisk has a long sustainability history and perfectly conciliate their corporate culture and values into their business activities, simultaneously, the company is characterized also by a long history in matter of internal know-how and specialty capabilities in their development process. R&D and production are key activities of Novo Nordisk; R&D is seen as the major driver because it leads to the development of new treatments, while production is a key element since more than half of the employees work in the field of production.
Novo Nordisk as a Danish company has a relevant role in their in-house capacities, resources and expertise. From our discussion emerges indeed, how the Danish cultural background is a forerunner in manner of sustainability issues and solutions, and also how plays a critical role in the control over in-house capabilities and know-how. Novo Nordisk is, indeed, the master producer for diabetes products, and has recently also expanded their therapeutic area into obesity care and other chronic diseases. This shift to amplify the production horizon is, actually, a measure to expand their action as healthcare providers, and to do so, they have undergone some collaborations and partnering programs.
Therefore, if sustainability is an essential part of the corporate culture and strategy, the adoption of an open innovation model is more recent. Facing so broader necessities, as the management of big data, innovation, digital devices and

technological advances, Novo Nordisk decided to open up their model. Indeed, as it is present in their Annual Report (2018), the recognition of an increasing level of innovation calls for the company to move beyond its core technology platforms and therapy areas, urges the Novo Nordisk to engage with external scientific partners from academia, biotech and big pharma globally (*ibidem*). Some partnerships open up to new therapy areas adjacent to the core business, others add complementary technological skills or contribute to the newly established technology platforms of stem cell therapy. Partnerships allowed so the company to drive further innovation, and faster (Iversen, 2018).

Relatedly, as my interviewee explained, for Novo Nordisk the research phase was proudly held internally, but since the research is more and more interconnected and the necessity even more specific, the company has pursued some collaborations with other partners. Especially with business schools, research areas and young researchers. Therefore, we can say that Novo Nordisk has adopted the open innovation model in order to acquire external knowledge and research projects, thus, to stay competitive with the surrounding environment, which has become source for innovations and discoveries. This business model transformation regarding innovation was radical and strong for this company, a total shift of pace, to close the gap that the company has with other competitors, which have already adopted the open innovation model. Indeed, this change provides Novo Nordisk the expansion of the therapeutic areas which they address with their products.

According to the insights that the interviewee gave me, I can assume that Novo Nordisk Open Innovation model provides the company novel ideas and innovations, focusing so on the research phase, while for the development stage the company holds internally all the capabilities and know-how to continue the process. This definition is in accordance with the Figure 12, presented in the previous chapter, about the knowledge innovator company type.

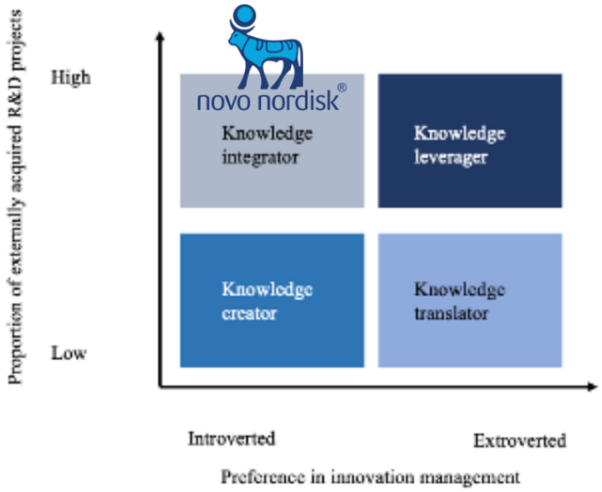

Figure 14. *Types of innovation model, Novo Nordisk case.* (Source: retrieved from Schuhmacher et al. (2013), "Models for open innovation in the pharmaceutical industry" in Drug Discovery Today, Vol. 18, No. 23/24, p. 1135, with Novo Nordisk interview data adaptation.)

Relatedly to the answers of the interviewee, I can assume that Novo Nordisk company can be placed into the *knowledge integrator* type, since there is a preference to use externally generated innovation, by using internal resources and capabilities. This introverted preference in innovation management is due to, that for the development of an innovation, or a new molecule, the process requires a lot of expertise and exploitation of know-how, which often, universities and researchers doesn't own internally. In this way, Novo Nordisk provides its own internal expertise by investing in an external research program and finish the potential successful development stage. Along with the innovation management, also for green technologies the company is already engaged with external partners, in order to provide better quality products, as biodegradable plastics and so on, which is particularly in line with the Circular for Zero strategy.

Having thus touched these macro thematic blocks, we have come to the final question and answer that outlines the drivers for competitive advantage in the pharmaceutical industry: sustainability and innovation.

Nowadays the quality level of pharmaceutical companies is so high that product makes no more difference among organizations. The improvement process

proceeds through additional enhancements, thus, to arrive, step by step, to a better-quality product. Once a company reaches it first, it acquires a competitive advantage, even if it is temporary. The competitive game is now playing on the overall company asset, history, cultural background and values, the corporate strategy, their brand perception, customer and product specialists' relationship, and health behaviors. At Novo Nordisk, to make accessible the new corporate strategy of Circular for Zero, they are providing scientific informers with specifical materials on this novel strategy, not only focused on the product they must sell. It is an important shift of mindset, since the company pursues an efficient communication strategy on who they are, which ambitions and goals they want to achieve, and how to reach them.

5. Conclusion Remarks on Novo Nordisk Corporate Sustainability and Innovation

Ending up this dissertation on the Novo Nordisk company, is clear that, if my purpose was to provide an empirical evidence of a well-performing company in matter of sustainability and innovation, our case study perfectly shows how this company can be seen as a model for other pharmaceutical competitors.

The Novo Nordisk company case represents so, practically, their capacity to combine company culture and values into business practices, to be also open to external environment as source for innovations and being a forerunner in terms of sustainability actions and circular economy. Their historical and successful adoption of the Triple Bottom Line approach proves how this can be seen as a feasible solution, for those companies who are falling behind the sustainability issue, in the moving towards the SDGs and CSR plans.

Moreover, we have seen as business model innovation can occurs and needs to be implemented if the company wants to remain competitive in its environment, keeping the pace with external trends and issues. The radical change that Novo Nordisk is implementing, shifting from a linear pharmaceutical business model to a circular economy, shows us, as innovation is a key driver for gain competitive

advantage, and to efficiently address novel needs with forward-looking solutions. This change of mindset, without doubt, may collide with the existent cultural background, thus, the corporate strategy must delineate specific directions in order to overcome institutional and operational barriers, enhancing also the participation of stakeholders in this novel path. What a good communication plan and sense of engagement with key partners and company's actors ensure, is to have a wider base of people with a strong sense of commitment, loyalty and identification with the company, raising the way of changing.

Undoubtedly, the Novo Nordisk company carries on a corporate strategy that is in line with Danish cultural value, that are far ahead in terms of sustainability and environmental care in relation to southern Europe, but, to this extent, can be seen as a business case model for competitors. On the other hand, their later adaptation and response to external environment with the open innovation model, represents as a pharmaceutical company is always in time to change its attitude towards innovation and coopetition[55] purpose.

[55] Coopetition is the act of cooperation between competing companies, specifically, businesses that engage both in competition and cooperation actions to gain advantage with a balanced integration of complementary resources, in order to create a profitable synergy, for both parties. (See: <www.investopedia.com/terms/c/coopetition.asp>)

CONCLUSIONS

The aim of the present thesis has been to demonstrate how a shift of pace is now essential for businesses, and a model innovation is crucial to meet social and environmental needs, no longer negligible. The upcoming needs for a sustainable future forces us, to think and imagine, new drivers for a competitive advantage.
I have focused my attention on the pharmaceutical industry, driven by my personal interest, in order to show how a Danish company can be seen as a model in reaction to the Sustainable Business Model Innovation call.

Based on a literature review started on the Business Model Innovation concept, which scope is to ensure a novel approach to implement the required change in the industrial system, a Sustainable Business Model is thus, recognized as medium to deliver a greater social and environmental value. Since a total redesign of the firm's value proposition is needed, also a new kind of definition of value needs to be unveiled, the so called, shared value creation. A sustainable business is, indeed, an organization that succeed in obtaining competitive advantage combining three different perspectives, people, planet and profit (TBL) that are strictly interconnected, belonging actually at the same macro environment. This thesis shows thus, financial profit is not undermined by the choice to hold a business in a sustainable way, but on contrary, their interdependence demonstrates how each dimension positively affect the other.

Considering so, sustainable business thinking as a constructive force, organizations must re-imagine and reconfigure their business model. In the pharmaceutical industry, particularly, I have concentrated my scope of investigation. This sector is facing, without doubt, many challenges to stay competitive, also affected by this Covid-19 pandemic, there is more evidence of how the access to care and its resilience, is essential.

My findings reinforced thus, that the inter-organizational contributions to an open system for knowledge creation, is critical to drive new perspectives and capabilities,

in order to extend the field of pharmaceuticals' action. Sustainability is no more seen as a separated dimension, or just a CSR department, but on contrary, needs to be integrated at all levels of organizations, thereby, to enable a Business Model Innovation. As ultimate radical innovation, we can consider for this sector, the shift from a traditional linear business model, to a circular one. This represents, undoubtedly, a huge challenge for the sector, but this holistic approach will surely provide companies higher returns and long-term sustainable presence.

Therefore, to enhance the sustainability dimension within an organization, is not possible not to cope with innovation too. Indeed, to implement any sort of incremental or additional adjustments, for a sustainable goal, is essential also to provide organizations with Business Model Innovation to amplify the impact of changes. Some barriers may arise, often those barriers are cultural and internal to the well-established way of being of the company, and even institutional, if there are not external incentive policies. For this reason, to address those challenges an open innovation model could be profitable to pharmaceutical sector, especially for the R&D phase, the relationships with suppliers and key partners.

The forementioned aim of the present thesis was to demonstrate how, sustainability can be seen as driver for competitive advantage in the pharmaceutical industry. Accordingly, I decided to focus on the Novo Nordisk company, headquartered in Denmark and a worldwide leader in diabetes products. The purpose was indeed, to provide a clear case of a well-performing company in matter of sustainability and Business Model Innovation. This business case, through the interview that I made to the company, represents so the empirical evidence of all my theoretical dissertations on which path companies may take to be more sustainable, or which barriers they may encounter.

In sum, my conclusions identify two strategic pillars to stay competitive in the pharmaceutical industry: sustainability and innovation.

Relatedly, some significant determinants, derived from the company interview, which directly affect the Sustainable Business Model Innovation are so the cultural background, the company values and the corporate strategic and financial direction. Likewise, researchers may further investigate how sustainability affects companies' performance, and see how companies differ from this case in terms of commitment to sustainable development and Business Model Innovation.

My personal hope is to see, in the coming years, incremental changes rather than additional adjustments, brave decisions to effectively ensure a shift of mindset in the pharmaceutical industry system, and not only. As I mentioned in the forefront of this thesis, Seneca recommended in his Epistula, "*Animum debes mutare, non caelum*", hence, that the necessary change must take place first in ourselves, and so, in organizations as well, since they are social entities[56] (Daft, 2016) too.

[56] Organizations are, indeed, social entities, goal-directed, designed deliberately structured and coordinated activity systems, link in the external environment. (Source: Daft, R.L. (2016), from Organizzazione Aziendale, Sixth Edition)

SUMMARY

Our present external environment is becoming highly challenging and there are more and more pressures on the behave of organizations. The external background, in which a company operates, has always been a critical driver for success or fail, and nowadays, the constant and purposeful adherence to that is becoming a key factor to gain competitive advantage. Businesses are indeed called upon to innovate their business model, to address sustainability issues and called to action to make innovations possible.

Sustainability undermines most of all processes, products and businesses. Indeed, there is an incredible shift of attention by organizations from a short-term focus to a longer-term one. This shift has come in response to turbulence and rapid changes that have occurred in the global economy (Perrott, 2015), and even more amplified by this Covid-19 pandemic issue. The pandemic has indeed intensified the global desire for authenticity and accountability, especially for large organizations, pushing companies to focus on sustainable change.

Signs of climate change, increased rate of species extinction and growing irreversible changes mean that our current production and consumption habits are no more sustainable. Sustainability has so the potential to affect many aspects of an organization's activities and worldwide configuration too. What sustainability highlighted, is the need of giving answers to social, environmental and ethical questions.

The United Nations too, in September 2015 adopted and prescribed a global sustainable plan, the 2030 Agenda for Sustainable Development, which includes a framework of goals to be achieved by corporations by that date. This global plan is common recognized as Sustainable Development Goals (SDGs), including 17 goals with 169 targets. The 2030 Agenda provides so a shared program for peace and prosperity for people and the planet, now and into the future.

The interplay indeed, between SDGs and innovation is clear, scholars recognize this close relationship from the idea generation to marketing phase, but what is crucial is that to survive and stay competitive in this globalized market, is necessary

to fit with SDGs goals, thus, to prepare business model according to the sustainability objectives that a company wants to achieve.

The present thesis was hence, concerned with the recognition of sustainability as business driver for competitive advantage, and its practical declination inside an organization's practices. To efficiently address this goal, some business model innovations are required, providing thus a novel business framework for future's organizations.
The purpose of this research was to investigate the pharmaceutical industry, specifically, with its drivers and barriers for Business Model Innovation, and how pharmaceutical companies can innovate their business model to answer the sustainability call.

The methods used to derive an answer to this research topic, and have an initial theoretical background, was to provide a literature review on concepts as the Business Model Innovation (BMI), its subsequent declination in Sustainable Business Model Innovation (SBMI), that fully integrates into its mission sustainability goals, and then, the role that innovation has, together with the latter, in enhancing a new business model type that companies may adopt.
The literature review has been made through some official database, as Google Scholar, Summon Discovery, EUPHA, PubMed.Gov, Emerald Insight and ScienceDirect.

From a literature perspective has been noticed a growing interest in research field in giving a common definition for the Sustainable Business Model Innovation concept. Often called in brief Business Model Innovation, or sustainable business, it has been recognized as a medium to deliver greater social and environmental value in the industrial system. Business Model Innovation scope is to provide a novel approach to deliver the required change, through redesigning the firm's purpose and value creation, by preserving the environment in the meanwhile capturing economic value for itself.

This is due to the upcoming need for a sustainable future and the pressing challenges of our age, which see as driver for new competitive advantage the role of sustainable innovations, that imply moving beyond the individual firm's perspective to a network system vision to generate value. Indeed, as Lüdeke-Freund (2010) stated, a sustainable business model creates competitive advantage through higher customer value and contributes also to a sustainable development of the company and society.

To create a sustainable business a holistic approach is needed, by understanding the potential conflicts and positive or negative aspects of the value proposition, aligning so opportunities to be converted into business model innovations. In the end, we can consider sustainable business thinking as a constructive force thus to re-imagine the role that a firm has, integrating concepts as Triple Bottom Line approach and shared value creation, into the way business does business (Bocken *et al*., 2015). This would imply a coevolutionary process with technologies, social practices and institutions to make the change towards sustainability possible.

In literature has been noticed a high attention to the process of integration of social dynamics with environmental ones, many authors referred to this phenomenon as the 3P[57] approach, the Triple Bottom Line, that is how an organization should combine standard metrics of financial success with those that measure environmental stewardship and social justice (Perrott, 2015). The Triple Bottom Line approach realizes and understands how external and internal factors can be integrated, in order to plan a sustainable strategic plan that will cover different perspectives. Considering that, an organization must follow a strategic process to deal with sustainability issues (Perrott, 2015), and exploiting the sustainable business model would be the solution to make this green translation possible.

Sustainability-oriented innovation involves realizing purposeful changes to an organization's culture and values, as well as to its production processes, so to add and create social and environmental utility. Value, indeed, is no more created by firms autonomously, but by acting together with external parties (Bocken *et al*.,

[57] 3P approach is based on three sustainable cornerstones: people, planet and profits. Thus, contributing to an economic and environmental equity.

2014). According to this view, the work of Porter and Kramer suggested us a modern vision of capitalism: the shared value creation.
The concept of shared value can be defined as all those policies and operations that enhance the competitiveness of a company, while simultaneously pursuing economic and social conditions into their communities (Porter and Kramer, 2019). Creating shared value, indeed, is embedded into the core company's mission, and for authors organizations must reconceive their intersection between society and performance so to allow the creation of shared value.

Relatedly, what a business model innovation implies, is to overcome barriers and experiment with alternative models, the ways with which conduct business operations. Changes to business model are so recognized as fundamental approach to enact innovations for sustainability, in this way, BMI is a potential mechanism to integrate sustainability into business (Evans *et al*., 2017). Integrating thus into the business model, concepts as dynamism, innovation and network of ecosystems, it is possible to refer to external elements as sources for innovative development. This would lead organizations to broaden their base for idea generation and creative perspectives deriving from different ecosystems.

Sustainable Business Model Innovation, subsequently, represents an emerging research stream that attempt to strengthen companies' ability to pursue sustainable goals (Baldassarre *et al*., 2017). It succeeds in combining the firm's value proposition with stakeholders' interest and environmental attention. According to Bocken *et al*. (2020), SBMI can also be considered as medium to integrate, build and reconfigure internal and external competences to address rapidly changing environments. To this extent, dynamic capabilities can assess new opportunities, mobilize resources to capture value and address opportunities, and transforming the business model, with a continuative process of organization's renewal.
Although the positive impact of this model innovation, it hasn't been possible to ignore that barriers may arise along the transformational process. Barriers have been conceptualized and characterized into institutional, strategic and operational ones (Bocken *et al*., 2020). Institutional barriers are part of the organizational

design and internal structure, all those well-established norms, rules and processes that may limit the transformative path. The core set of an organization's actions are what constitutes strategic barriers, often concerned with short-term preference. While for operational barriers, they are those best practices, standardized processes and fixed allocated resources that contribute to the core firm's objective.
Therefore, we can notice a growing importance in recognizing sustainability as driver for innovation and competitive advantage.

In the pharmaceutical sector, some challenges have been arisen to stay competitive in the market, forcing companies to realize some organizational changes. Hence, to practically integrate Business Model Innovation into pharmaceutical sector, the present thesis has proceeded by investigating the system's response to sustainability call.
Pharmaceutical system is made up by goals, product, guidance principles, processes and system components, the context and its related stakeholders. All the functions carried out by pharmaceutical system are regulated by norms, laws and policies, so as to provide the better-quality outcomes, in a timely and effective way. In this view, according to authors, pharmaceutical system has some performance goals, intermediate and ultimate. The former are efficiency, quality and equitable access to medicine, which represents the scope of the firm, while the latter, are means for ultimate performance goals as ensure a health status, financial protection and citizen satisfaction (Teramae, 2020).
In the last decade, pharmaceutical companies have been facing an urgent call to improve and keep their performances under strict control. Indeed, the pharmaceutical industry is a highly regulated sector and innovation contribute to its effectiveness. It is characterized by frequent innovation and intense international competition. Moreover, operating in a highly internationalized industry, pharmaceutical companies have a growing interest into globalization and the related issue of sustainability, considering that organizations cover both developed countries and the less ones (Van Leeuw and Scheerlinck, 2011).
The inter-organizational vision is then reinforced to develop an open system to knowledge creation, that would drive new perspectives and capabilities to the

established know-how of pharmaceutical companies. As a result, to effectively implement sustainable practices into the way of doing business, pharmaceutical companies must adopt an integration process aiming at comprehending Business Model Innovation to reap a new kind of value and to ensure a profitable long-term presence in the industry.

The business activities of pharmaceutical industry are characterized by several elements, the R&D department, regulatory submission and launch, sales and marketing and investment collection. In this competitive landscape it is relevant to say that to sustain a strategic advantage, companies must fit with innovative solutions, novel products and their differentiation.

To overcome this industry-specific attitude, some pharma companies are increasingly outsourcing their research practices, or also, by strategic alliances to catch research-based innovations.

Moreover, since the pharmaceutical industry, involving also chemical and biotechnological industries, is a sector that has a high impact on environment and society, it is commonly recognized as a carrier of pollution and non-safety behaviors. To this point, the pharmaceutical sector has to deal with some fundamental global issues in matter of environmental contributions.

For this reason, nowadays is critical to assess the role that sustainability has in this type of industry, and how, leveraging on that, corporations could meet some competitive advantages and financial rewards. Therefore, the pharmaceutical sector efforts related to sustainability are held up by companies as indicative of their ethics, as they primarily represent the role of health providers to community (Schneider *et al*., 2010).

Sustainability actions are not to be seen as separated dimensions, but rather, as a comprehensive approach to drive innovation inside a firm and to allow an equitable development for a novel pharmaceutical strategy. Moreover, the new EU Pharma strategy, adopted on 25 November 2020, aims at creating a future proof regulatory framework and at supporting industry in promoting research and technologies, although market failures. It is mainly based on four principal pillars, of which one is to enhance innovation and sustainability of the pharmaceutical industry.

The Pharmaceutical Strategy for Europe complements so existing measures, identifying as driver for the EU pharma industry, innovation for environmentally sustainable and climate-neutral pharmaceuticals and manufacturing.
Milanesi *et al*. (2020) in their literature work, highlighted some emerging challenges for future research areas on sustainability in pharma industry; as the social sustainability in terms of market access to medicines, or on the adoption of innovative solutions to waste management and the relationship among innovation and sustainability. The quest to address those challenges, shed light on the necessity to renewed pharma value chain, modifying its business model. Innovation, in fact, will be critical especially in the search for new business models, so as to include new collaborative models within and without the pharmaceutical companies and reshaping the internal value chain (Hunter, 2011).

As stated before, inter-organizational capabilities and contributions from external actors are a key role to business model innovation, we have to transform products and services in profitable innovations which sustainably generate value.
To this extent, a business model innovation will create higher value by exploiting the business opportunities. Since, the BMI adopt also the use of external sources for information and innovative ideas, to correctly manage this novelty, organizational actors have to balance the exploitation of established capabilities, with the exploration of new opportunities.
Besides the several positive drivers that business model innovation can bring to pharmaceutical industry, more literature and empirical research have to be done to close the gap between theory and practice, as to minimize the skepticism and barriers to undergo for a sustainable organizational strategy.
Therefore, to strengthen sustainability vision, pharmaceutical companies must start implementing incremental innovations and planning a long-term strategy to redesign their business model in order to be more resilient to external pressures. Businesses require to be adaptative and flexible, in order to manage external disturbances and, to face urgencies, moving towards sustainable initiatives that pursue long-term objectives.

To successfully integrate sustainability into pharmaceutical business practices, Leonard and Schneider (2004) suggest four macro dimensions: to know in-depth the business and articulate a sustainable concept in the vision statement, establish and appoint top management to lead and support the activities, involving and empowering all stakeholders with initiatives, and last, prioritize and mobilize resources according to the activities. Engaging in a Sustainable Business Model Innovation, describes the ambition at unfolding the full potential of a traditional way of doing business and make proactive contributions to the sustainable model development.

To achieve growth through innovation, indeed, represents an opportunity for the Open-Innovation Model to take the lead to initially transform and translate, a new vision of collaborations among companies in this industry. Hence, waving towards a new definition of business model framework, integrating and recognizing sustainability as future driver for competitive advantage. Open-innovation model could be so a promising driver to advance and increase productivity in the pharmaceutical industry (Martinez-Grau and Alvim-Gaston, 2019).

Pharmaceutical companies must plan forward-looking strategies and start to transform their traditional linear business. A possible solution could be also the adoption of a Circular Economy model, being conscious that "business as usual" is no more a feasible solution.

A Circular Economy is, indeed, a regenerative system, which aim is to achieve a better balance and harmony through economy, environment and society. The European Commission since 2015 pursues measures aimed at transforming the EU economy into a more sustainable and competitive one. A circular approach depicts an opportunity for the pharmaceutical industry to ensure access to sustainable supplies of raw materials and energy, and to drive new opportunities for growth thanks to the adoption of sustainable business model (EPFIA, 2020).

The second objective of this thesis was to investigate empirically the theoretical assumptions into a company's daily business practices.

The method used for this empirical part, was the one of an interview with semi-structured questions, to a Danish company, the Novo Nordisk, leader in diabetes

care and well-preforming in terms of sustainability and innovation. With this practical evidence was so possible to deduct some conclusions and have in-depth insights of real-life business processes. The data were gathered first, by consulting official documents as Annual Reports, Official Website and related literature articles, then, postulating a series of questions to be made to the interviewee.
Therefore, in order to provide an empirical evidence of a real-business practices in terms of sustainability and innovation, the interview has made possible to see if there were correspondences with the literature review.

The case company selection was held by some criteria, the aim was to identify a European company that have adopted the SDGs, a decisive sustainable practices and environmental engagement, by also adopting an open innovation model to foster knowledge. Actually, according to the Sustainable Development Report 2020 the top five countries performing better than others are ranked: (1) Sweden, (2) Denmark, (3) Finland, (4) France, (5) Germany. From that, the decision to concentrate my attention and personal interest on the second classified with a score of 84.6, Denmark. Nevertheless, from my previous knowledge and personal interest I found that a particular Danish pharmaceutical company can be seen as a model for our empirical research: the Novo Nordisk company.
The strategic selection of this type of company was based upon the reflection of providing an inspirational model of business in matter of sustainability and innovative practices. In addition to these principles, the case company selection was depended also on the ESG Rating score that the company holds, which according to the MSCI ESG Index, Novo Nordisk's rating of AAA[58] (considered so a leader in the industry in its management of ESG risks) remains unchanged since September 2018.

Novo Nordisk worked strategically with environmental and social responsibility, and their engagement in stakeholder dialogue and sustainability is extremely important, since the company believes in the Triple Bottom Line as imperative

[58] Novo Nordisk A/S, MSCI ESG Rating. (See: <www.msci.com/our-solutions/esg-investing/esg-ratings/esg-ratings-corporate-search-tool/issuer/novo-nordisk-a/s/IID000000002135404>, accessed on 4th June 2021)

approach (Morsing and Oswald, 2009). Starting from 2004 the company's management decided to undergo the TBL approach, thus, to continuously perform their business in a financially, environmentally and socially responsible way.
They adopted an integrated reporting system, providing a single annual report document that offers a more comprehensive overview of their performance, progress and strategic goals. While, in addressing the Sustainable Development Goals program, Novo Nordisk works with its partners across multiple goals.

What underlies all the strategical and operational company's practices, is the Novo Nordisk Way, a set of ten main principles which directs every managerial and organizational action in the company. A sort of code of conduct that highly depicts and highlights the goals, and the ways practices are held by the company along their value chain.
The company pursues the Zero Environmental Impact strategy; indeed, they use 100% renewable power in all their global production facilities, and according to the novel strategy launched last year, Circular for Zero, Novo Nordisk is strongly involved in transforming their business model into a sustainable circular economy.
The Novo Nordisk company case represents so, practically, the capacity to combine company culture and values into business practices, and to be also open to external environment as source for innovations and being a forerunner in terms of sustainability and circular economy. Their historical and successful adoption of the Triple Bottom Line approach proves how this can be seen as a feasible solution, for those companies who are falling behind the sustainability issue, in the moving towards the SDGs and CSR plans.

They collaborate with leading universities, biotech companies and are continuously involved in looking for new skilled partners. The mutuality of interests that intercourse among those players provides the company complementary capabilities aiming at discovering novelty products and openly sharing knowledge.
Moreover, we have seen as business model innovation can occurs and needs to be implemented if the company wants to remain competitive in its environment, keeping the pace with external trends and issues.

The radical change that Novo Nordisk is implementing, shifting from a linear pharmaceutical business model to a circular economy, with its Circular for Zero program, shows us, as innovation is a key driver for gain competitive advantage, and to efficiently address novel needs with forward-looking solutions. This change of mindset, without doubt, may collide with the existent cultural background, thus, the corporate strategy must delineate specific directions in order to overcome institutional and operational barriers, enhancing also the participation of stakeholders in this novel path. What a good communication plan and sense of engagement with key partners and company's actors ensure, is to have a wider base of people with a strong sense of commitment, loyalty and identification with the company, expanding the way of changing.
Nevertheless, organizational culture has, in the Novo Nordisk's way of integrating sustainability into business practice, a relevant role, since it facilitates the development of an internal environment aimed at proactively implementing the corporate strategy (Morsing and Oswald, 2009).

Undoubtedly, the Novo Nordisk company carries on a corporate strategy that is in line with Danish cultural values, that are far ahead in terms of sustainability and environmental care in relation to southern Europe, but, to this extent, can be seen as a business case model for competitors. On the other hand, their recent adaptation and response to external environment with the open innovation model, represents as a pharmaceutical company is always in time to change its attitude towards innovation and coopetition[59] purpose.

The aim of the present thesis has been to demonstrate how a shift of pace is now essential for businesses, and a model innovation is crucial to meet social and environmental needs, no longer negligible.
The upcoming needs for a sustainable future forces us, to think and imagine, new drivers for a competitive advantage.

[59] Coopetition is the act of cooperation between competing companies, specifically, businesses that engage both in competition and cooperation to gain advantage with a balanced integration of complementary resources, in order to create a profitable synergy, for both parties. (See: www.investopedia.com/terms/c/coopetition.asp)

I have focused my attention on the pharmaceutical industry, driven by my personal interest, in order to show how a Danish company can be seen as a model in reaction to the Sustainable Business Model Innovation call.
A sustainable business is, indeed, an organization that succeed in obtaining competitive advantage combining three different perspectives, people, planet and profit (TBL), that are strictly interconnected. This thesis shows thus, financial profit is not undermined by the choice to hold a business in a sustainable way, but on contrary, their interdependence demonstrates how each dimension positively affect the other.
Considering so, sustainable business thinking as a constructive force, organizations must re-imagine and reconfigure their business model, especially in the pharmaceutical industry where I have concentrated my scope of investigation.
This sector is facing, without doubt, many challenges to stay competitive, also enhanced by this Covid-19 pandemic, demonstrating how the access to care and its resilience is essential.

My research findings reinforced thus, that the inter-organizational contributions to an open system for knowledge creation, is critical to drive new perspectives and capabilities, in order to extend the field of pharmaceuticals' action. As ultimate radical innovation, we can consider for this sector, the shift from a traditional linear business model, to a circular one. This would represent, undoubtedly, a huge challenge for the sector, but this holistic approach will surely provide companies higher returns and long-term sustainable presence.
Therefore, to enhance the sustainability dimension within an organization, is not possible not to cope with innovation too. Indeed, to implement any sort of incremental or additional adjustments, for a sustainable goal, is essential also to provide organizations with business model innovation to amplify the impact of changes. Some barriers may arise, often those barriers are cultural and internal to the well-established way of being of the company, and even institutional, if there are not external incentive policies. For this reason, to address those challenges an open innovation model could be profitable to pharmaceutical sector, especially for the R&D phase, the relationships with suppliers and key partners.

In sum, my conclusions suggest two strategic pillars to stay competitive in the pharmaceutical industry: sustainability and innovation.

Relatedly, some significant determinants, derived from the company interview, which directly affect the Sustainable Business Model Innovation are so the cultural background, the company values and the corporate strategic and financial direction.

Likewise, researchers may further investigate how sustainability affects companies' performance, and see how companies differ from this case in terms of commitment to sustainable development and Business Model Innovation.

The research hope to inspire other pharmaceutical companies to pursue a sustainable development program, by making business model innovation adjustments, so as to arrive to a new competitive landscape, in which financial purposes are balanced and integrated with social and environmental ones.

ACKNOWLEDGEMENTS

I would first like to thank my supervisor Daniele Mascia for having encouraged me in my work and his presence along this project, and my co-supervisor Sara Lombardi for her oversight.
I would also like to thank A. Mazzitelli, for guiding and stimulating me through these five years, convincing me to overcome all barriers, with faith and courage.

I would also like to thank my interview partners, Dr. T. Franchini for having kindly introduced me to the company, and Dr. A. Baroni, who allowed me to have an in-depth knowledge and insights into their business practices with gentle willingness.

At the end of this path, I would like to thank my family, who always supported me along this time and made this adventure possible.
To my parents, especially, who have endlessly encouraged me to pursue my passions and for teaching me the beauty to see at the world with constant curiosity and respect for others.

To my beloved sisters, who have constantly inspired me with their diversity and support me in every step that I take. Thank you for the love in your active participation throughout my personal and academic path, and for being every day my safe harbor.

To whom protected and guided me from above with love, for the values and ambitions that have inspired me.

I am also grateful to all my friends, who always supported me with their attention and care. For their sincere interest and constant presence throughout my bests and difficulties.

To the person with whom I have shared my journey, who constantly believed in the brave of my strengths, leading me to see at things from different perspectives.

REFERENCES

Adams, R., Jeanrenaud, S., Bessant, J., Denyer, D. and Overy, P. (2016), "Sustainability-oriented Innovation: A Systematic Review", International Journal of Management Reviews, Vol. 18, pp. 180-205

Ahrensbach Rasmussen, K. and Foss, N.J. (2014), "Business Model Innovation in the Pharmaceutical Industry: The Supporting Role of Organizational Design", Institut for Strategic Management and Globalization

Ang, K.L., Saw, E.T., He, W., Dong, X., Ramakrishna, S. (2021), "Sustainability framework for pharmaceutical manufacturing (PM): a review of research landscape and implementation barriers for circular economy transition", Journal of Cleaner Production, Vol. 280

Angeles Martinez-Grau, M., Alvim-Gaston, M. (2019), "Powered by Open Innovation: Opportunities and Challenges in the Pharma Sector", Pharmaceutical Medicine, Vol. 33, pp. 193-198

Baldassarre, B., Calabretta, G., Bocken, N.M.P., Jaskiewicz, T. (2017), "Bridging sustainable business model innovation and user-driven innovation: A process for sustainable value proposition design", Journal of Cleaner Production, Vol. 147, pp. 175-186

Baumgartner, R.J., Rauter, R. (2017), "Strategic perspectives of corporate sustainability management to develop a sustainable organization", Journal of Cleaner Production, Vol. 140, pp. 81-92

Blum-Kusterer, M. and Hussain, S.S. (2001), "Innovation and corporate sustainability: An investigation into the process of change in the pharmaceuticals industry", Business Strategy and the Environment, Vol. 10, pp. 300-316

Bocken, N.M.P., Geradts, T. H.J. (2020), "Barriers and drivers to sustainable business model innovation: Organization design and dynamic capabilities", Long Range Planning, Vol. 53

Bocken, N.M.P., Rana, P., Short, S.W. (2015), “Value mapping for sustainable business thinking”, Journal of Industrial and Production Engineering, Vol. 32, pp. 67-81

Bocken, N.M.P., Short, S., Rana, P., Evans, S. (2013), “A value mapping tool for sustainable business modelling”, Corporate Governance International Journal of Business in Society, Vol. 13, pp. 482-497

Bocken, N.M.P., Short, S.W., Rana, P., Evans, S. (2014), “A literature and practice review to develop sustainable business model archetypes”, Journal of Cleaner Production, Vol. 65, pp. 42-56

Boons, F., Lüdeke-Freund, F. (2013), “Business model for sustainable innovation: state-of-the-art and steps towards a research agenda”, Journal of Cleaner Production, Vol. 45, pp. 9-19

Boons, F., Montalvo, C., Quist, J., Wagner, M. (2013), “Sustainable innovation, business models and economic performance: an overview”, Journal of Cleaner Production, Vol. 45, pp. 1-8

Capo, F., Brunetta, F. and Boccardelli, P. (2014), “Innovative Business Models in the Pharmaceutical Industry: A Case on Exploiting Value Networks to Stay Competitive”, International Journal of Engineering Business Management, Vol. 6, No. 23

Chesbrough, H. (2010), “Business Model Innovation: Opportunities and Barriers”, Long Range Planning, Vol. 43, pp. 354-363

Cillo, V., Messeni Petruzzelli, A., Ardito, L., Del Giudice, M. (2019), “Understanding sustainable innovation: A systematic literature review”, Corporate Social Responsibility and Environmental Management, Vol. 26, pp. 1012-1025

Cordova, M.F. and Celone, A. (2019), “SDGs and Innovation in the Business Context Literature Review”, Sustainability, Vol. 11

Daft, R. L. (2010), Management, South-Western Cengage Learning, Ninth Edition

Daft, R.L. (2016), Organizzazione Aziendale, Apogeo Education, Sixth Edition

Di Fabio, A. (2017), "Positive Healthy Organizations: Promoting Well-Being, Meaningfulness, and Sustainability in Organizations", Frontiers in Psychology

Deloitte Insights (2020), "Biopharma leaders prioritize R&D, technological transformation, and global market presence", Deloitte Report, Deloitte Center for Health Solutions

Dey, C. and Burns, J. (2010), "Integrated reporting at Novo Nordisk", Accounting for Sustainability, Practical Insights

Ding, B. (2018), "Pharma Industry 4.0: Literature review and research opportunities in sustainable pharmaceutical supply chains", Process Safety and Environmental Protection, Vol. 119, pp.115–130

EFPIA (2020), "EFPIA White Paper on Circular Economy", European Federation of Pharmaceutical Industries and Associations

Eppinger, E. and Kamprath, M. (2011), "Sustainable Business Model Innovation in Personalized Medicine", R&D Management Conference

European Commission (2020), "Pharmaceutical Strategy for Europe"

EY and Farmindustria (2017), "Report on the biotechnologies of the pharmaceutical sector in Italy 2017"

Fjeldstad, D., Snow, C. (2018), "Business models and organization design", Long Range Planning, Vol. 51, pp. 32-39

Fondazione Symbola for Farmindustria (2017), "Next Generation Pharma Report"

Freeman, R.E. (1984), "Strategic Management: A Stakeholder Approach", Cambridge University Press

Gautam, A. (2016), “The changing model of big pharma: impact of key trends”, Drug Discovery Today, Vol. 21, No. 3

Gower, R. and Schröder, P. (2016), “Virtuous Circle: how the circular economy can create jobs and save lives in low and middle-income countries”, Tearfund, Institute of Development Studies

Gray, R. (2006), “Social, environmental and sustainability reporting and organizational value creation?”, Accounting, Auditing & Accountability Journal, Vol. 19 No. 6, pp. 793-819

Hafner, T., Walkowiak, H., Lee, D. and Aboagye-Nyame, F. (2017), “Defining pharmaceutical systems strengthening: concepts to enable measurement”, Health Policy and Planning, Vol. 32, pp. 572-584

Hart, C. (2018), “Doing a Literature Review: Releasing the Research Imagination”, SAGE Study Skills, 2nd edition

Hernandez-Vivanco, A., Bernardo, M., Cruz-Cazares, C. (2018), “Sustainable innovation through management system integration”, Journal of Cleaner Production, Vol. 196, pp. 1176-1187

Horvath, B., Khazami, N., Ymeri, P., Fogarassy, C. (2019), “Investigating the Current Business Model Innovation Trends in the Biotechnology Industry”, Journal of Business Economics and Management, Vol. 20, p.63-85

Hunter, J. (2011), “Challenges for pharmaceutical industry: new partnerships for sustainable human health”, Philosophical Transactions of The Royal Society A, Vol. 369, pp. 1817-1825

Joyce, A. and Paquin, R.L. (2016), “The triple layered business model canvas: A tool to design more sustainable business models”, Journal of Cleaner Production, Vol. 135, pp. 1474-1486

Kamboj, S. and Rahman, Z. (2017), “Market orientation, marketing capabilities and sustainable innovation. The mediating role of sustainable consumption and competitive advantage”, Vol. 40, No. 6, pp. 698-724

Kopach, M.E. (2018), “Sustainability: A foundation for pharma, generic and Government partnerships?”, Current Opinion in Green and Sustainable Chemistry, Vol. 11, pp. 54-57

Lapinskaite, I., Skvarciany, V., & Janulevicius, P. (2020), “Impact of Investment Sources for Sustainability on a Country’s Sustainable Development: Evidence from the EU”. Sustainability, Vol. *12* No. 6, 2421

Lüdeke-Freund, F. (2010), “Towards a Conceptual Framework of Business Models for Sustainability”, in Proceedings of the Knowledge Collaboration & Learning for Sustainable Innovation Conference, Delft, Netherlands

Madsen, H.L. (2020), “Business model innovation and the global ecosystem for sustainable development”, Journal of Cleaner Production, Vol. 247

Milanesi, M., Runfola, A., Guercini, S. (2020), “Pharmaceutical industry riding the wave of sustainability: Review and opportunities for future research”, Journal of Cleaner Production, Vol. 261

Moldavanova, A. & Goerdel, H.T. (2018), “Understanding the puzzle of organizational sustainability: toward a conceptual framework of organizational social connectedness and sustainability”, Public Management Review, Vol. 20 No. 1, pp. 55-81

Moors, E.H.M., Cohen, A.F. and Schellekens, H. (2014), “Towards a sustainable system of drug development”, Drug Discovery Today, Vol. 19, No. 11, pp. 1711-1720

Morsing, M. and Oswald, D. (2009), “Sustainable leadership: management control systems and organizational culture in Novo Nordisk A/S”, Corporate Governance International Journal of Business in Society, Vol. 9, No. 1, pp. 83-99

Mustapha, M.A., Manan, Z.A., Wan Alvi, S.R. (2017), “Sustainable Green Management System (SGMS) – an integrated approach towards organizational sustainability”, Journal of Cleaner Production, Vol. 146, pp. 158-172

Mustapha, M.A., Manan, Z.A., Wan Alwi, S.R. (2017), “Sustainable Green Management System (SGMS): An Integrated approach towards organizational sustainability”, Journal of Cleaner Production, Vol. 146, pp. 158-172

Myers, M.D. (2019), “Qualitative research in Business & Management”, SAGE Publications, Third Edition

Novo Nordisk (2003), Sustainability Report

Novo Nordisk (2004), Annual Report

Novo Nordisk (2010), Annual Report

Novo Nordisk (2016), Annual Report

Novo Nordisk (2017), Annual Report

Novo Nordisk (2018), Annual Report

Novo Nordisk (2019), Annual Report

Novo Nordisk (2020), Annual Report

Perrott, B.E. (2015), “Building the sustainable organization: an integrated approach”, Journal of Business Strategy, Vol. 36, No. 1, pp. 41-51

Pfitzer, M.W., Bockstette, V. and Stamp, M. (2013), “Innovating for Shared Value”, Harvard Business Review

Porter, M.E. and Kramer, M.R. (2006), “Strategy & Society: The Link Between Competitive Advantage and Corporate Social Responsibility”, Harvard Business Review

Porter, M.E. and Kramer, M.R. (2019), “Creating Shared Value” in “Managing Sustainable Business”, pp.323-346

Price Waterhouse Coopers (2007), “Pharma 2020: Challenging business models. Which path will you take?”, Pharmaceuticals and Life Sciences

Reinhardt, I.C., Oliveira, J.C., Ring, D.T. (2020), “Current Perspectives on the Development of Industry 4.0 in the Pharmaceutical Sector”, Journal of Industrial Information Integration, Vol. 18

Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., Fuller, G., Woelm, F. (2020), “The Sustainable Development Goals and COVID-19”, Sustainable Development Report 2020, Cambridge University Press

Schaltegger, S., Ludeke-Freund, F. and Hansen, E.G. (2012), “Business cases for sustainability: the role of business model innovation for corporate sustainability”, International Journal and Sustainable Development, Vol. 6, No. 2

Schiraldi, M.M. (2014), “Innovations in the Pharmaceutical Industry”, International Journal of Engineering Busines Management, Vol. 6, No. 15

Schneider, J. and Leonard, T. (2004), “Integrated sustainability in the Pharmaceutical industry”, Corporate environmental strategy: International Journal for Sustainable Business, Vol. 11, pp. 119-128

Schneider, J.L., Wilson, A. and Rosenbeck, J.M. (2010), "Pharmaceutical companies and sustainability: an analysis of corporate reporting", Benchmarking: An International Journal, Vol. 17, No. 3, pp. 421-434

Schönherr, N., Findler, F., Martinuzzi, A. (2017), "Exploring the interface of CSR and the Sustainable Development Goals", Transnational Corporations, Vol. 24, No. 3, pp. 33-49

Schuhmacher, A., Germann, P.G., Trill, H. and Gassmann, O. (2013), "Models for open innovation in the pharmaceutical industry", Drug Discovery Today, Vol. 18, No. 23/24, pp. 1133-1137

Seawright, J. and Gerring, J. (2008), "Case Selection Techniques in Case Study Research: A Menu of Qualitative and Quantitative Options", Political Research Quarterly, Vol. 61, No. 2, pp. 294-308

Singh, J., Singh, H., Kumar, A. (2020), "Impact of lean practices on organizational sustainability through green supply chain management – an empirical investigation", International Journal of Lean Six Sigma, Vol. 11, No. 6, pp. 1049-1082

Smith, N.C. (2013), "Sharing Big Pharma's Value", Economics & Finance INSEAD Knowledge

Snyder, H. (2019), "Literature review as a research methodology: An overview and guidelines", Journal of Business Research, Vol. 104, pp. 333-339

Stubbs, W., Cocklin, C. (2008), "Conceptualizing a sustainability business model", Organization & Environment, Vol. 21, pp.103-127

Teramae, F., Makino, T., Lim, Y., Sengoku, S. and Kodama, K. (2020), "Impact of Research and Development Strategy on Sustainable Growth in Multinational Pharmaceutical Companies", Sustainability, Vol. 12, No. 5358

Teramae, F., Makino, T., Lim, Y., Sengoku, S. and Kodama, K. (2020), "International Strategy for Sustainable Growth in Multinational Pharmaceutical Companies", Sustainability, Vol. 12, No. 867

van der Waal, J.W.H., Thijssens, T., Maas, K. (2021), "The innovative contribution of multinational enterprises to the Sustainable Development Goals", Journal of Cleaner Production, Vol. 285

Van Leeuw, F., Scheerlinck, I. (2011), "What Shapes Companies Corporate Sustainability? Belgian Pharma Businesses Views on Global Sustainable Development", The international business & economics research journal, Vol.2 No.12

Varadarajan, R. (2017), "Innovating for sustainability: a framework for sustainable innovations and a model of sustainable innovations orientation", Journal of the Academy of Marketing Science, Vol. 45, pp. 14-36

Velter, M.G.E., Bitzer, V., Bocken, N.M.P., Kemp, R. (2020), "Sustainable business model innovation: The role of boundary work for multi-stakeholder alignment", Journal of Cleaner Production, Vol. 247

WBCSD (2011), "Sustainable consumption and value chain"

Yin, R.K. (1994), "Case Study Research: Design and Methods", SAGE Publications, Second Edition

Young, D. and Reeves, M. (2020), "The quest for sustainable business model innovation", BCG Henderson Institute, Boston Consulting Group

Zingales, F. and Hockerts, K. (2003), "Balanced Scorecard and Sustainability: Examples from Literature and Practice", INSEAD Faculty and Research, Center for the Management of Environmental Resources, pp.8-10

SITOGRAPHY

www.investopedia.com/terms/c/coopetition.asp

www.capgemini.com/wp-content/uploads/2020/07/20-06_9880_Sustainability-in-CPR_Final_Web-1.pdf

www.citieschangingdiabetes.com/about-us/programme.html

www.ec.europa.eu/eip/ageing/standards/general/general-documents/en-iso-90012015_en.html

www.ec.europa.eu/growth/industry/sustainability/corporate-social-responsibility_en

www.ec.europa.eu/health/sites/health/files/human-use/docs/pharma-strategy_report_en.pdf

www.ema.europa.eu/en/human-regulatory/research-development/compliance/good-manufacturing-practice

www.efpia.eu/media/554521/efpia_pharmafigures_2020_web.pdf

www.epa.gov/sustainability/learn-about-sustainability#what

www.eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52015DC0614

www.financial-dictionary.thefreedictionary.com

www.globalreporting.org/about-gri

www.integratedreporting.org/profile/novo-nordisk-denmark-pharmaceuticals-biotechnology

www.investopedia.com/terms/b/blockbuster-drug.asp

www.investopedia.com/terms/c/corp-social-responsibility.asp

www.iso.org/standard/63787.html

www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/what-is-value-based-management

www.novonordisk.com/about/who-we-are

www.novonordisk.com/annual-report

www.reuters.com/companies/NVO/profile

www.sdgindex.org

www.sdgs.un.org/goals

www.spglobal.com/ratings/en/products-benefits/products/sustainable-finance

www.store.uni.com/catalogo/uni-en-iso-14001-2015

www.un.org/sustainabledevelopment/news/communications-material

www.unglobalcompact.org/take-action/leadership/gc-lead

www.unglobalcompact.org/what-is-gc/mission

www.unglobalcompact.org/participation/report/cop/create-and-submit/detail/6820

www.xenotech.com/blog/what-is-dmpk-and-how-does-it-fit-into-drug-development/

www2.deloitte.com/us/en/insights/industry/life-sciences/pharmaceutical-industry-trends.html