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The impact of Board's Gender Diversity for Innovation

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Abstract

This thesis investigates the impact of gender diversity on corporate boards and its connection to innovation. Through the method of comparative and descriptive analysis by the 50 most innovative companies and the S&P 500 index, the study aims to shed light on the role of gender diversity in fostering innovation within organizations. While previous research have yielded important results in theoretical terms, this study explores the practical analysis of data to prove the relationship between these two concepts.

The research methodology involves an examination of the theoretical links between the concepts of innovation and diversity of gender in order to connect them in a correlative evaluation. Further, it utilizes quantitative measures, including the Board of Directors composition in terms of gender diversity metrics and innovation rankings, to provide a comprehensive analysis of the link between these factors.

On the first step, the correlation between these two factors is proved through important researches that associate the connection between Innovation and Diversity of the Board, considering female board representation high associated with greater innovative success, and thus enhancing firm performance in innovation-intensive industries (Jie et al 2019), However, when assessing the 2022 data from companies in order to propose a comparison and descriptive analysis to prove the relationship between gender diversity of the board and innovation, we could verify that companies set as Innovative did not show higher levels of gender diversity of the board compared to the average. In other words, our hypothesis was refuted.

Furthermore, in order to enhance the research and also understanding the path of different companies in terms of diversity and inclusion actions, we could talk to two of the most important companies of Brazil. Both understand diversity and inclusion as one of the most important matters in terms of a company's future. The theme is common, since guaranteeing that you have in your workforce similarity to the society you are inserted in, is fundamental with the purpose of understanding the level of sustainability your business is set.

Finally, although it was not possible to prove the connection between innovation and gender diversity of the board through the chosen method, the implications of this research contribute to the ongoing discourse on gender diversity and innovation, emphasizing the importance of fostering diverse and inclusive corporate cultures.

Keywords: gender diversity, innovation, comparative analysis, Brazil, Portugal.

Resumo

Este estudo investiga o impacto da diversidade de gênero nos conselhos corporativos e sua conexão com a inovação. Por meio do método de análise comparativa e descritiva das 50 empresas mais inovadoras do Mundo em 2022 e do índice S&P 500, o estudo busca lançar luz sobre o papel da diversidade de gênero no fomento à inovação nas organizações. Embora pesquisas anteriores tenham produzido resultados importantes em termos teóricos, este estudo explora a análise prática dos dados para comprovar a relação entre esses dois conceitos.

A metodologia de pesquisa envolve um exame dos vínculos teóricos entre os conceitos de inovação e diversidade de gênero, a fim de conectá-los. Além disso, utiliza medidas quantitativas, incluindo a composição do Conselho de Administração em termos de métricas de diversidade de gênero e classificações de inovação, para fornecer a relação entre esses fatores.

No primeiro passo, a correlação entre esses dois fatores é comprovada por meio de importantes estudos importantes que conectam inovação e diversidade do conselho, considerando a representação feminina no conselho ao maior sucesso inovador, e, portanto, aprimorando o desempenho da empresa em setores intensivos em inovação (Jie et al, 2019). No entanto, ao avaliar os dados de 2022 das empresas, verificamos que as empresas consideradas inovadoras não apresentaram níveis mais altos de diversidade de gênero do conselho em comparação com a média. Em outras palavras, nossa hipótese foi refutada.

Além disso, para aprimorar a pesquisa e entender o caminho de diferentes empresas em termos de ações de diversidade e inclusão, pudemos conversar com duas das empresas mais importantes do Brasil. Ambas compreendem a diversidade e inclusão como uma das questões mais importantes para o futuro de uma empresa. O tema é comum, uma vez que garantir que você tenha na sua equipe de trabalho uma semelhança com a sociedade em que está inserido é fundamental para compreender o nível de sustentabilidade do seu negócio.

Por fim, embora não tenha sido possível comprovar a conexão entre inovação e diversidade de gênero do conselho por meio do método escolhido, as implicações desta pesquisa contribuem para o discurso contínuo sobre diversidade de gênero e inovação, enfatizando a importância de promover culturas corporativas diversas e inclusivas.

Keywords: Diversidade de Gênero, Inovação, Análise Comparativa, Brasil, Portugal

Index of Abbreviations and Acronyms

ABC	Santo André, São Bernardo & São Caetano
BCG	Boston Consulting Group
ESG	Environmental, Social and Corporate Governance
FIG	Figure
IBM	International Business Machines Corporation
R&D	Research & Development
S&P 500	Standard & Poor
S&P 500	Standard & Poor's 500 Companies
SEC	Security and Exchange Commission
SME	Small and Medium Sized Enterprises
TAB	Table
TMIC	The Most Innovative Companies
UN	United Nations
US	United States
WOB	Women on Board

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1. Research Introduction

1.1. Introduction

In a very competitive corporate environment, based on globalization and the impairment of physical boundaries, companies to evolve, and consolidate themselves in the market, are requested to deliver value to clients in a very rapid and innovative way. In this context, strategies are designed to promote this path. Innovation is a matter that can be taught, and many tips are already consolidated to help companies to promote it.

One of the recommendations to promote a more innovative and thus act as a performance lever, is to have diversified teams - in terms of gender, ethnicity and different life circumstances in general - in the workforce of the companies. Under this concept, the key to success implies the way they use the knowledge and backgrounds of their people and utilize them efficiently in order to provide new solutions of innovative products and services (Cardoso, et al., 2007).

As Thi-Thanh Phan and Hai-Chin Yu (2022) explain in their article "Innovation, institutional ownerships and board diversity", firms characterized by the presence of female directors, with a high representation within the audit committee, or a considerable proportion of directors from diverse groups have a strong and positive effect on innovation. These firms show a greater predisposition for investments in research and development (R&D) and consequently generate a higher number of patents. The study highlights for this consideration, the important role played by female directors. Overall, these factors contribute to the enhancement of innovative practices and outcomes in organizations.

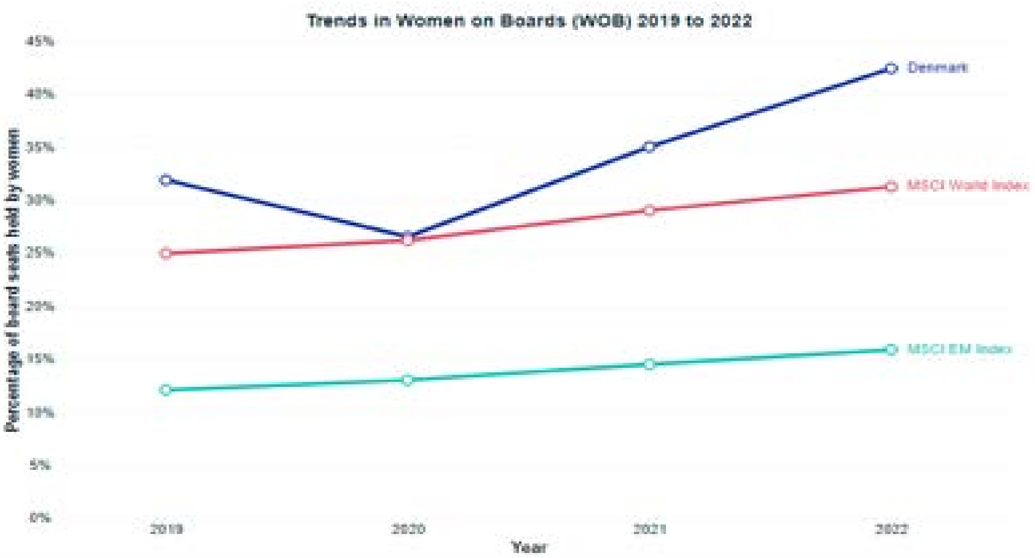
Going further than the practical dimension of number of patents or results, it is possible to understand how this condition is organized in a human aspect. When studying the diversity of teams linked to innovation, we can see that this conception connection can be set on the fact that when employees feel included, they will be more apt to share their ideas and express their creativity. In other words, when employee feel accepted and included by its authenticity, we will be able to have as a result, more innovative behavior among staff members, and consequently, this situation will lead to increased opportunities for firm's innovation (Lambert, 2016).

Innovation is an important matter, since it can indicate if a company is ready for the complexity of new markets and flows, and consequently, it can say a lot about how sustainable this enterprise business is. Consequently, the concept is an important aspect for an investor to choose where to capital injection (Phan, Chin Yu, 2022). Based on this investors interest, the importance of diversity for innovation is already a topic that is discussed and promoted, especially in the last two decades, and it is demonstrated as well when we see the push of shareholders in order to promote diversity during the last years through ESG strategies.

Beside the investment dimension, Innovation & Diversity can be considered a vast theme, which research efforts have been being targeted for some decades. As an example of this, a study of the beginning of 00's, already showed that in terms of board diversity the percentage of board seats held by women directors in Fortune 1000 firms more than doubled from 5.6% in 1990 to 12.3% in 1999 (apud Kang, Ding, Charoenwong, 2010) and the tendency of growth keeps reaching high levels year over year, as the market incentives iniciatives that encompasses the theme. However, it is important to salient the inequality of this growth throughout the world.

The difference between the tendency of diversity on board of companies was studied by Morgan Stanley (2022), and it confirms that emergent countries show a slower movement compared to the rest of the world. European countries are precursors in this tendency, being leaded by Denmark, as we can see on Figure 1:

Figure 1: Trends in Women on Boards (WOB) 2019 to 2022



Source: Morgan Stanley 2022

To link the new trend of pushing diversity to the boards to innovation indicators, we propose to analyze the impact of diversity in innovative companies, and if this can be linked to their level of innovation. Our hypothesis is that there is a connection between both indicators in a positive result.

In order to be assertive in terms of diversity, we have chosen to use as diversity indicator the level of gender diversity on the Director's Board of companies, once, based on the theory of Donald C. Hambrick and Phyllis A. Mason, through the study Upper Echelons: The Organization as a Reflection of Its Top Managers (1984), the characteristics of the company can be predicted by the Board participants particularities. In practice, executives in the upper echelons of firms act based on their personalized interpretation of the situations they face. These personalized constructions are a function of their experiences, values, and personalities. Consequently, how the boards are led to work together to execute their fiduciary responsibilities is reflected in the character of those at the helm of firms (Rexford, et al., 2020 Seijts et al., 2019).

1.2. Motivation

Rebeca Mario Martins, the author of this dissertation is a Brazilian Woman graduated in International Relations in the Federal University of ABC. Currently, she is in a Master's degree in Innovation and Technological Entrepreneurship in Porto University.

During her professional life, Rebeca has worked in the Brazilian Traditional Financial Market for almost six years and have faced some important challenges in terms of the lack of gender diversity in the environment that she works. After moving from the traditional banking market for the innovative fintech structures, she had the opportunity to see in practice how a diverse environment could interfere in her productivity and in the aim of the company to look for innovative and fast solutions.

Working in the business market, currently as a Manager of a team and specially as a woman, Rebeca also sees the lack of female presence in some situations that does not match with the composition of the society overall and thus understands the need of looking for alternatives to promote a different context and give strength to this movement that aims for attention and focus.

Living in an environment where woman and man have the exact same opportunities and duties, in a business where they are truly evaluated and paid without gender biases and consequently have the same prospects of growth, is the big goal for her, however it is noticeable that this change will not be sought if no effort will be put into it.

Although it is a battle that needs to be fought by many hands, Rebeca understands that in her role as a Master student and a manager of a team she has some tools to discuss the theme and consequently generate a change in some scale.

1.3. Objectives

Although promoting gender equality might be interpreted as a matter of pressing moral and a social issue, the theme is also a discussion in economics aspects. According to the World Economic Forum's Global Gender Gap Report 2020, in the United States, for example, the gender equality would only happen in 151 years (Forbes, 2020), if it is shocking taking in consideration the lack of female representativeness on Business Environment, it becomes more unbelievable if we add the information from McKinsey Global Institute (2015) that this disparity contributes for a unused economic potential that could add from USD12 tri to USD 28tri in the world economy.

Based on this, understanding the potential of the theme, a work that could prove the connection between Gender Diversity of Directors' Board and Innovation would add efforts and pushes to a tendency that had already started but needs more strength to gain velocity and provide same opportunities and space for both genders.

1.4. Structure of Dissertation

This project will be organized in two important parts. The first one is providing a background of concepts and historical studies that relate diversity to innovation, with the aim of explore previous studies that already exist and correlate in the theory these two indicators, and thus provide a robust basis for the research and paths we can follow with the aim of generating a fair study and results for our main question.

And the second that will be based on firming the rational of comparison between innovative companies to the average ones. Our choice of companies to analyze as "Innovative" was based on the Boston Consulting Group annual study, that could supply the list of The 50 Most Innovative Companies in 2022, (see the Figure 2 "BCG Most Innovative Companies, 2022), published in September, 2022, this study has been conducted by the agency for the last 16 years and present a robust strategy and methodology of comparison to provide the companies name that are considered innovative.

On the other hand, to have a basis of comparison, we have selected the index of S&P 500 – an important index that summarize the characteristics and performance behavior from 500 publicly traded companies in the United States and is widely used as benchmark for comparison in researches.

With the conduction of the research, our goal is to test the hypothesis that diversity brings innovation, through analyzing the level of diversity on the board of directors from innovative companies.

Figure 2. BCG Ranking Most Innovative Companies Report 2022

2. Concepts & Literature background

2.1. Introduction

On this chapter we are going to define the main concepts we intend to analyse in order to respond our research question and conduction.

Our aim is to connect in practice the concepts of company's innovation and gender diversity of the Board's Directors. Based on this, it is extremely important that we can understand the theoretical connection between both concepts and also build a robust academic structure as basis for its research performance.

Once there is a vast net content of previous academic authors that have already delved the theme and conducted numerous studies in order to provide us with guidance on where we can apply our efforts with the aim of conducting research and proving or refuting our main question "Can we say that more Gender Diversity of Board of Directors imply in Innovation for Companies?

2.2. Innovation

Performance of a company could be synthesized as a measurement system of the case company has fulfilled symbolic functions to signal strategic focus and to influence decision-making (Li et al 2009). In the beginning of 1900's, Schumpeter has exposed his idea of "innovation", relating the concept to the creation of an alternative in terms of costs or in increasement of demand from product or services (Schumpeter, 1934), based on this, it is not wrong to assume that innovation and Key Performance Indicators have been being related for almost a century of research.

Many studies suggest that company performance can be improved through product innovation (Charterina & Landeta, 2013) and there is a strong correlation between innovation quality and trade and industry performance (Suliyanto & Rahab, 2012; Sulistyo, 2016). Therefore, a company that is more oriented into generating innovation is more able to also improve its performance (Gerni, 2013) the quality of innovation also significantly affects performance (Azadehdel et al., 2013). Product innovation improves business performance (Charterina & Landeta, 2013). Proactive environmental innovation capability significantly affects company performance (Fong & Chang, 2012) (Sutapa et al., 2017).

Currently, the pursuit for innovation in order to leverage performance is being even more intense on Business environment, since the first acts as a self-reinforcing mechanism, which further boosts economic performance (Cainelli et al, 2006). This aim for innovation has been common not only in startups, but also in big companies, with the need of reinventing themselves to be able to keep on the competitive environment of new technologies and fast delivery results to the market, to increase the funding through investments.

With the passing of the years, it is becoming more and more important to be prepared to this competitive environment, once it requires that companies keep providing competitive advantage to grow and protect its long-term position in the market. Permatasari and Dhewanto (2013) discuss that the ability to create low-cost operations and differentiation create sustainable competitive advantage. Competitive advantage shows that companies can act better than competitors in the same industry (Sutapa et al., 2017), curiously, as Schumpeter had exposed in the beginning of 1900's, the method to promote this differentiation is through innovation, as cited above.

Another important example of the Innovation seek is the focus on team engagement. Manso (2010) shows that companies that reward employees for their results (through compensation plan, job security, and timely feedback on performance) are essential to motivate innovation. However, the engagement of the teams is not only conquered by financial rewards it is also a matter of workplace environment (Sowath et al., 2014), and when we talk about this theme, we find that diversity is not only a formidable competitive weapon as a differentiation (Ayega et al., 2018), but also a very important layer to develop critical-thinking, problem solving and employee professional skills (Cletus et al., 2018).

2.2.1. Boston Consulting Group's 50 Most Innovative Companies

The BCG's 50 Most Innovative Companies is a list, result from the research of the company in order to provide a ranking with the most renown enterprises that stand out when the subject is promoting Innovation.

The method of the agency to provide this ranking in 2022 was made by an analysis with more than 1.500 global innovation executives who were polled in December 2021 and January 2022. The Agency assesses a company's performance on four dimensions and then take an average of normalized scores to calculate its overall ranking. (Boston Consulting Group, 2022)

Based on the Report "Are you ready for Green?" by BCG (2022), the four dimensions of analysis are:

• Global Mindshare: the number of votes received from all global innovation executives.

• Industry Peer View: the number of votes received from executives in a company's own industry.

• Industry Disruption: The Diversity Index (Herfindahl-Hirschman) of votes across industries.

• Value Creation: total shareholder return, including share buybacks from December 31, 2018, through December 31, 2021 (three years).

2.2.2. S&P 500

This index aims to represent performance of a particular market, industry or segment of the economy—or even entire national economies. S&P index tracks nearly every asset class and business sector, from the U.S. corporate bond market to futures contracts for palladium. This is why the S&P 500 is often treated as a proxy for describing the overall health of the stock market or even the U.S. economy (Forbes, 2021).

The S&P 500 Index, which was initially created in March 1957, is the most commonly utilized benchmark for assessing the performance and characteristics of U.S.-based stocks with large capitalization. The index comprises 500 stocks, and it is regularly refreshed; approximately 20 new firms that fulfill the market value, earnings, and liquidity criteria of the Standard & Poor's Corporation are added annually, while a corresponding number are removed due to not meeting these standards or being terminated by mergers or other corporate events. (Siegel et al., 2006).

2.3. Innovation & Diversity

Other important layers to be considered are the level of productivity and commitment of teams, since they are two important pieces to lead to high performance. Creating an environment of diversity acceptance and valorisation of uniqueness is also an important aspect in terms of performance indicators and it there are increasement in productivity through leveraging unique perspectives and innovative ideas, increased morale thanks to higher levels of employee engagement (Calcetas, et al., 2021).

However, the importance of diversity for a company goes further than only the employee engagement, acceptance, and culture valorisation. Studies suggest that a team composed by individuals from different backgrounds can develop especially valuable and unique ideas as creativity thrives on diversity (Robinson et al., 2015). Robinson and Stubberud (2015) indicate in their research that diversity is a key element in successful innovation. And this conclusion is not restricted for a specific size of company, since they suggest that despite Small and Medium Sized Enterprises (SMEs) have fewer employees than large businesses, strategic hiring and sharing of ideas among people with different backgrounds could lead to improved innovation efforts.

Being "creativity" and "innovation", along with "risk-taking" and "proactiveness", essential elements in an entrepreneurial orientation, it is fundamental to include methods of finding them on a day-to-day basis (Robinson et al., 2015). Based on this, Basset-Jones (2005) argues that diversity is a recognizable source of creativity and innovation that can provide a basis for competitive advantage.

It is important to mention the connection between creativity and innovation since both concepts go hand-in-hand like two sides of a coin. While creativity provides the idea, innovation turns the idea into reality. Without the idea, there is no innovation, but without innovation, the idea goes nowhere (Robinson et al., 2015).

2.3.1. Gender Diversity

Over the past decades, gender diversity has increasingly been embraced and encouraged by many public and private organizations (Hillman *et al.*, 2002; Smith *et al.*, 2006) (Nalongded et al., 2019). The concept of diversity in workforce has been receiving a special attention, because taking in consideration the complexity of the world, being able to promote and stimulate the interaction between different people is fundamental. Getting to the experience's exchange is the basis to create an environment of dialogue, inclusivity postures and thus flexibility and creativity, and consequently allowing new visions about different possibilities of growth (Cardoso, et al. 2007). Also, social heterogeneity allows agents to leverage the benefits of diversity and to develop technologies of higher complexity (Ryckebusch, et al., 2022).

As a prove of diversity of gender and employee productivity, Nalongded, Muhammad and Kavoos (2019) research has shown that advocating for gender equality is not merely a fairness issue, but a benefit for organizations. Gender-diverse teams create a rich workplace environment by providing varying perspectives that help address complex problems, enhance the decision-making process, and subsequently lead to innovation and improved company performance (Santos, et al 2022).

However, when we take into practice and what companies do to this theme, it is noticeable that there are different motivations behind improving women's representation in leadership positions. For instance, in some countries the laws and regulations require organisations to embrace gender diversity. In some cases, legally mandated quotas have been introduced in countries such as Norway (Seierstad, 2016 apud Nalongded et al., 2019). However, society has been pushing the companies in order to see movements besides what is mandatory by law (Nalongded et al., 2019).

When dealing with board levels, the gender diversity has been promoted and claimed, especially in the last few years, where the diversity of companies is a theme to be discussed and requested to Share Holders fund decisions. This tendency is not groundless, the literature on group diversity suggests that diversity has a positive association with firm performance since group diversity not only increases the pool of knowledge where group decisions are made but also facilitates innovation and creativity (apud Kang et al., 2010).

Deszo and Ross (2010), bring in their study that after analyzing 15 years of panel data on the top management teams of the S&P 1,500 firms, it is possible to correlate that female board representation improves the performance of companies that are focused on innovation strategies. On the other hand, a review of the literature suggests that increasing gender diversity in corporate boards by appointing women directors can improve the ability of boards to discharge their control and strategic roles (Kang et al, 2010).

In terms of board diversity, according to fin Jie Chen, Woon Sau Leung, and Kevin P. Evans (2018), their research provides compelling evidence that female board representation is strongly linked to increased innovative success, thereby enhancing firm performance in industries that prioritize innovation. The authors discovered that companies with female directors exhibit a greater inclination to invest in innovation, resulting in a higher number of patents and citations relative to their R&D expenditures. Specifically, their analysis indicates that a 10 percentage point increase in the tenure-weighted fraction of female directors corresponds to approximately 6% more patents and 7% more citations.

Further examination of the underlying mechanisms revealed that the positive association between female board representation and corporate innovation is particularly pronounced in contexts characterized by lower product market competition and higher managerial entrenchment. These findings align with the notion that female directors' enhanced monitoring capabilities improve managerial incentives for innovation. Additionally, the researchers found that the positive impact of female board representation on firm performance was discernible exclusively in firms that place significant emphasis on innovation and creativity (Chen et al., 2018).

2.3.2. The pursuit for gender diversity in companies.

When we talk about the pursuit for gender diversity for companies, we also bring to the light an important aspect, the ESG practices. The abbreviation is related to the mark of companies when the terms of reputation, credibility and sustainable responsibility are discussed. The term was first discussed in the beginning of 2000's by UN Global Impact and it suggests that companies that are in accordance with these lines, is a company that understands how its impacts in society can be positive and negative, and also act about them, in order to minimize the negative aspects and potentialize the positive ones, as well as equate the previous damages.

The ESG subject is getting higher importance, since it has been a prior layer to be taken into consideration in order to define fund allocating from investors. This priority has become a tool for them to indicate how much sustainable a company presents itself and thus bring important benefits in terms of higher return and also lower risks (Sherwood et al., 2018).

Understanding the importance of ESG pressure to promote equality in society, we recognize the need that the movement goes further the role of investors and shareholders. As a matter that connects society and business performance through innovation, it is essential that there are regulatory agencies that promote and rule it.

We can already observe results on this step, as we can see through the increasement of 5% for women on S&P 500 boards - an international index that represents the performance of 500 large publicly traded companies in the United States - in 2022 vs the previous year. These advances for women on boards were also spurred by calls for reform after the allegations of harassment and abuse of power by men exposed in the #MeToo movement of 2017. That same year State Street Global Advisors launched the "Fearless Girl" campaign, prompting large institutional investors to vote against directors at companies that lacked women on their boards. That pressure, coupled with a California state law that set quotas for women, pushed gains for several years (Bloomberg, 2023).

Another example of this pressure for gender diversity, we can citate the Security and Exchange Commission (SEC), the regulatory agency of market capitals in the United States of America, which, in 2021 had approved a proposal from National Association of Securities Dealers Automated Quotations (NASDAQ) which demands that all listed companies of its stock market have at least one woman and other member from a minority underrepresented, included in their board directors.

An important example of this process is I.B.M. which has been recognized for its commitment to policies that offer and deliver more gender equality on work force. One of them is "Women in Technology" initiative, which focuses on advancing women's careers in the technology field, historical and known by the strong association with men and underrepresentation of woman (Silva et al, 2023). The company also offers flexible work arrangements, leadership development programs for women, and mentoring opportunities to support gender diversity in its workforce.

The Food Delivery App in Brazil, iFood, was considered in 2022 the most innovative company of Brazil and the 6^{th} of Latin America (Fast Company, 2022), created in 2011, today, iFood launches in 2023 delivering more than 65 million of orders per month (iFood Portal, 2023) and acting not only in the business of food delivery but also in banking with a digital account for Restaurants of its platform.

Talking to Viviane Santos, (personal communication, April 14, 2023) one of the responsible players in the company in order to generate diversity and inclusion, we can understand how the theme is taken very seriously there "We understand iFood as a social ecosystem and thus, we have to assume this responsibility as part of this environment". Viviane explained the most important pillars that organize the importance of this field for the company. They are:

1. Having the awareness that it is important to see in your workforce a representation of your target market. Example: Brazilian population is composed by 51% of woman and 56% of black people, not seeing this part of citizens as workforce brings difficulties to see them as clients. And this statement is based on two factors:
    a. It is fundamental to deeply understand and connect to the clients in order to be possible to diagnose potential pains and wills and thus generate genuine value as a company to the client.
    b. Providing income to this population is another important aspect to be brought to light once it is important to have a target market with financial strength in order to consume your product or service.
2. The will pursuing diversity as a matter of moral and ethics.

Today, iFood has as a goal, the intention to reach by 2025 at least 50% of leaderships roles. In terms of board directors, iFood presents 20% of gender diversity (iFood, 2023).

Also in Brazil, with almost a century of history, the company B (personal communication, April 27, 2023) owns tens of thousands of employees and represents one of the biggest brands in the country for its segment. With regards to gender diversity, Company B has established a set of ambitious objectives aimed at fostering gender equality within its workforce. During a conversation with a specialist regarding the company's agenda, she explained that these goals assume paramount significance, particularly when considering the vast diversity present within the surrounding society in which the company operates. Consequently, it becomes imperative to reflect this diversity within the company's workforce, as it can effectively translate into the enterprise's long-term sustainability and competitive advantage. Furthermore, recognizing the potential inherent in the company also signifies a commitment to social responsiveness and effecting positive societal transformation through the promotion of diversity and inclusion.

Besides the moral aspect, as mentioned above, the specialist from Company B has also provided how intense and needed is this concern in order to understand the decision and pushes from Shareholders over the theme, once they are becoming more attentive on ESG aspects that also demonstrate how the company operates, how it is ready to deal with the complexity of the market and thus provide return for the investor.

The agenda is implemented through the implementation of affirmative hiring processes and internal courses within the organization. These measures are designed to ensure that diversity not only becomes integrated within the workforce but also remains a sustained presence within the company.

Besides the fact that the theme is important to Company B, it is important to mention that as much as the unicorn startup iFood, the traditional and centenarian Company B, also do not have any indicators in their following routine that links innovation to diversity. In other words, today this connection is not seen as the main reason why aiming for innovation in companies.

This chapter has discussed along the themes of innovation, performance, diversity and creativity how the theme we are going to analyze is already a matter of importance for business and entrepreneurs around the world.

Hence, the next step is to analyse in practical aspects if we can connect the concepts we have exposed above through literature. Therefore, we will focus on diversity of gender of the board of directors from the listed companies mentioned above (see Figure 1. BCG Ranking Most Innovative Companies Report 2022). The reason of choice to discuss about Board Diversity is stated on the theory of Donald C. Hambrick and Phyllis A. Mason, through the study Upper Echelons: The Organization as a Reflection of Its Top Managers (1984) that points that the characteristics of the company can be predicted by the Board participants particularities. In practice, executives in the upper echelons of firms act based on their personalized interpretation of the situations they face. These personalized constructions are a function of their experiences, values, and personalities. Consequently, how the boards are led to work together to execute their fiduciary responsibilities is reflected in the character of those at the helm of firms (Rexford, et al., 2020 Seijts et al., 2019).

It is important to understand if we can connect in practice all these companies that belong to different industries to these concepts of diversity and innovation indicators. How are they inserted in this environment and if all of them can be linked to what we have started to discuss.

3. Methodology

3.1. Introduction

In this chapter we present the methodology that was chosen to address the research goals and thus provide the answer to the research question we have proposed ourselves to respond. This choice of methodology serves as a roadmap for the process of researching and consequently it outlines the approach, data collection methods and techniques that was used to offer the best path to comprehend and discuss the hypothesis.

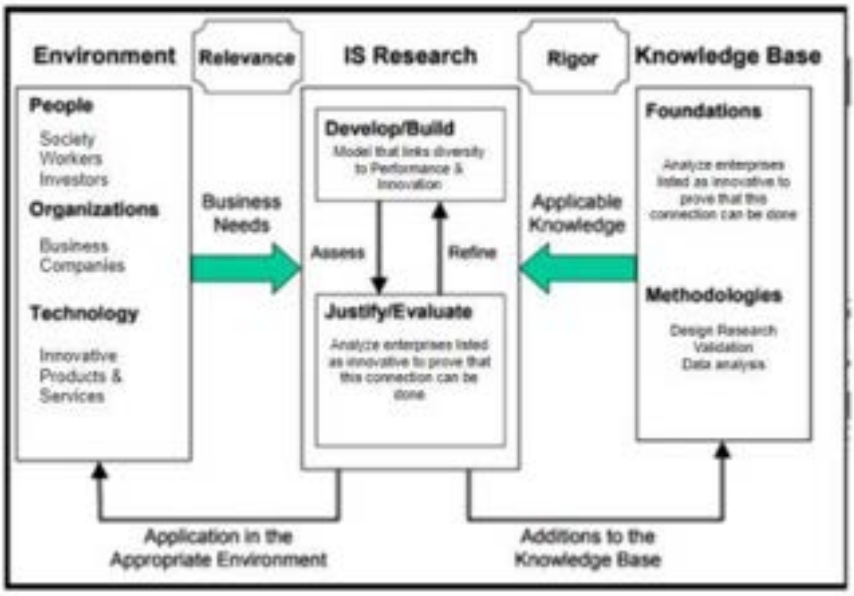
3.2. Preliminary Background

The objective of this research is to understand if any connection between innovation and diversity of gender on the board of directors is there. In other words, our hypothesis is that companies with more diversity of the board bring more innovation to their results. The research was conducted by two biases: the qualitative and quantitative analysis.

Through the literature review, it was possible to understand the connection between innovation and diversity, how and why companies are being pushed to bring diversity and inclusion in their routines, whether by investments pushes – as we could understand through the ESG policies – or other layers, such as better analyzing the pain of clients and thus delivering the right and innovative solution.

However, it is important to understand if we can connect, in a practical aspect, beside the inherent literature, innovative companies to diversity of the boards. To help us on this challenge, we decided to analyze the 50 most innovative companies in 2022 by Boston Consulting Group such as their board characteristics and compare them with the average of S&P 500 Board, the index that exposes the characteristics as well as the performance of 500 large publicly traded companies in the United States and help us on quantify and analyze the aspects in a fair and comparable method.

Figure 3. Design Science Approach



3.3. Methods of Data Collection

For collecting data, we have chosen to use the Secondary Data Analysis method, in other words, we have used data that was already developed through other organs and connected them to answer our hypothesis: There is impact on Innovation through the increasement of gender diversification of the Directors' Board.

Based on this, we have analyzed the companies rated by Boston Consulting Group as the 50 Most Innovative Companies in 2022 (BCG, 2023), they are: Apple, Microsoft, Amazon, Alphabet, Tesla, Samsung, Moderna, Huawei, Sony, IBM, Meta, Nike, Walmart, Dell, Nividia, LG, Target, Pfizer, Oracle, Siemens, Toyota, Alibaba, HP, Lenovo, Zalando, Bosch, Johnson & Johnson, Cisco, General Electric, Jingdong, Xiaomi, eBay, Hyundai, P&G, Adidas, Coca-cola, 3M, PepsiCo, Hitachi, SAP, Tencent, General Motors, Ford, Intel, ByteDance, Panasonic, Philips, Mitsubishi, Nestle and Unilever.

To enrich the analysis, we have conducted a research based on data provided by each of the private organizations. In other words, through the Annual Report of companies and the official Websites, we could access the composition of Directors' Board from each of the 50 companies to conduct the analysis.

Since the list above is represented by companies from different business segments, we also add the line of sector characteristics for the Innovative Companies, data collected through the Private Organization Bloomberg.

After the base enrichment with the main information, we have selected the comparable index to conduct our next steps. For this stage, we have selected S&P 500 Companies. The list is developed by Standard & Poor's Financial Services LLC (S&P), an private agency of risk classification.

Through the same agency, we could also include information of Gender Diversity on Board Companies for the 500 companies analyzed as comparative and also the composition of sectors for the same enterprises, in order to quantify and make it comparable the two different information: the list of 50 Most Innovative Companies (2022) and the S&P 500 (2022).

3.4. Methods of Data Analysis

The chosen method of Data Analysis was the Descriptive Analysis, since this method can provide a comprehensive and informative overall in terms of data, empowering us to verify and understand characteristics, patterns, insights and consequently provide a robust basis for answering our research question.

In other words, we have selected the indicators we would like to analyze and summarize them in order to provide the general and segmented means of companies both from BCG's Most Innovative Companies and the S&P 500. With this data, it was possible to compare the data and try to find a tendency of behavior in an effort to determine if is there any correlation between the two concepts we have discussed through theoretical tools and we want to confirm through practice aspects.

3.5. Research Limitations

The limitations of the research are based on two important factors:

1. We have selected a benchmark list of companies to be characterized as Innovative. Despite the strong method of definition and the credibility of the Private Consulting Agency that has developed the segmentation, we were not able to analyze a longer list of companies to use it as comparison. In other words, we have decided to analyze through the lens of a organization and consequently the limitations and biases that the consulting agency might have had during the work.

2. As an important comparison tool, extensively used through researches over the years, we have selected S&P 500 as the list to be used as a picture of the characteristics for companies in general. In other words, we are going to use the 500 companies listed to provide and

make it possible the comparison between innovative companies and the whole average of companies. Consequently, defining if we can prove the hypothesis we would like to test, is based on the behavior of the 500 companies of S&P. However, we understand that decision brings some limitations to the study, since it represents the characteristics of largest publicly traded companies in the United States based on market capitalization and not the characteristics of the whole world enterprises.

3. Finally the last limitation encompasses the fact that we could not analyze the structure and details of composition and acting of teams from each company we have analyzed. Thus, the analysis we have conducted is limited to the composition of the board and not how the composition of the board provides different dimensions into the structure of the workforce.

4. Data Analysis

4.1. Introduction

In this chapter, we are going to analyze the data collected from each of the 50 most innovative companies in 2022, listed by BCG and compare them with the S&P 500 index list. Based on Descriptive analysis, we suggest that it will be possible to compare and understand if the literature we have researched can be verified in practice, in other words, we are going to validate if Diversity of Gender also suggests a higher level of innovation in companies.

4.2. Main Data

To analyze the data, we have selected the Descriptive Analysis. Thus, evaluating the listed companies by Boston Consulting Group as the 50 most innovative of the world in 2022 and selecting through the annual report of each one how the board of directors was composed by gender – WOB in the same period (Table 1)

Table 1. The 50 Most Innovative Companies in 2022

#	Name	% WOB	Bloomberg Sector	Origin Country
1	Apple	27,78%	Technology	U.S.
2	Microsoft	41,67%	Technology	U.S.
3	Amazon	45,45%	Consumer Discretionary	U.S.
4	Alphabet	27,27%	Communications	U.S.
5	Tesla	25,00%	Consumer Discretionary	U.S.
6	Samsung	22,22%	Technology	South Korea
7	Moderna	30,00%	Health Care	U.S.
8	Huawei	11,76%	Technology	China
9	Sony	40,00%	Technology	Japan
10	IBM	16,67%	Technology	U.S.
11	Meta	44,44%	Communications	U.S.
12	Nike	30,77%	Consumer Discretionary	U.S.

#	Name	% WOB	Bloomberg Sector	Origin Country
13	Walmart	27,27%	Consumer Staples	U.S.
14	Dell	25,00%	Technology	U.S.
15	Nvidia	23,08%	Technology	U.S.
16	LG	28,57%	Technology	South Korea
17	Target	38,46%	Consumer Staples	U.S.
18	Pfizer	33,33%	Health Care	U.S.
19	Oracle	33,33%	Technology	U.S.
20	Siemens	20,00%	Industrials	Germany
21	Toyota	10,00%	Consumer Discretionary	Japan
22	Alibaba	30,00%	Consumer Discretionary	China
23	HP	46,15%	Technology	U.S.
24	Lenovo	18,18%	Technology	China
25	Zalando	40,00%	Consumer Discretionary	Germany
26	Bosch	30,00%	Consumer Discretionary	Germany
27	Johnson&Johnson	41,67%	Health Care	U.S.
28	Cisco	45,45%	Technology	U.S.
29	General Electric	33,33%	Industrials	U.S.
30	Jingdong	28,57%	Consumer Discretionary	China
31	Xiaomi	0,00%	Technology	China
32	eBay	40,00%	Consumer Discretionary	U.S.
33	Hyundai	15,38%	Consumer Discretionary	South Korea
34	P&G	46,15%	Consumer Staples	U.S.
35	Adidas	28,57%	Consumer Discretionary	Germany
36	Coca-cola	50,00%	Consumer Staples	U.S.

#	Name	% WOB	Bloomberg Sector	Origin Country
37	3M	38,46%	Industrials	U.S.
38	PepsiCo	33,33%	Consumer Staples	U.S.
39	Hitachi	16,67%	Industrials	Japan
40	S.A.P.	28,57%	Technology	Germany
41	Tencent	22,22%	Communications	China
42	General Motors	53,85%	Consumer Discretionary	U.S.
43	Ford	28,57%	Consumer Discretionary	U.S.
44	Intel	41,67%	Technology	U.S.
45	ByteDance	0,00%	Communications	China
46	Panasonic	16,67%	Technology	Japan
47	Philips	23,08%	Consumer Discretionary	Netherlands
48	Mitsubishi	15,38%	Consumer Discretionary	Japan
49	Nestlé	33,33%	Consumer Staples	Switzerland
50	Unilever	20,00%	Consumer Staples	England

4.3. Data Analysis

After this process it was necessary to compare this tendency of Board Gender Diversity in innovative companies with others, not selected as the most innovative ones, this comparison was made through the Index by S&P 500, as mentioned before, the list that brings the characteristics of the largest publicly traded companies in the United States based on market capitalization.

Summarizing the data from Bloomberg of S&P 500 Boards (2023), we got the result of 32% of the Board of Directors from the 500 enterprises are filled by women. Through this indicator, we could notice that the average of woman on board for the list of The Most Innovative Companies (TMIC) in 2022 by BCG is lower than the exposed by the benchmark index. (Table 2), since the TMIC shows 9% less women in their Directors' Board than the 500 listed companies of S&P.

Table 2. The Comparative of Gender Diversity of the Boards: S&P 500 Board 2022 vs The Most Innovative Companies in 2022 for BCG

Index	**% of Woman on the Board**
2022 - S&P 500 Board	32%
2022 – TMIC Board by BCG	29%

As follows, based on this descriptive and general comparison, we cannot prove that diversity of gender might suggest more innovation in companies, since the selected as the most innovative ones, present a lower gender diversity composition of the board rather than the others.

However, we must take into consideration the difference between the composition of sectors from companies of S&P 500 Board and TMIC Board by BCG. (Figure 2 and Figure 3). In other words, to fairly compare data, we must assure that we are comparing two similar objects.

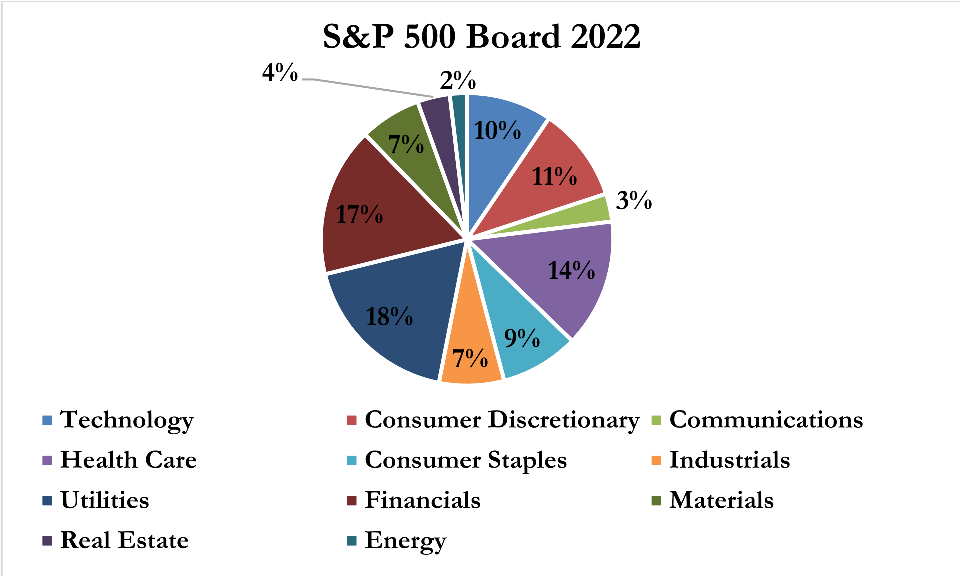
To overcome this possible doubt, we could delve into the data and characteristics of each company from BCG's TMIC and the S&P 500, in order to segment the information and be able to fairly bring the data to comparison.

As analyzed, the sectors among the S&P 500 Board are more expansive, since it embraces companies from sectors such as Utilities, Financials, Materials, Real Estate and Energy, that curiously, are not covered from the The 50 Most Innovative Companies in 2022 by BCG.

Based on this, we can suggest that we might have differences of board composition by sector and our hypothesis of connecting Gender Diversity of the Board and Innovation can be better unveiled if we delve into the specificities related to the segments that these companies can bring in their composition.

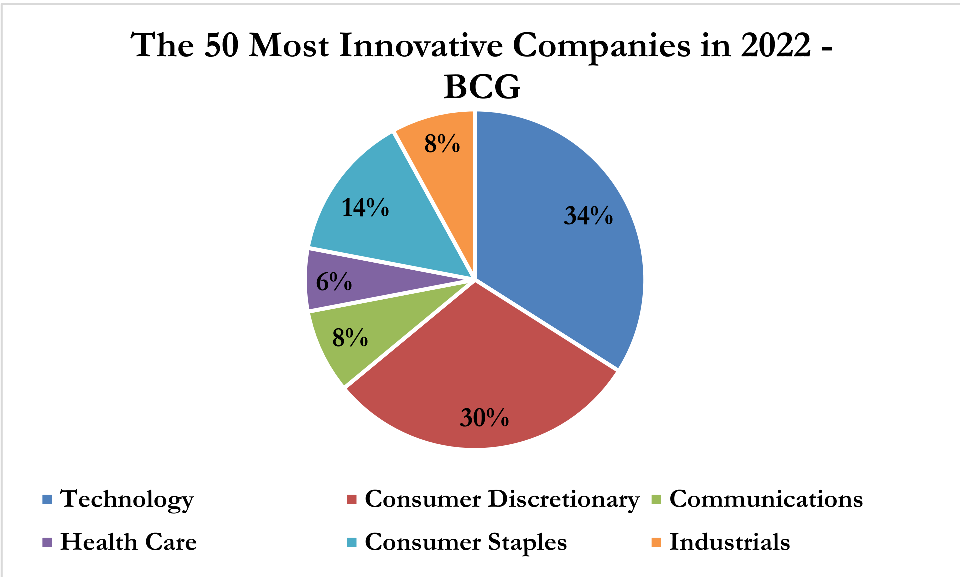
As a result of this evaluation we could analyze different compositions of segments for both lists that are represented on Figure 4 and Figure 5.

Figure 4: Sectors of S&P 500 Board



Source: S&P 500 Board 2022

Figure 5: Sectors of The Most Innovative Companies in 2022 by BCG

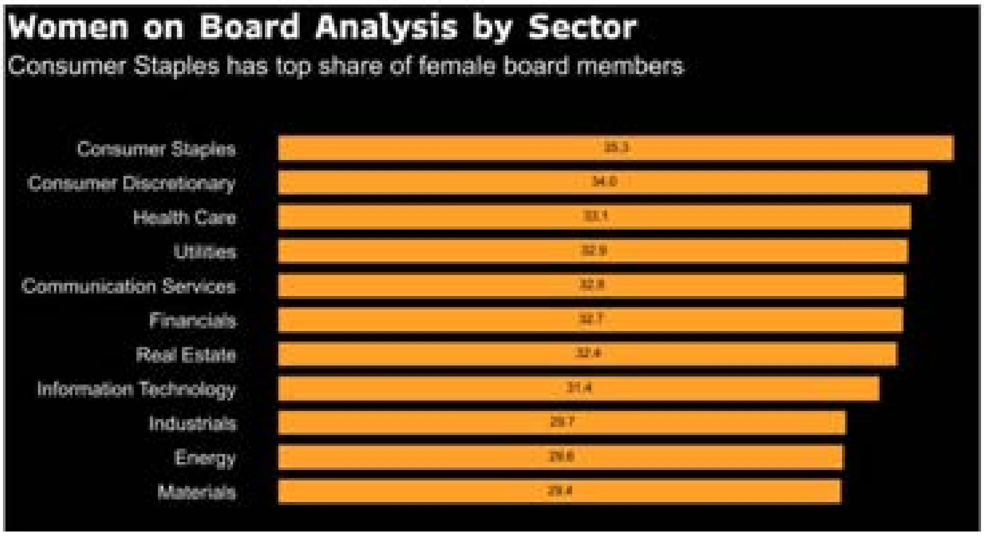


Source: Composition of Sectors by Bloomberg S&P 500 Board 2022

Analyzing the two graphics above, we can verify that the S&P 500 board index encompasses more segments than the ones represented on BCG's The 50 Most Innovative Companies in 2022, such as "Utilities", "Real Estate", "Financials" or even "Energy". Thus, it is noticeable that different segments might have differences in their compositions as well.

Consequently, analyzing the indicators through a segment lens, considering this different characteristics, it is necessary to measure and compare companies from similar sectors to fairly determine if Gender Diversity of Board is higher in Innovative Companies rather than the general of S&P 500. Bloomberg (2022) has studied these differences by segment of their index in order to understand the behaviors over this dimension and as a result, it is clear that segment operates a significantly indicative when we want to define characteristics of companies. See Figure 6.

Figure 6: S&P 500 - Woman on Board Analysis by Sector



Source: Bloomberg S&P 500 Board 2022

Thus, evaluating and comparing the indicators based on segments, we adopt a perspective of analysis that is possible to delete from our result possible outliers companies that might promote a missunderstanding of the real potential of the comparison, guaranteeing a fairer result and a potential discussion of segments throughout the analysis.

Dividing by sectors we have analyzed different results as presented on tables below:

Table 3. Gender Diversity of the Board by Sectors Comparison:

Sectors	**BCG's TMIC '22**	**S&P 500**
Communications	23,5%	32,8%
Consumer Discretionary	29,6%	34,0%
Consumer Staples	35,5%	35,3%
Health Care	35,0%	33,1%
Industrials	27,1%	29,7%
Technology	27,5%	31,4%

Based on the comparison from segments, we can conclude we have divergence between segments that must be taken into consideration. While the segments of Communications, Consumer Discretionary, Industrials and Technology have showed themselves in average 20% below in gender diversity of the board for innovative companies compared to the 500 listed companies of S&P – being Communication the segment with higher divergence: almost 40% of difference - the segments of Consumer Staples and Health Care have demonstrated a higher proportion of gender diversity on board from innovative companies rather than the same comparable list (see Table 4 for the detailed delta of difference between TMIC and S&P 500 by segment).

Table 4. The Difference between BCG's TMIC and S&P 500:

Sectors	**Delta**
Communications	-39,6%
Consumer Discretionary	-14,9%
Consumer Staples	+0,6%
Health Care	+5,4%
Industrials	-9,6%
Technology	-14,2%

Thus, even when we analyze the full lists comparison or by segmentate definition, we cannot prove through the method of Descriptive Analysis of the collected data that companies considered innovative presents more gender diversity of the Directors' Board. In other words, we can say that our hypothesis is refuted by this research, once the finding is not consistent with the initial assumption.

This result can be explained through the finding of Ordaz et. Al, 2005, that we can connect diversity on board of directors to innovation only in cases where there is a context of strategic consensus in the management team, in other words, the rationale behind this developing perspective stems from the recognition that organizational outcomes are influenced not only by top management team characteristics, but also by the processes taking place within it. Therefore, factors such as consensus, communication, and the pursuit of agreement can potentially alter the direct relationship that was initially established between Board characteristics and organizational decisions or outcomes (Carmelo-Ordaz et al., 2005).

Regarding these inherent limitations from the research scope, through the conduction of the study it was not possible to comprehensively delve into the details and structures of each company by BCG's list which we have analyzed in order to propose the link between the two concepts. Thus, the conclusion of a profound understanding of how these factors are integrated into their teams and routines is not possible to be provided through our investigation. Consequently, the understanding of the impact of Board characteristics on Innovation would substantially benefit from taking into account the board's influence on the broader organizational structure. In terms of next steps and possible opportunities to get the study strengthened, we suggest that an approach into each company in order to deeply understand the routines and teams organizations, would provide a more robust result and higher definition of how these two concepts of gender diversity and innovation can be interlinked and correlated.

5. Conclusions

In conclusion, through the literature it was possible to associate the connection between Innovation and Diversity of the Board, considering female board representation high associated with greater innovative success, and thus enhancing firm performance in innovation-intensive industries (Jie et al 2019). However, we could not verify this perspective when we analyze the 50 Most Innovative Companies listed by Boston Consulting Group in 2022.

The refutation of our hypothesis came when we analyze the global average of both selected indexes, when we had as result that Innovative companies present 9% less women on Board Composition than others and also in a segmented perspective, when 67% of the segments show a lower composition of women on Board of Innovative companies.

Although the sectors of Health Care and Consumer Staples from Innovative Companies present a higher proportion of female board than the comparable index (Health Care presents 5,4% more woman on Board than the average and Consumer Staples 0,4% higher), we have concluded that connecting these two concepts to prove Innovation from Diversity of the Board is not possible, since the other 4 sectors have demonstrated a lower diversity for Innovative Companies..

A reason for having this conclusion although all the theoretical studies conduction that link Gender Diversity of the board and Innovation, is that organizational results are shaped not solely by the characteristics of the top management team but also by the dynamics and processes occurring within the team itself, and thus, connecting only the two factors isolated is not possible.

However, it is important to mention that based in a world where 49,5% of population is composed by woman, it is insufficient when we analyze a rate of 32% of female composition on Directors' Board from S&P 500 (Bloomberg, 2023) and 29% among Innovative Companies with extreme power such as Apple, Microsoft and Amazon.

Even though we were not able to provide strength in terms of this scope of analysis to promote the aim for equity in gender diversity on business enterprises, we understand that companies are already seeking for promoting this reflection of society composition into their workforce, such as the case of iFood and Company B (that asked to not have its name published). These companies do not have a link between innovation and gender diversity in their routines, however they already put efforts in order to support diversity and inclusion among their employees, in order to ensure strong ESG indicators and, consequently, attract investments, as well as to address moral and social aspects such as the need to see themselves as actors capable of changing the gender inequality system we currently observe.

This result proves that even though the connection between Gender Diversity and Innovation is not clear for a general overview descriptive analysis, the need of continuing actions in the business environment are needed to promote more equity and diversity in companies, in order to provide more equivalence between the enterprises workforce and the composition of society.

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