Open Business Models and the Diplomacy of Innovation: What do companies have to develop?

SUMMARY

In the form of a theoretical essay, this article has the purpose of discussing what companies should develop from the perspective of the open business model and innovation diplomacy. Companies support the economic growth of the market and, more specifically, by the way, innovation is generated by scientific and technological development. In this context, diplomacy can be revealed by soft power, by the convergence of the triple and/or quadruple helix, and by the promotion of partnerships and expansion of open business models. This essay presents some variations and examples of open business models. Through the multidisciplinary approach of open business models and innovation diplomacy, was sought to combine and extract constructs, which allowed the development of a scheme that proposes the interaction and integration to be developed by companies, regarding their performance in models of open businesses, whose sectors must strive to strengthen and establish the diplomatic approach, based on the complexity of interactions promoted by science, technology, innovation, management, sustainability, and resources. It is suggested that this work be empirically evaluated through the developed scheme to identify the impacts of interaction, integration, and diplomacy reaching communities as a possibility of practical and innovative understanding in open business models.

Keywords: Open Business Models. Innovation Diplomacy. Organizations.

1 INTRODUCTION

The economic development of countries is increasingly based on scientific and technological development through innovation, so much so that the success attributed to many companies can be supported by invested and dedicated innovation (Tidd & Bessant, 2015), which can justify countries like the United States and China to promote "innovation as the central axis of their strategies to resume growth after the crisis of 2008" (MCTI, 2020).

Innovation ecosystems are characterized by an open, continuous, dynamic business model (Rabelo & Bernus, 2015), whose knowledge networks are guided by interaction (Nunes, 2019). In this sense, the Triple Helix innovation model stands out, which has greatly influenced the interactions between academia, companies and government in promoting and encouraging innovation (Etzkowitz & Zhou, 2017; Mineiro, Vieira, Castro, Brito, 2018).

By Quadruple Helix, this model was expanded with the inclusion of "society" in this triad academia-business-government, to achieve significant results in a technological, sociological, and economic context with co-creative and collaborative approaches (Hubavenska, 2018), which the representation of people in open innovation ecosystems

has been fostered by contributions and common actions in society, including examples of projects such as smart cities (OECD, 2011).

Considering that global competitiveness has increasingly demanded and fostered innovation in conducting business, mechanisms have been promoted by the regional economy, inserting this innovation in the market through experiments and prototypes (Gibson, 2011). In geographic aspects, technology has allowed access to a global scale and advanced knowledge has been an engine for the globalization of R&D (Leijten, 2017).

The need to establish a global relationship has also required companies, a true foreign policy and diplomatic knowledge to strategically manage their influence in countries so that they can achieve a "social license to operate", in addition to providing favorable business environments for society (Alammar & Pauleen, 2016; Egea, Parra-Meroño & Wandosell, 2020).

In this respect, companies have an important role to play in policies and deserve due attention for business diplomacy (van Willigen, 2020) in an increasingly virtual and connected market that has given enormous power to multinational organizations.

Although they don't have military power, companies have voluptuous economic resources, considering the change of actors and their objectives in world politics (Nye, 2004). An example of this is the company Apple, whose value is estimated at US $ 1.3 trillion, equivalent to the gross domestic product of 95 countries.

With the advent of new paradigms in the business environment and in world politics, these have affected the way power is developed and distributed among companies and the market. Based on innovation, companies are increasingly interconnected and co-creation ventures demonstrate a potential way of developing 'soft power', a competence required in relationships, such as Apple and Google, which cooperated with each other in creating contact tracking technology to combat COVID-19 (Brandenburge & Nalebuff, 2021).

Diplomacy is the art and practice of conducting negotiations between representatives, groups, and states (Carayannis & Campbell, 2011) and the relevance of this theme is based on the quest to broaden the vision of the practicality of innovation diplomacy, adding a greater understanding of complexity and the strategy in capturing pecuniary benefits in the form of private, public or hybrid goods.

Considering the existing theoretical gap in national and foreign production, in relation to the trade-off of open business models and innovation diplomacy, the objective of this theoretical essay is understanding the connections between the elements of the quadruple helix, to identify new constructs, not limited to existing ones, with the following question: how can companies develop and expand innovation diplomacy through open business models?

The relevance of this theme is based on the search to broaden the vision of the practicality of innovation diplomacy, adding a greater understanding of complex natures and strategy in the business context.

To achieve the proposed objective, this work is divided into five sections. Highlighting this introduction, in section two the open business models, the dynamics of "innovative helix", innovation ecosystems and diplomacy are exposed. Section three presents the methodological procedure adopted. Section four presents a scheme linking the multidisciplinary approach of open business models and innovation diplomacy is proposed. Finally, in section five, the final considerations are presented.

2 THEORETICAL FRAMEWORK

2.1 Open Business Models

According to Tidd & Bessant (2015:4), even though "innovation is driven by the ability to establish relationships, detect opportunities and take advantage of them", it can go beyond the expansion of new markets and businesses, as it represents a new way to adapt traditional fronts such as established and mature businesses. The open innovation tactic has changed traditional business models to open business models (Saebi & Foss, 2015), because of the global competition leveraged by costs and expenses with R&D (research and development), technology, in addition to the product life cycles being increasingly shorter (Saebi & Foss, 2015; Weking, Lupberger, Hermes, Hein, Böhm, Krcmar, 2020).

Indeed, technology is considered one of the main “determinants in the formation of relations between nations, alongside wars and economic changes” (Malik, 2012), and starting from the need for innovation, companies try to build partnerships, to obtain competitive advantages (Thorgren, Wincent, Örtqvist, 2009).

“The era of open innovation”, published in the MIT - Sloan Management Review in 2003, is the seminal work of the open business model field, in which the expression “open innovation” was brought up by Chesbrough and Appleyard.

Within the scope of open business models, Enkel, Gassmann and Chesbrough (2009) identified nine perspectives for open innovation (Table 1), whose constructs can identify the experience of companies that develop projects and encourage others to develop new businesses, stimulating market and leveraging various sectors through innovation diplomacy:

Spatial Perspective	It is globalized innovation. Enable virtual, decentralized R&D teams and innovation processes.
Structural Perspective	Industry value chains are becoming more disaggregated, less costly, and more specialized due to more complex technologies and products.
Perspective of user	Users are integrated into the innovation process to use the freedom available in its early stages.
Perspective of the Supplier	Researched with less intensity but has a strong impact on innovation. Suppliers that have early integration into the innovation process can significantly increase innovation performance in most industries.
Leverage Perspective	Creation of technology and intellectual property.
Tools Perspective	They allow customers to create or configure their own product or allow companies to integrate external problem solvers or idea creators through websites.
Institutional Perspective	Instead of private investment, in a Schumpeterian innovation model with monopoly profits, obtain the free disclosure of inventions, discoveries, discoveries and knowledge.
Cultural Perspective	The culture of incentive systems, management information, systems, communication platforms, decision criteria, supplier evaluation lists - to understand the influence of all these aspects in the culture of open innovation, research must take more of the psychological field.

Table 1 - Perspectives for Open Innovation
Source: author, based on Enkel et. al (2009)

Still, in the literature, three formats of stakeholder integration in open business models were identified (Jonas & Roth, 2017; Weking et. al, 2020):

- Passive: integration in a natural way, without initiatives or communication, in which the concerned parties are involved in a non-pressured way, as well as consumers support in the development of the solution;
- Reactive: there is an invitation by external stakeholders to evaluate, discuss concepts, prototypes and share objectives;
- Active: external stakeholders are equal partners in an innovation project to solve and discuss a problem together, for example: creative co-workshops with external stakeholders, such as startups, specialists, customers, and users.

Presenting the nine perspectives of the open business models (Enkel, Gassmann, Chesbrough, 2009) and then three more integration formats (Jonas & Roth, 2017; Weking et. al, 2020), it is possible to work on the articulation between them.

In this sense, Chesbrough (2007) understands that to get the most out of the open innovation system, companies must open their business models, actively seeking to explore external ideas and allow unused internal technologies to flow out, where other companies can unlock their latent economic potential.

2.2 Dynamics of innovative helix

Etzkowitz and Leydesdorff (1995) debuted the Triple Helix model that introduces the interaction between actors in knowledge provider environments represented by academia, while companies practice and demand this knowledge to produce goods and services.

In addition to the third helix by institutions, regulatory bodies make up the government that creates and regulates norms so that this triad academy-business-government can interact while developing the economy, society through innovation (Etzkowitz & Zhou, 2017).

Starting from the triple helix, user-oriented innovation models emerged, adding a fourth helix (Miller, McAdam, Moffett, Alexander, Puthusserry, 2016) leading to an ecosystem in which “one of the main prerequisites for open innovation is cooperation within the quadruple helix” (Hubavenska, 2018).

Thus, innovative helix aims at collaboration, financing, and knowledge inputs, in addition to expanding the actors in promoting research, technology and innovation (Leijten, 2017), the triple helix is represented by academia, companies, and government, while in the quadruple helix, people and civil society have been added to this ecosystem.

Considering that the concept of innovation ecosystem is not a consensual theme (Adner, 2017; Vasconcelos, Facin, Salerno and Ikenami, 2018), Granstrand and Holgersson (2020) developed a study that involves review of the concept, identification of components through empirical examples defined it as “an innovation ecosystem is the evolving set of actors, activities, and artifacts, and the institutions and relations, including complementary and substitute relations, that are important for the innovative performance of an actor or a population of actors”.

For Curley (2016), attention to open innovation needs to be extended to all sectors and ecosystems, making it a practice for all concerned parties:

Closed innovation	Open innovation	Open innovation 2.0
Dependency	Independency	Interdependency
Subcontracting	Cross- licensing	Cross- fertilization
Ground	Bilateral	Ecosystem
Linear	Linear, leaking	Nonlinear mash-up
Linear subcontracts	Bilateral	Triple or quadruple helix
Planning	Validation, pilots	Experimentation
Control	Management	Orchestration
Win - lose game	Win - win game	Win more– win more
Box thinking	Out of the box	No pits!
Single entity	Single discipline	Interdisciplinary
Value chain	Value network	Value constellation

Table 2: From closed innovation to open model 2.0
Source: Curley (2016)

The table 2 sought to demonstrate the leap from actions in a closed innovation system to an open system level, with greater interdependence, based on experimentation and an increased value ecosystem (constellation). Demonstrating that different sectors can exploit disruptive technologies to "transform their domain, obtain technological advances, promote alignment of interests, investments and collaboration among many stakeholders" (Curley, 2016: 316).

Innovative helix aim at collaboration, financing, and knowledge inputs, in addition to expanding the actors in promoting research, technology and innovation (Leijten, 2017). Understanding multilateral structure combined with Quadruple Helix can require a deeper level of contextual knowledge.

2.3 Innovation ecosystems

Open innovation ecosystems have also been fostered by people's contributions to achieving common goals and actions in any organization. In the Open Innovation Yearbook 2.0 organized by OECD (2018a) new functional modes for the creation and acceptance of open innovation ecosystems were introduced:

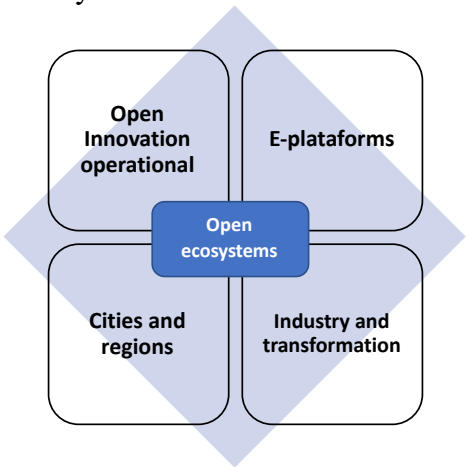

Figure 1: Open ecosystem functional modes
Source: author, based on OECD Yearbook (2018a)

Operational open innovation. It stands out for the transformation of the role of individuals and their skills in the socioeconomic context, guided by the co-creation by all

concerned parties, experiments, data generation and initial prototypes leading to new products and services (Curley & Salmelin, 2018). So much so that self-organized networks are increasingly developing advanced technologies and products in the digital economy.

Universities have played an important role in the development and orientation of the common interests of quadruple helix to deliver significant results in a technological, sociological, and economic context, in which jobs have demanded co-creative and collaborative approaches (Hubavenska, 2018).

When manufacturing companies open their business model more holistically and consent to the participation of concerned parties in the captured value, they become co-creators, causing manufacturers to establish alliances with consumers and other external partners (Kortmann & Piller, 2018).

e-Platform. *Accomplissh* is an initiative that aims to "accelerate co-creation by setting up a multi-actor platform for the impact of the social sciences and humanities. It is a unique co-creation engagement platform focused on society, culture, economics or impacts related to policies originating from research in the social and human sciences" (Kwakkel & Keith, 2018: 31).

The e-platform is a consortium of 14 European universities, members of the Horizon 2020 Program, whose objective is to seek co-creation in a practical, tangible way, generated from an innovative mentality focused on the university, industry, governments, and society (Horizon Project, 2020), in line with the quadruple helix.

Still, the government, in its role as an incentive and accelerator of innovation, tends to involve interested partners to share initiatives that will streamline solutions to all involved (OECD, 2018a), bringing financing agents such as entrepreneurial capital, crowdfunding, start-up laboratories and angel investors.

Cities and regions. It is understood that to carry out the development of open platforms, collaboration with other cities with similar objectives is necessary.

This was the reason why the city of Eindhoven applied for a Horizon 2020 project to increase the capacity of public authorities to plan, implement sustainable energy policies and measures through a roadmap for smart cities (Horizon Project, 2020). Philips in a partnership with Technological Campus Eindhoven, started from the closed innovation model to the open model.

In Brazil, an initiative focused on innovation and the potential development of the knowledge society, ANPROTEC (National Association of Entities Promoting Innovative Enterprises) and IASP (International Association of Science Parks), have turned their efforts towards the organization and promotion of smart cities, under the understanding that urban intervention occurs through people's participation in a knowledge economy and society.

Still, based on the elements of ambition (city aspirations for the future), vision (perspective of using renewable energy) and roadmap (planned actions), this Brazilian project promoted in the city of Porto Alegre, in the southern region of the country, has promoted articulation with three universities around high impact and structuring actions for the advancement of the ecosystem (ANPROTEC, 2020).

Industry and transformation. The quality and quantity of entrepreneurial initiatives allowed innovation to unlock and capture the pecuniary benefits of science for the company in the "form of private, public or hybrid assets" (Carayannis & Campbell, 2011).

This may explain why companies are increasingly playing an important role in building regional and global value chains. Open model innovation seeks the prospect of shortening deadlines and reducing costs (Lima & Leocádio, 2017).

Organizational ambidexterity encompasses several research fields and involves disciplines such as organizational learning, strategic management, leadership theory and organizational design. A balance of internal and external resources allows companies to avoid the risk of failing and losing control over core competencies (OECD, 2018a).

For Gupta, Smith and Shalley (2006), learning, improving, and acquiring new knowledge are fundamental for exploitation and exploration, as companies that manage to orchestrate these two aspects of ambidexterity are considered innovative (Zack, 2002).

The Oslo Manual (OECD, 2018b) sought to explore the model of open innovation from this ambidextrous perspective, by presenting aspects of knowledge flows in and out of institutions. The study addressed the enabling factors, the main conditions for success and implications for industry and transformation, compared to previous studies.

The greater the engagement, the higher the innovation - and Nunes et. al (2017) could infer that companies that are more intensely engaged in knowledge networks increase the probability of obtaining higher levels of innovation, which can lead to better economic performance.

Ribeiro, Uechi and Plonski (2018) promoted a study that reports the importance of entrepreneurship in education, like the actions promoted at the Massachusetts Institute of Technology - MIT, starting from projects, autonomous student initiatives and the creation of solid enterprises supported by mentoring networks.

Therefore, the functional modes approached by open businesses, can expand the innovative capacity by adding knowledge from universities, companies, and development institutions (Lima & Leocádio, 2017) aligned with the innovation diplomacy "pulled by practices, strategies inserted in the intersection of innovation and foreign policy" (Innscid, 2020).

2.4 Diplomacy

Whether in an informal or social sense, the art of diplomacy can lead to good science between representatives and states in a non-confrontational and polite way, consisting of commitments between parties (Innscid, 2020). So much so that this was the understanding generated at the meeting promoted by the British Foreign Office and the Royal Society, with the participation of scientists, government officials and politicians from 17 countries around the world. (Carayannis & Campbell, 2011; Leijten, 2017).

Research on multilateral stakeholder relations remains scarce, in which concentrations in certain groups are perceived, in addition to the negligence of stakeholders (Weking et. al, 2020). Stakeholders are those represented by agents and institutions that can be impacted or can impact the results of organizations.

However, the growing role of innovation in diplomacy can be seen in the agenda of global governance institutions (Leijten, 2017). The World Trade Organization - WTO has a permanent front and comes to frame the scenario by means of rules and regulations on international trade, expanding the adhesion of countries.

For Alammar and Pauleen (2016), business diplomacy is associated with management and interaction with stakeholders and the environment, as shown in Fig. 2:

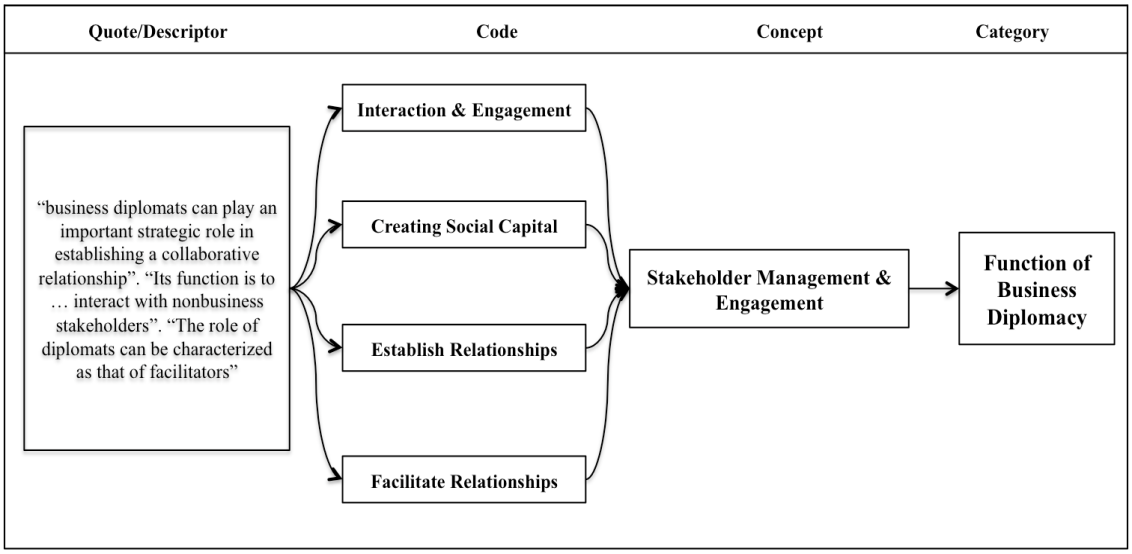

Fig. 2. Business Diplomacy Management
Source: Alammar and Pauleen (2016)

In line with this perspective, Egea et. al. (2020) complements that business diplomacy is a social phenomenon derived from classical diplomacy, dynamic in the consolidation process, which develops in relationships of a different nature. The authors came to contribute with four main instruments that exert influence and, consider the most necessary to implement strategies of corporate diplomacy: networking with external stakeholders, competitive intelligence, corporate reputation, and lobbying.

Bjola and Zaiotti (2020) argue that diplomatic practice also includes digital practice, considering them as two distinct political communication approaches: for the first, "it is the improvement of international conflict by peaceful means, while for digital, they thrive affection or gratification, emotion or indignation".

In this sense, Carayannis and Campbell (2011), explain the diplomacy of innovation as a practice focused on cultural, socio-economic, and technological approaches to create connections between initiatives and solutions with markets and investors. So much so that innovation diplomacy has supported the breaking of stereotypes that can be linked to countries, demonstrating the ability to contribute and be a reference in technologies (MCTI, 2020).

2.4.1 Soft Power

The Structuring Theory brought by Giddens (2003), perceives in the human agency, the active, reflective, rational, and motivated being. It is the agent with the power to influence the state of things with the structure, the latter, represented by institutions and organizations. The structure, while permissive, encompasses rules and resources, a set of transformational relationships that are organized as properties of social systems (Peci, 2013).

Although in classic realism, what matters is hard power, theories in international relations have brought intercultural, cross-cultural dialogue and knowledge communities through soft power (White & Fitzpatrick, 2018).

Soft power is based on the ability to achieve goals through influence, rather than coercion. Nye (2004) states that the concept of "soft power" emerged as a way of illustrating the United States' tripod of power in the late 1980s: the military, the economic and soft power. Scientific and technological soft power seeks to interact with all levels of diplomacy in a triad formed by the environment (Royal Society, 2010):

(i) Traditional. Based on influence, negotiation and cooperation;

(ii) Public. Involving all aspects of traditional diplomacy, in addition to common interests and values;

(iii) Cultural. In which the cultural sum, opens communication and networking channels, based on strategy, purpose and legislation.

Technology research and development requires an ever-increasing range of knowledge inputs, in which multidisciplinary teams work on such complex problems. Consequences of the growth of the role of information (Nye, 2015) and knowledge as a determining factor in economic and social growth, competition and power are central.

White and Fitzpatrick (2018) developed a study focused on analyzing the role of multinational corporations as non-governmental actors in public diplomacy. The results inferred that it would be up to the government to initiate the participation of the corporate sector in public diplomacy.

Current technologies and those to be developed have become an influential social and political force in the monopoly of a small number of large companies. Recognition of local policies promoted by bottom-up innovation must be supported and encouraged by governments, allowing ecosystems to integrate the global network, which can "strengthen international relations, economics and innovation diplomacy" (Leijten, 2019: 8).

Leijten (2019) exposes that populism and protectionism have pushed and led to an increase in nationalism, tensions, and protection in relations between states, when different parts of the population are penalized by choices such as religion, ethnicity, wealth, political formation, in a way to pursue their interests.

Such a scenario reveals the fragmentation of states, protectionist measures and closed systems, such as intellectual property rules. Protectionism demands mobilizations such as the increase in import tariffs for products, making it difficult to access international scientific and technological collaboration, forcing consumption in the local market (Leijten, 2019).

Protectionism characterized by defensive and protective policies, part of mobilizations such as the increase in import tariffs on products, making access to international scientific and technological collaboration difficult, forcing consumption on the local market. (Leijten, 2019).

The scope of soft power appears to be limited to liberal democracies, where authoritarian or non-liberal regimes choose to appeal to other resources of attraction - but developing countries tend to incorporate soft power into their actions, such as the successful initiatives promoted by Turkey (Çevik, 2019).

Still, "Institutional or social cultures can inhibit the involvement of users and citizens" (Curley, 2016). An institutional asymmetry can also hide complexities characterized by size, budget and institutional culture that may characterize the exercise of power and intelligent perspectives of power must originate from intelligent institutions (Wilson III, 2008).

2.4.2 Cooperation and competition: coopetition

Granstrand and Holgersson (2020) understand that many definitions of the innovation ecosystem place emphasis on collaboration by complements and actors, while less commonly on competition, but both cooperation and competition can coexist: co-opetition combines competition and cooperation (Bouncken, Fredrich, Ritala, Kraus 2015; Brandenburger & Nalebuff, 2021).

Coopetition is related to companies that come together to innovate and add value in the generation of new products, services, and processes, while individually seeking to appropriate part of the value (Bouncken et. al, 2018).

The report on sustainable development objectives, 17 global initiatives were presented - in number 9, there is a front focused on industry, innovation, and infrastructure, in which it highlights urgent actions that enable small-scale industries to financial services to "resuscitate the global economy" (UN, 2020).

Diplomacy as a catalyst for influencing relationships has leveraged open business models in companies, including small businesses. In a well-known allegory, the story of David and Goliath, represented by the little shepherd who defeated Goliath, a champion soldier and giant with just a simple slingshot (Gladwell, 2013), startups and scaleups can be said to have surprised and bothered by the strength and growth in business until then dominated by large corporations.

So much so that different types of alliances and coopetition have been observed in radical or incremental innovation implementations, uniting large powers and small companies and even consumers, such as:

Company	Segment	Project	Opening purpose	Integration	Initiative
IBM	Information Technology	Open Source	Promote an open-source community	Passive	Cooperation
Natura	Cosmetics	Natura Campus	Believing in the relationships and the power of networks to transform the challenges of humanity	Active	Cooperation
Apple and Samsung	Consumer goods	Retina Display	Development of protection screens for cell phones	Reactive	Coopetition

Table 3: Examples of companies that promote open business
Source: author (2021)

IBM. It brought a project whose philosophy is intellectual freedom, based on an open business model with suppliers or strategic partners, such as IBM's collaboration with the Linux community. The Open Source (IBM, 2020) project allows community planning and collaboration in the elaboration, based on the exchange of ideas and software developed by the communities, which has driven creative, scientific, and technological advances in industries, such as: education, government, law, health, and manufacturing.

Natura Cosmetics. A Brazilian multinational company, has 181 partners for scientific cooperation, including companies, technology institutes, government, and NGOs in the innovation process.

The company fosters a network of organizations involved in the company's innovation process, and highlights that this allows measuring and expanding the performance of partnerships and strengthening collaborative relationships.

The headquarters for innovation in the Amazon rainforest seeks to expand and expand collaboration with potential suppliers and universities. Including promoting innovation initiatives such as co-creation, crowdsourcing and hackathon sessions (Lopez-Vega & Vanhaverbeke, 2015) featuring an active integration, in which external stakeholders are equal partners in promoting solutions.

Apple and Samsung. "Will the United States and China be able to unite on a mission to Mars?" Brandenburger and Nalebuff (2021) understand that it is an impractical challenge as it involves sharing intellectual property of technology used for the war

industry of both countries. This kind of incredibility has happened to other competitors before.

In the early 2019, in a previously unthinkable agreement, the American company Apple started offering services such as movies and iTunes programs to be broadcast on televisions from Samsung, a South Korean company. While Samsung, started to provide protections screens for Apple phones - they are rival companies that, while compete, also collaborated with each other.

With expectations of socially responsible performance on the part of companies continuing to evolve and expand, companies can be higher standards in terms of their involvement in social issues, requiring executives to rethink their agendas and partnerships (White & Fitzpatrick, 2018).

2.5 Main Barriers and Challenges in Open Business

Initiatives aimed at consolidating innovation ecosystems are taken as a priority by governments and entrepreneurs, who have increased investments in R&D. Whereas, everyone must deal with complex systems of interaction between many different factors (Leijten, 2017):

(i) scientific problems, whether in the life sciences (research on diseases, food, and biodiversity);
(ii) technological issues (artificial intelligence, data and robotics);
(iii) management science (supply networks);
(iv) land science (climate change and deforestation); and
(v) materials (nanotechnology).

The facilities provided by the rapid advancement of these technologies are accompanied by growing concerns about cybersecurity, making this a priority theme in policies (MCTI, 2020).

The delay in formulating policies in relation to the market (Curley, 2016), may come in the opposite direction of an innovation platform or in carrying out innovation projects or challenges to deliver expected results.

Regarding coopetition, one of the biggest challenges may be antitrust rules, as it is possible for regulators to double their attention when rivals come together. Brandenburger and Nalebuff (2021) highlight that companies need to identify what types of cooperation and coopetition are allowed, so that it is clear to regulators that are working on demand and not to characterize collusion or cartel formation.

This kind of understanding of regulators can be illustrated by technology companies like Yahoo and Google in 2008, that had their deal rejected when trying to unite in providing search engines on the Internet. Another case of recent discussion are powers Google, Facebook, Apple, and Amazon (Kang & McCabe, 2020) about agencies promoting obstacles to these companies in the acquisition of startups.

Other litigation risks are exacerbated when companies build "jungles" of strategic patents that cover little innovative progress and instead serve as a legal weapon to protect profits (Shapiro 2001).

In the opposite direction of open business models, monopoly can be represented by regulation and patent law, considering that patents are often seen as a mechanism to prevent, rather than encourage, the diffusion of patented ideas. Highlight for the absence of data for the whole economy on the number of innovations in which the patent count has become a standard way of measuring innovation (Moser & Voena, 2012).

This perspective made Moser (2013) seek to investigate whether patent laws increased the volume of innovations or not - and historical evidence suggests that in countries with patent laws, most innovations occurred outside the patent system.

Therefore, such barriers and risks can restrict innovative activities that are opportune to face global challenges (OECD, 2018a), whose policies of engagement in the fields of technology transfer, aim at a higher diplomatic level (Royal Society, 2010).

3 METHODOLOGICAL PROCEDURES

Meneghetti (2011) understands that free reflection in a theoretical essay instigates readers to draw their own conclusions through reflective writing that seeks to establish and encourage the debate on the subject being addressed.

For this, a theoretical essay with a qualitative approach was developed, through an assessment of the literature that met the objective of the study, presenting the concepts worked by the authors.

Aspects that could fill the knowledge gap about theoretical and practical contents involving open business models and diplomatic innovation were sought through bibliographical research and systematic literature review.

4 DISCUSSION

Considering the rapid dispersion, amplification of influence and involvement in global demands by organizations, the implementation of open business models aligned to diplomacy can attract the attention of companies to a diplomatic environment little explored by the literature.

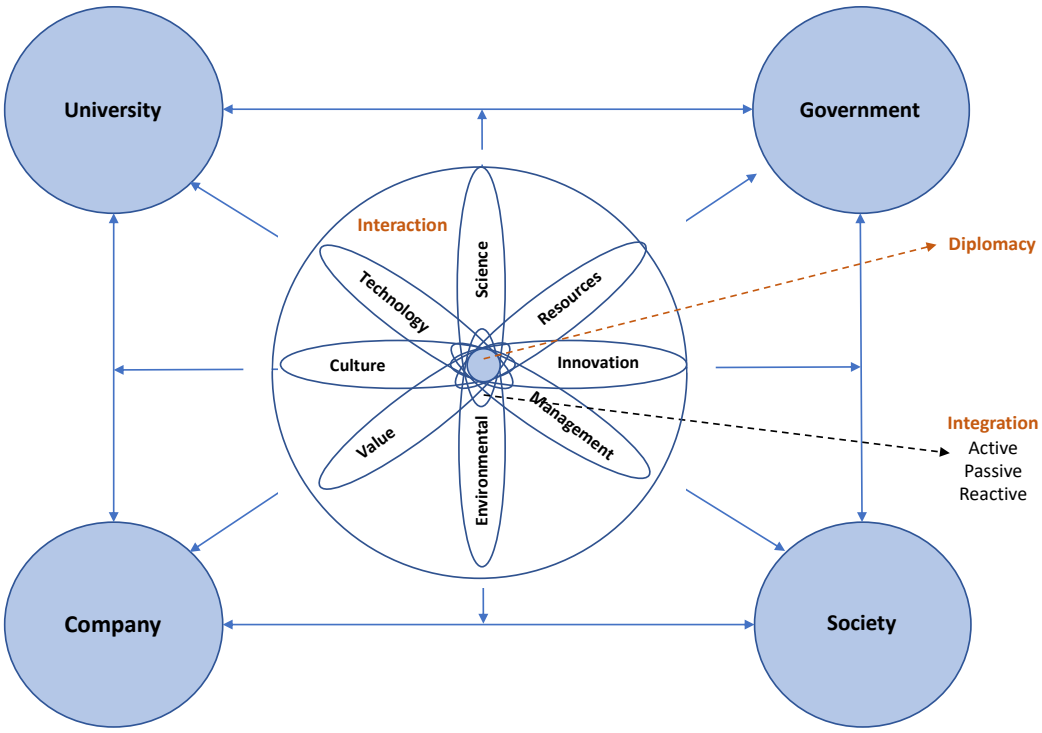

Fig. 3. Interaction and integration of quadruple helix: diplomacy in the center
Source: authors (2021) based on Carayannis & Campbell (2011)

In the same way, the literature made it possible to build a scheme (Figure 3) that synthesizes constructs and combinatorial elements in open business models and the

spectrum of innovation diplomacy so far discussed to reach regional interest in a global arena.

Considering the question "how can companies develop and expand innovation diplomacy through open business models?", this scheme exposes a proposal as interaction and integration have come to collectivities as a possibility of understanding in open business models.

The scheme proposes the interaction and integration to be developed by companies, regarding their performance in open business models, considering diplomacy at the center of the Quadruple Helix, the interaction of complex systems (Leijten, 2017) and the integration of stakeholders (Jonas & Roth, 2017; Weking et. al, 2020).

Partner companies in all sectors of the quadruple helix can make efforts to strengthen and establish the diplomacy approach, based on the complexity of the interactions promoted by science, technology, culture, value, environment, management, innovation and resources, whose constructs were identified with greater intensity in the theoretical framework.

Networks emphasize interaction, connectivity, and mutual complementarity and reinforcement (Carayannis & Campbell, 2011). There can be many reasons why competitors cooperate. At the simplest level, it can be a way to cut costs and avoid redundant efforts and regulators tend to take a more favorable view when companies work together to reduce costs or increase demand (Brandenburger & Nalebuff, 2021).

In a traditional context, the university normally exchanges knowledge with society and companies. Co-creation comes by integrate the parties and actors for an environment of cooperation and dialogue, fostering best practices, for an increasingly connected and complex environment (Kwakkel & Keith, 2018).

However, famous leaders, successful executives and large companies are in a position considered "comfortable" in the market and provide good success stories, as some that were exposed in this work. However, this developed scheme can be applied in small, medium companies and startups that are fighting for market space and have more urgency to make things happen through the expansion of operational partnerships and strategic alliances. Even in an entrepreneurial environment composed only of people.

5 FINAL CONSIDERATIONS

The promotion of a search for combinations and knowledge assets, in which "multiple mental spaces are involved, a considerable amount of creativity expected" for existing problems, companies will be able to promote a combinatorial process of innovation, based on the discovery of value creation together to its employees, partners, competitors and customers.

Building and contributing to ecosystem innovation with all stakeholders puts the theories of shared culture into practice through experimentation and joint creation. “Sharing is the best guarantor to make the cake grow for all shareholders” (OECD, 2014: 23). It can be inferred that innovation diplomacy is a field of activity where there is more practice than theory, the exposure of a company to the ecosystem through open business can impact cultural change through innovation in society and in its relationship with government entities, agencies, and university.

Considering it as opportunity for further research in this vein is vast, for future studies, it is recommended to seek evidence through applied research, the influence of the open business model (based on diplomacy, integration, and interaction) on economic performance and the importance of knowledge networks on the companies innovation performance.

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