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Innovation Law and Policy and Business Model

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ABSTRACT

The objective of the research is twofold: a) to explore the law innovation and policy (ILP) in connection with the business model (BM) seeking to identify the main elements; b) to structure a set of key aspects based on the elements identified in the connections between ILP and BM. Next, we intend to apply the key aspects proposed in a Brazilian federal public university. The research is exploratory, qualitative, based on a case study. The findingss obtained point to six key aspects: value as a unit of analysis, value segment, systemic perspective, alignment among dimensions, balance between supply and demand and new configuration pattern. The findings obtained are innovative and contribute to fill the gap in the academic literature of ILP and BM. The findings have three practical implications, for strategic leaders of higher education institution (HEI), coordinators and professors of HEI and the federal government.

Keywords: Innovation; Law; Policy; Business model; Higher education; University; Value creating; value Capturing

INTRODUCTION

Innovation law and policy (ILP) and business model (BM) are two themes that have been growing the interest of scholars and practitioners every year at global level. Several academic papers investigate ILP and BM. ILP is focused on studying innovation policies and BM focuses on an organizational configuration based on the logic of creating and capturing value. However, ILP and BM are two themes that are isolated and far apart in literature review.

In the ILP field academic papers demonstrates the interest of scholars [1-5]. The ILP has mechanisms and instruments to foster systems of innovation, research, development and investments in advanced technologies that can induce the change of the economy of nations, into an economy based on innovation, seeking to pursue economic and social prosperity [6-7]. The academic analyzes of ILP have been developed linked with several other themes. Among the academic analyzes of ILP we highlight the connections and links with the design of public policies of the European Union for the future [2], the importance of induced regulation for sustainable development [8], alignment with social welfare [9], open innovation [10], gender [11] and creation and diffusion of innovation [12], new roles of universities in regional

innovation systems [13], and contributions from universities for innovation, regional growth and employment [14].

Although ILP academic analyzes establish connections and interfaces with innovation in companies, small and medium businesses and new business creation, there is a gap in the academic literature, between ILP and BM, particularly with BM at university (HEI) [15-16].The BM establishes the logic of creating value and capturing value of an organization, represented by a set of interrelated components that is addressed to the dimensions of the customer, value proposition, value configuration, organizational architecture and economic [17-18]. The BM emphasizes the notion of value that involves the processes of understanding value, creating value, capturing value and delivering superior value to the customer [19].

The preliminary survey carried out by the authors in the ILP academic literature identified that academic paper seeking to explore the connections between ILP and BM is incipient. Particularly when the research focus is between ILP and BM in public HEI. ILP is far from BM in academic literature. The lack of academic articles of ILP and BM, focusing on public HEI exposes a gap in the academic literature that needs to be investigated, due to the transformations that are occurring in the BM of universities [20-22].

In this direction, the present research is guided by the following basic question: What are the key aspects in the connections between innovation law and policy and business model, focusing on higher education institutions? The research objective is twofold: a) to explore the ILP and BM seeking to identify the main elements; b) to structure a set of key aspects based on the identified elements, in the connections between ILP and BM. Next, it is intended to apply the key aspects in a Brazilian federal public university.

The study is structured in five sections. The first section contains the introduction. In the second section is the ILP and BM literature review. In third section has key aspects, the connections between ILP and BM. In the fourth section are methods and techniques. In the fifth section the case study analyzed and the sixth section is data analysis. The seventh section are the findings and in the last section are the final considerations.

LITERATURE REVIEW

Innovation Law and Policy

Radosevic [1] develops the academic analysis of ILP and distinguishes four research lines: innovation policies of economic development, innovation policy theory, innovation system and innovation policy evaluation. Based on the four main areas identified by Radosevic [1] and ILP literature review, it is possible to explore some elements that are directly involved with ILP. Among the ILP elements, there are segments interested in innovation, sources of resources, national and international partnerships, creation of new organizations and organizational restructuring, intellectual property, technology transfer and transfer of scientific knowledge, simplification and efficiency of administrative and financial processes.

The first element analyzed is the segments interested in innovation. ILP enables long-term structural changes in the economy of nations, impacting the most varied organizations and society as a whole, among which are business, non-business, governmental organizations, universities, research and development organizations [8-9-13-15]. Therefore, ILP is addressed

to the most varied organizations that integrate the different organizational segments of society interested in innovation.

The second element concerns investments and sources of funds. Public investments are a priority to capture scientific and technological opportunities, paving the way for private investments and accelerating the nation's economic growth [23]. The writing of a guideline to guide developed and developing countries to incorporate innovation highlights the different segments that, with mutual interference, are able to generate sources of resources and optimize spending on the implementation of innovation. This guideline presents empirical evidence, typologies and efficient instruments in public policies [5].

One of the possibilities of a source of resources for innovation was pointed out by studies on the comparison of indexes between the countries of Turkey and South Korea, based on reports from the Global Innovation Index between 2007 and 2015 and which showed evidence between innovation and development, using macroeconomic and microeconomic factors, such as GDP / capital, R&D spending, trade international [6].

The third element is the national and international partnerships foreseen in the ILP that allow, to expand the possibilities of cooperation in the field of innovation. Some strategies were pointed out in the book 'Law and policy of innovation in the European Union' [2]. These strategies reinforce three actions. First, the need for interactive governance, simplicity in the sharing and commercialization of knowledge and technology among countries. Second, show the relevance of national and international partnerships to enhance the technology transfer. Third the simplification and efficiency of administrative and financial processes.

ILP instruments and mechanisms encourage the creation of new organizations and organizational restructuring. The fourth element is related to creating new organizations and organizational restructuring. The creation of organizations, nucleus and support centers for the innovation system and restructuring of organizations are involved in order to develop the management of the innovation system. There several kind of organizational structures, for instance, the creation of nucleus and centers of innovation support for innovation, technology transfer and diffusion of innovation [5].

The fifth element is intellectual property [24]. Countries in search of prosperity in the face of accelerated technological development and intense economic competition must value innovation and relate it to the country's social development conditions. The sixth element involves the technology transfer and the transfer of scientific knowledge [12-25]. Innovation requires efficient ways of technology transfer, scientific knowledge transfer. A good example has been the practice of open innovation as an example in Spain presents the way the country reinforces the interaction between academia, government and company [10].

The seventh element involves the mechanisms and instruments of the ILP aiming at the efficiency of the administrative and financial processes of the management of the innovation systems and the benefits generated by the innovation products in the organization.

Business Model

The BM of the HEI is changing due to political-legal, socio-cultural, demographic, technological, environmental and economic drivers [10-21-22]. The challenges of BM design that involves diverse stakeholders in a university context require strategic intelligence from the university to operate with conflicts of interest [18-26]. Howell and Annansingh [27] also identify that culture and the dependence on the path impact on the norms related to the generation and sharing of knowledge in universities. Gaus and Raith [22] see the entrepreneurial university as a unique business model for creating value, with technology transfer being a viable factor to favor the company's innovation and provide sustainability for the university.

According to Fielt [22], the most current definition of the business model refers to how the organization creates and captures customer value. The great relevance of Erwin Fielt's thought was to extract six important elements in the analysis of the business model. The first element was the understanding of the creation of value in the definition of the business model. The value in BM involves the guidelines principles as understanding value, creating value, capturing value and delivering superior value to the customer [19]. BM emphasizes the value logic of an organization of how it creates and captures the value of the customer, linked with the question about what are the benefits that the organization offers for society and the market how do you monetize these benefits [22]. The value segment is the second element. The perspective of value creation must be integrated with customer value (use) and value creation with business value (exchange) and value capture. This fact establishes the possibilities for strengthening the relationship between public and private in the business model.

The third element mentions that the BMl be seen in a systemic perspective, it means that the business model is progressing from economic to operational to strategic levels [22]. The fourth element refers to the correlation between the four dimensions of the business model - customer, value proposition, organizational architecture and economic dimensions - and which need to be understood in mutual interference [22]. The fifth element deals with the interlocution between supply and demand in the value proposal, linking “customer value (use) and value creation with commercial value (exchange).

The sixth element is the establishment of connections among the economic, strategic, technological and operational issues in the business model. The seventh element is the meaning of innovation in MN considered the change in the configuration pattern, which can be in a business unit or in the entire company. These elements are parameters for the analysis of business models that can support managers in the innovation trails of companies.

KEY ASPECTS: CONNECTIONS BETWEEN INNOVATION LAW AND BUSINESS MODEL

Based on ILP and BM literature review seven elements of ILP and six elements of BM were explored and each explored element has its own characteristics and inductive lines. There are similar and converging characteristics between ILP and BM. Considering the analyzed elements of ILP and BM, table 1 presents the connections, which are named in six key aspects: value, value segment, systemic perspective, Alignment among dimensions of the BM, balance between supply and demand and new configuration standard.

Table 1: Connections between Innovation Law and Business Model

Key aspects	Innovation Law and Policy Elements	Business Model Elements
Value	-Intellectual property	-Value as a unit of analysis
value segment	-Segments interested in innovation	-Value segment (customers)
systemic perspective	-national and international partnerships	-Progressing from economic to operational to strategic levels. -connections among the economic, strategic, technological and operational issues in the business model -Strengthening the relationship between public and private in the business model.
Internal alignment among dimensions	-efficiency of the administrative and financial processes of the management	-Internal correlation among BM dimensions
supply and demand balance	-transfer of technology and the transfer of scientific knowledge -Funding sources	-commercial value (exchange)
New configuration standard	-creation of organizations, and restructuring of organizations	-change in the configuration pattern

MATERIAL AND METHODS

The present study consists of an exploratory investigation because the investigation deals with a topic in which information on the relationships between its components is not yet available [28]. The research method adopted is the case study [29-30], with description, understanding and interpretation of the facts.

The research was developed in four stages. In the first stage, a review of the ILP and BM literature was carried out, seeking to explore the main existing elements. In the second stage, from the identified elements of ILP and BM, the connections were analyzed. and the key aspects. Then, the key aspects were analyzed. In the third stage, the case study of a Brazilian public federal university was selected. Data collection from university was carried out based on the institutional development plan (IDP). The fourth step was the analysis of data from the selected university with the application of the six key aspects.

BRAZILIAN CASE STUDY

The Innovation Law in Brazil

Recent changes in the legal framework for science, technology and innovation signal new stimulus for innovative activity in Brazil. The federal Decree nº 9.283/2018, which regulates the Law nº 13.243 / 2016, provides Brazilian HEIs, particularly, federal public universities, new possibilities to implement their internal innovation policy.

Why in Brazil do HEIs still fail to effectively implement the innovation law? There several reasons and we emphasize three reasons: i) failure to align the law's articles with the internal organizational dynamic of the HEIs; ii) curricula with traditional teaching methodologies and iii) little vitality in the relations between university, company and government. These three interconnected reasons are the result of the characteristics of higher education in the country, pointed out in the Organization for Cooperation and Economic Development (OECD) assessment report (OECD, 2018).

University Overview

University of Brasilia (UNB) is a public federal HEI. According to the data presented in IDP of UnB, in the period from 2016 to 2020, it has 65 centers, 29 centers, 559 laboratories. There are 24 academic units, 163 undergraduate programs and 99 graduate programs. Its teaching staff comprises two thousand seven hundred professors and has four thousand five hundred students. UNB developed 3558 research projects; 528 certified research groups and 15578 publications in journals. It is the 11th university in Brazil, the 16th in Latin America (Times Higher Education, 2018), the 8th university with the best performance in Brazil and the 19th in Latin America (QS World Rankings, 2018).

The university innovation policy implemented in 2020 contributed to the creation of the research and innovation and the strengthening of the technological innovation nucleus with the expansion of national and international partnerships.

DATA ANALYSIS

Table 2 summarizes the application of the six key aspects in the Brazilian innovation law (BIL). The six key aspects are value, value segment, systemic perspective, Alignment among dimensions of the BM, balance between supply and demand and new configuration standard. In the second column of the table 2 has a business model elements and the third column has the main elements and articles of the Brazilian innovation law nº 13. 13.243 / 2016. In the fourth column has a main indicators for Brazilian HEI. The indicators for HEI were obtained from the institutional development plan (IDP) of the university selected by the case study.

Table 2: Connections between Innovation Law and Business Model in Brazilian HEI

Key aspects	Business model elements	Articles with elements of Innovation law	Indicators For Higher Education Institutions
Value	Value as a unit of analysis	- Intellectual property Articles 11 and 22 - Technology transfer and scientific knowledge transfer - articles 3, 4, 6 Protection of research results, innovation of products, services, procedures and processes.	- Percentage of increase in projects that generate patents, software registrations and / or transfer of know-how - Percentage of increase of professors involved in licensed technologies per year - Number of articles on innovation and entrepreneurship published without ISI, SCOPUS OR SCIELO indexed journals per year CNPq productivity fellows index - Percentage of international publications - Value acquired in technological services per year - Percentage of students involved in Junior Companies - Number of defenses in graduate programs with the theme of innovation.
value segment	Value segment (customers)	Segments interested in innovation Article 1st -Governmental entities and their development agencies to companies and non-profit entities, -Micro and small and medium-sized companies,	-Number of organization of technological transfer -- Number of licenses.

		-Support Foundation, Scientific, Technological and Innovation -Institution (ICT), Technological Innovation Center (NIT), Park and Technological Pole.	
systemic perspective	public-private relationship	Provision of technological services - Article 8 promotion to non-profit companies and entities, through the granting of article 19 resources	- Value acquired in technological services per year - Number of patent filings and registrations per year - Number of licenses.
	Systemic Perspective	National and international partnerships articles: 3rd, 5th, 8th, 10th, 15th and 19th - Internationaliza-tion process - Interinstitutional technical and scientific partnerships -Strengthening relations between university, business and government -Partnership scientific events	- Percentage of increase in the execution of resources during the year, arising from Decentralized Execution Term. - Percentage of employees trained to analyze international instruments - Number of partnerships with computer law signed per year
	Establishing connections		- Percentage of employees trained to analyze international instruments - Number of partnerships with computer law signed per year - Number of international partners signed per year. -Percentage of increase in the execution of resources during the year, arising from Decentralized Execution Terms

			-Number of events held in partnerships.
Internal alignment among dimensions	Interrelation between client, value proposition, organizational architecture and economic dimensions	Simplification and efficiency of administrative and financial processes Article 27 Reducing bureaucracy of import purchases, legal certainty in relation to the control team work for the use of resources.	Percentage of reduction of process returns to DPA, due to non-compliance with the relevant legislation Percentage of reduction in the average time (in days) of permanence of processes in the DPA Average term for contracting projects Rate of compliance with the deadline for sending accountability defined in the projects and percentage of participation of the costs with the end activity of the CDT in relation to the total costs.
supply and demand balance	supply-demand links	Funding sources 9th, 10th, 13th, 14th, 16th, 18th, 27th -Infrastructure of research and innovation - laboratories - Licensing and royalties Payment of research grants National and international strategic partnerships Research and technologies at the University Acquired patents Institutionalized junior companies Disciplines with active methodologies	- Mapping percentage of the research infrastructure. - Rate of use of laboratories - number of royaties and return of resources to the university and the researcher - number of technical and scientific cooperation

		University-supported companies	
		Technology transfer and scientific knowledge transfer Innovation Law articles 3, 4, 6 -National and international strategic partnerships -Research and technologies at the University -Acquired patents Institutionalized junior companies -Disciplines with active methodologies -University-supported companies	-Number of organization of technological transfer -- Number of licenses.
New configuration standard	New Configuration Organizational	- Legal nature and characterization of the Technological Innovation Center / Nit Innovation Law article 16th -Support Foundation, Social Organization, Center or research center	- form of institutionalization of the NIT in the university - number of NIT partners - NIT resources - number of internal and external technical cooperation - number of companies incubated

According to table 2, the BIL presents in some articles (articles 3, 4, 6, 11 and 22) how HEIs can transfer technology and what indicators HEIs need to have as a reference in the Institutional

Development Plan. For whom Brazilian HEI provides benefits, it is explained in the public-private relationship that, in Brazil, it still lacks better regulation and that is why the BIL in its article 8 proposes the ways of providing technological services and in article 19 the promotion of companies and non-profit entities, through the granting of resources.

From a systemic perspective, articles 3, 5, 8, 10, 15 and 19 of the BIL present ways of making international partnerships. One of the strategies is to expand national and international partnerships so that the exchange of knowledge generates royalties, licenses, patents and that can minimize the economic and operational issues of HEIs (articles nº 3, 5, 8, 10, 15 and 19)). Article 27 of the BIL, dealing with reducing the bureaucracy of import purchases and providing actions that increase legal certainty in relation to control team works, for the use of public resources in Brazilian HEI. The BIL proposed in its articles 9th, 10th, 13th, 14th, 16th, 18th, 27th forms of improvement regarding the infrastructure of research and innovation laboratories and licensing and royalties. The Innovation Law, in article 16, signals the possibility of strengthening Technological Innovation Centers and deals with the conditions and characterizations of the NITs.

FINDINGS

From the review of the ILP and BM, it was possible to find six key aspects focusing on Brazilian HEIs. The main aspects are as follows:

1. Key aspect 1 - value - proposes to establish the benefits that HEIs must offer to society with regard to the production of scientific knowledge that can be transferred to society to solve the required problems.
2. Key aspect 2- value segment - For whom the HEIs offer the benefits, that is, they carry out the technological transfer of patents and intellectual property as a whole. They are companies, companies, governmental and non-governmental organizations.
3. Key aspect 3 - systemic perspective - expanding strong national and international partnerships. Therefore, there is an exchange of knowledge and technologies between countries. Systemic perspective emphasizes inolves: a)Progressing from economic to operational to strategic levels; b) connections among the economic, strategic, technological and operational issues in the business model; c) Strengthening the relationship between public and private in the business model
4. Key aspect 4 – Internal alignment among dimensions - client, value proposition, organizational architecture and economic dimensions - and which need to be understood in mutual interference. Internal aligment involves efficiency of the administrative and financial processes of the management
5. Key aspect 5 - Balance between supply and demand - the implementation of new BMs in HEIs must be guided by the ILP with a greater balance between society's supply and demand in the field of education. The sources of funding is strategic resources to balance supply and demang.
6. Key aspect 6 - New configuration standard - This aspect refers to the innovation in the BM that concerns the transition from one configuration standard to another and this requires that the HEIs improve their innovation environments. ILP signals the possibility of strengthening science, technology and innovation institution (STII) and deals with the conditions and characterizations of the technological core of innovation. The indicators for IES can be the amount of available resources, the number of internal

and external technical cooperation, the number of incubated companies, licensing and patents.

FINAL CONSIDERATIONS

The findings are innovative and contribute to fill gaps in the academic literature. The academic literature little explores the connections between ILP and BM applied in Brazilian HEIs. In this sense, the themes ILP and BM are isolated and fragmented in the academic literature and few analyzes are developed with a focus on HEIs. Considering the results obtained, the research fully achieved the proposed objectives

The findings have several practical implications and only three practical implications will be highlighted: a) HEI strategic leaders can use these findings to publicize cultural innovation policies linked to the BM in their institution; b) HEI coordinators and teachers can use the findings to include the concepts of ILP and BM in undergraduate and graduate curricular programs to enrich students' skills; c) the federal government can use the results to build policies to encourage innovation from the perspective of BM culture in HEIs; and d) The findings may contribute to open an arena for the discussion of the ILP in relation to the BM for Brazil to improve national and international rankings with regard to innovation and entrepreneurship.

The limitations of the research have been to offer a very broad analysis of the necessary connections between HEIs, business models and the Law of Innovation, so that it does not meet the diversity of institutions that the country has regarding levels of organization, differences in learning methodologies and readiness to implement innovation policy in business models.

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