

XIII RESEARCH WORKSHOP ON INSTITUTIONS AND ORGANIZATIONS

STRATEGIES OF BRAZILIAN ELECTRICITY COMPANIES TO PROMOTE COLLABORATION WITH STARTUPS: AN ANALYSIS BASED ON THE MAIN STARTUP PROGRAMS

Abstract

There is an ongoing technological transformation in the electricity sector. In this context, companies will need to be increasingly aware of aspects such as energy security, accessibility and sustainability. They will seek to collaborate with other actors, such as startups, to develop innovative solutions. This article analyzes startup initiatives as a strategy to promote knowledge and innovation in companies in the electricity sector, based on the frameworks of open innovation and dynamic capabilities. Startup support programs in the Brazilian electrical sector will also be presented in this study.

Keywords: Dynamic Capabilities, Electrical Sector, Open Innovation, Startups.

1. INTRODUCTION

There is an ongoing technological transformation in the Electricity Sector. In this context, consumers will have a more active behavior, demand will be flexible, and energy flows will be multidirectional (CASTRO *et al.*, 2017). The emergence of intelligent networks based on Information and Communication Technologies (ICTs) results from the increasing complexity of the Electricity Sector in Brazil and in the rest of world. In these networks, there is a high technological component in the measurement and monitoring systems of energy flows.

Electricity sector companies will therefore need to be at the forefront of innovative processes to remain competitive and efficient. Although the Brazilian electricity sector has the characteristic of being a natural monopoly in the transmission and distribution segments - being competitive only in generation - a company that does not innovate is bound to lose market value and pass on less benefits to clients than the most innovative players in the industry, whose essence is to seek continuous improvement of service delivery through the insertion of new products, new processes, as well as establishing routines and new organizational models within the company.

Actors in the Brazilian electricity sector will need to pay more attention to aspects such as security, accessibility and sustainability. For this, companies should seek progressively to work with other players, such as startups, to find innovative solutions to the challenges of the industry and of the companies themselves. Startups are characterized by being dynamic, lean and rapidly scalable companies, as well as being able to create innovations for more consolidated industries due to their organizational particularities. In addition, startups are independent of industry trajectories and lock-ins, as they deviate from usual business practices, but in many cases do not have the financial and political resources to influence the

system in transformation (GEELS; SCHOT, 2007). In this way, startups can benefit from development programs led by the large consolidated companies in different sectors. Everyone wins with cooperation: startups receive the financial support they need to develop their products and services, and large companies in the electricity sector can count on partners to think about solutions to their challenges.

2. RESEARCH PROBLEM AND OBJECTIVES

Empirical studies on spatial concentrations of innovative activities show that the electricity sector develops technology based on cooperation networks (CORSATEA; JAYET, 2014). In cooperation networks, startups can take risks that larger and more consolidated companies are not willing to face, thus taking the lead in technological development opportunities (LA ROVERE; MIRANDA, 2017).

Thus, companies can acquire dynamic capabilities by encouraging startup programs, which allow the discovery and development of new opportunities, with the effective combination of internally and externally generated inventions, and the invention of new business models (TEECE, 2007).

The development of new opportunities, therefore, depends on the collaboration with several actors, through the formation of networks. The concept of open innovation underscores the importance of a broad external base and subsequent integration involving suppliers and customers, which reinforces the argument of the importance of networks. Networks influence access to resources for knowledge-intensive entrepreneurship and also the perception of what innovative opportunities can be developed through science, technology and markets. The startups programs are part of the training and development of networks by large companies.

In addition to all of the above, the electricity sector has several characteristics that make the innovation process exogenous to the dynamics of the sector (CASTRO; DANTAS, 2016). Therefore, it is necessary to adopt public policies for the promotion of innovations and the adoption of partnerships to materialize and develop innovations for the sector.

This article has the purpose of analyzing startup support programs as a strategy to foster knowledge and innovation in companies of the electricity sector, based on the approaches of open innovation and dynamic capabilities. To do so, the results of a qualitative research will be presented focusing on a case study of startup support programs in the Brazilian electric sector. The first step of this research was a literature review based on scientific articles, books, theses and dissertations. The second step was a bibliographical research to detail the new cooperation models proposed in startup support programs of the electricity sector. Finally, we identified the main startups support programs in the Brazilian electricity sector, highlighting their main characteristics, based on documentary research through documents, reports and official sites.

This paper is divided into five sections besides this introduction. Section 2 will present reasons and motivations for large companies to carry out initiatives to support startups. In subsections 2.1 and 2.2 the concepts of dynamic capacities (2.1) and open innovation (2.2) will be detailed. In section 3, the methodology of this paper will be developed. In section 4, new models of cooperation – startup support programs – are presented. In section 5, the main

characteristics of startup programs in the Brazilian electric sector are discussed. And section 6 brings the final considerations of this paper.

3. A THEORETICAL APPROACH: MOTIVATIONS FOR LARGE COMPANIES TO IMPLEMENT STARTUP SUPPORT PROGRAMS

To understand the reasons why large companies in the electricity sector – both electricity distribution companies and suppliers of goods and services to the electricity sector - are promoting startup programs, one must first understand the relevant factors of the new techno-economic paradigm, as approached by Perez (1984) which highlights the value of the knowledge economy and fosters an exponential growth of startups.

There is a worldwide trend of increased economic activity by small firms. There are important elements that are driving the transition from slow businesses with massive and stable investments, backed up by the belief of increasing demand, to high-speed businesses with fluid technologies, new players, and growing customer focus. Carlsson (1992) states that this occurred for two reasons. First, there were changes in the world economy from 1970 onwards. These changes have intensified global competition and increased uncertainty and growth in market fragmentation. Second, there were changes in the characteristics of technological progress. The direction of technological progress has resulted in structural change affecting the economies of industrialized countries. Audretsch and Thurik (1998) point to a shift towards a knowledge-based economy as the driving force behind the shift from large to small businesses. Recombination processes appear to be occurring on a larger scale. Acs (1992) emphasized the consequences of these changes and the growing importance of small enterprises, namely: fostering entrepreneurship, new innovation routes, deeper industrial dynamics, and job creation. For the authors, the increase in the participation of small companies led to a qualitative change in the demand for capital and a greater variety in the supply of products and services.

When one studies the processes of innovation in an industry, we can see that companies do not innovate in isolation (LUNDVALL, 1992). To be successful, companies need to look for new sources of knowledge and technologies to be able to continually develop products and services. With this, the competitiveness of companies is becoming more dependent on complementary knowledge with other companies, as well as knowledge providers, such as universities, research institutes and consultants (NOOTEBOOM, 1999). Changes in the knowledge base and in the learning processes of the companies induce transformations in the behavior and the structure of the agents and in their relations among themselves. Changes in the structure, content and function of a network are the result of a coevolutionary process involving actors, knowledge, technology and institutions. These processes are sector-specific and are sometimes path dependent (VONORTAS *et al.*, 2009). Ideas and achievements derived from failed innovations can emerge from the ashes: a failed enterprise can be recapitalized and become a success, causing participants to acquire new techniques and knowledge (WINTER, 2016).

The use of knowledge refers to the assimilation, transformation and exploitation of new knowledge. Observable aspects of reality are interpreted not as a solution to a static problem but as the result of understandable dynamic processes that have occurred in the past. Knowledge is systemic when it consists of an integration of different scientific knowledges

and/or engineering disciplines necessary for innovation, forming a larger system (TEECE, 1986). Furthermore, use of knowledge is emphasized as an important factor in innovative activities (CHESBROUGH, 2003). The intensity, speed, and direction of attempts to identify and collect relevant information can determine the quality of business capabilities. These activities can vary in complexity, which highlights the need to have areas of expertise within the company to internalize externally generated knowledge (MALERBA et al., 2016).

Learning is a process of attempts, feedbacks and evaluations (TEECE, 1997). Thus, it is important to understand the process of path dependence, in which the effects of interaction occur over time and can multiply. The importance of path dependencies is widened where there are increased income conditions. The concept of path dependencies is linked to the technological opportunities of the industry (TEECE, 1997), which are not always completely exogenous to the industry, since some companies have the capacity to engage or to support basic research, and also because technological opportunities are sometimes fostered by innovative activity.

The development and good management of intangible assets and intellectual capital is increasingly recognized as central to sustained competitiveness. The understanding that intangible assets are critical remains opaque and poorly addressed in orthodox frameworks (TEECE, 2012). Knowledge is increasingly seen as vital to economic growth and to the development of society, including a specific focus on the role of technological knowledge in the stimulation of certain types of entrepreneurship. Regarding the management of intangible assets and the study of knowledge in companies, which are fundamental factors for the competitiveness of companies, the analysis of dynamic capacities and open innovation becomes of utmost importance. These two key concepts will be addressed, respectively, in the subsections 2.1 and 2.2. Both the development of dynamic capabilities and the establishment of open innovation initiatives can be accomplished through startup support programs.

3.1. Dynamic capabilities

Dynamic capabilities enable companies to create and to deploy intangible assets for long-term, sustainable economic performance (TEECE, 2007). Dynamic capacities are, therefore, the basis of competitiveness in regimes of rapid technological change. The term "dynamic" refers to the ability to renew skills to achieve congruence with a changing business environment. Some innovative responses are needed when time and market are critical, when the rate of technological change is fast and the nature of competition and markets is difficult to determine. The term "capabilities", on the other hand, emphasizes the fundamental role of strategic management by adapting, integrating and reconfiguring internal and external organizational aspects, as well as functional capabilities and competencies for the requirements of a changing environment.

Teece (1997, 2007, 2012) observed that the strategy of accumulating valuable technological assets, undertaken by many multinationals, is no longer sufficient to support a company's competitive advantage. Companies around the world that have emerged in recent years have demonstrated rapid and flexible responses to product innovations, coupled with a management capacity to coordinate and rearrange both external and internal competencies. There are many companies that accumulate valuable assets but do not have many capabilities. Through the dynamic capabilities approach, the essence of strategy formulation is the selection and development of business technologies and models that build competitive

advantages by assembling and orchestrating resources that are difficult to replicate; thus, competition is shaped by capabilities (TEECE, 1997; 2007).

The concept of dynamic capabilities as a coordinated management process opens the door to the potential of interorganizational learning. Learning is a process where repetition and experimentation allow tasks to be performed better and faster. It also allows the identification of new production opportunities (TEECE, 1997). In a context of dynamic capabilities, the ability to integrate and combine assets, including knowledge, is a basic skill. The combination of know-how within the company, and between the company and external organizations - such as other companies or universities - is important. Integrating know-how from outside and inside the company is especially important for success when systems and networks are part of the process. Good incentive design, knowledge sharing and knowledge integration are important for business performance, as well as being key elements for the creation of dynamic capabilities (CHESBROUGH, 2003).

Dynamic capabilities can be broken down into capabilities of firms to: (i) perceive and design opportunities and threats (sensing); (ii) seize and decide on opportunities (seizing); (iii) to maintain competitiveness through the protection, combination and reconfiguration of the company's intangible and tangible assets (reconfiguring) (TEECE, 2007). Underlying these three generic and corporate capacities are the micro-foundations, defined by Teece as abilities, processes, procedures, organizational structures, decision rules and distinct disciplines, which constitute the organizational basis of dynamic capabilities. Micro-foundations are difficult to implement and to develop in companies, but companies with large dynamic capabilities are intensively entrepreneurial. These companies adapt and shape the business ecosystem through innovation and collaboration with other enterprises, entities and institutions (TEECE, 2012).

In summary, companies must acquire dynamic capabilities to become more competitive. The success of a company in achieving this will depend to a large extent on the creation of new products, processes, organizational forms and business models, which are driven by a management entrepreneurship. For this to happen, entrepreneurial managers will have enormous responsibility in shaping the future of the company, investing in knowledge, preserving intellectual property, and establishing a new asset mix (TEECE, 2012). Thus, companies can acquire dynamic capabilities by encouraging startup programs, which allow the discovery and development of new opportunities, with the effective combination of internally and externally generated inventions, besides the invention of new business models (TEECE, 2007). Without dynamic capabilities, a company cannot sustain competitive returns in the long run.

3.2. Open Innovation

The open innovation model has considerable advantages as well as positive implications for entrepreneurship (PEREZ, 2002). Open innovation lies in the context in which companies are increasingly rethinking key ways in which they generate ideas and bring them to the market, leveraging external ideas while developing their internal R&D programs (CHESBROUGH, 2003).

A few decades ago, the development of internal R&D was a valuable asset to the company, including as a barrier to entry for competitors in the market. Only a few large companies

could compete in terms of R&D in their respective industries. In the past, rivals who sought to overthrow these giants had to have considerable resources to set up their own labs if they wished to have any chance of success. Today, the most consolidated companies in the market have faced very strong competition from startups. Surprisingly, these new actors do little or no basic research on their own, but instead create new ideas in the marketplace through a different process (CHESBROUGH, 2003).

In the old model of closed innovation, the company had control of the entire innovation chain: it generated the idea, in addition to developing, manufacturing, marketing and distributing the product. There was a corporate assumption that heavy R&D investments would generate profits and therefore profits should be reinvested in more R&D. There were, however, a number of factors that contributed to the end of this virtuous cycle of closed innovation. These include increasing mobility of knowledge workers and increasing the availability of private risk capital. An internally-focused company, that is, a company with a closed innovation approach, is prone to lose a lot of opportunities, as several of them will be outside the company's scope of action and need to be combined with outside technologies to unlock their potential (CHESBROUGH, 2003).

In short, open innovation is based on some fundamental principles: (i) since not everything can be accomplished within the company, it is important to seek knowledge and personnel outside the company; (ii) it is not necessary to rely only on internally generated research to profit from it; (iii) building a good business model is often better than being the first to reach the market; (iv) the company is successful when it makes the best use of internal and external resources (CHESBROUGH, 2003).

The concept of open innovation underscores the importance of a broad external base and subsequent integration involving suppliers and customers, which enhances the importance of networks. Major innovations induce new innovations that require complementarities and facilitate similar innovations, including competing alternatives (PEREZ, 2009). The formation of collaborative networks favors this process. Incremental innovations constituted along a technological trajectory, instead of simple improvements, constitute new products, services and even whole industries, which are consolidated after a radical innovation (PEREZ, 2009). As new technologies have been confronting most companies with the breakdown of their previous trajectories, information on future developments has become increasingly necessary. Participation in collaboration arrangements is essential for the innovation process to take place effectively and to provide faster access to technological capabilities that are not well developed within the company (LASTRES, 1999). In short, networks are of paramount importance to promote and to leverage innovation processes.

Networks influence access to resources for knowledge-intensive entrepreneurship and also influence the perception of what innovative opportunities can be developed through science, technology and markets. One of the main aspects of the social context of the environment in which an organization finds itself is the social network of external contacts. A social network can be defined as a set of nodes bound by a set of social relations of a specific type. The type of network in which a company is inserted and its position in these networks can affect the company's behavior and performance (VONORTAS *et al.*, 2009). A network can provide access to external knowledge and resources that would otherwise not be possible.

Networks can also be loci of innovation. Innovation processes and network structure shape each other, that is, network actors define requirements for new products or services, produce

new artifacts, accept or refuse them, and in that process modify their relationships. This phenomenon is especially relevant when considering new enterprises, which necessarily change the structure and processes of the network upon entering the market (LA ROCCA; SNEHOTA, 2014).

Innovation management tends to use third parties to achieve greater agility, flexibility, forcing companies to reconsider their strategies and processes. By becoming networked organizations, companies need to collaborate to generate innovations (GASSMANN, 2006). In this sense, companies are developing new models of cooperation, specifically support programs for startups.

4. METHODOLOGY

The main objective of this article is to analyze startup support programs as a strategy to promote knowledge and innovation in utilities of the electricity sector, based on the approaches of open innovation and dynamic capabilities. For this, this study was carried out based on a qualitative research and literature review on the subject. With a qualitative focus, this article will make use of a case study, since, as pointed out by FLICK (2009), the object under study is the determining factor for the choice of method and not the other way around. YIN (2005) emphasizes that the case study can be treated as an important methodological strategy for research in the human sciences field, since it allows the researcher a deepening in relation to the studied phenomenon. Thus, aspects that would not be noticeable in a database analysis or in just a bibliographic or documentary search can be discovered.

A case study on the Brazilian Electricity Sector was carried out, in specific regarding startup programs carried out by utility companies of this sector, to draw comparisons between the objectives, proposals and areas of the different programs. Thus, in the first place a bibliographical research was done based on scientific articles, books, theses and dissertations with the objective of constructing the theoretical reference about the reasons for the creation of startup programs of big companies and the relation of these programs with the concepts of dynamic capabilities and open innovation. Furthermore, a review of the literature was carried out to identify new cooperation models promoted by startup programs in the electricity sector, highlighting the advantages of these programs for large companies in the sector. Finally, a documentary research of articles, reports and official sites of companies was done with the purpose of characterizing the main startup programs in the Brazilian electricity sector, emphasizing their proposals, particularities and areas of action.

5. STARTUPS AS A WAY OF PROMOTING DYNAMIC CAPABILITIES IN THE ELECTRICAL SECTOR

The possession of dynamic capabilities is especially relevant for the performance of multinational enterprises in business environments with specific characteristics (TEECE, 2007). First, the environment must be open to international trade and fully exposed to new opportunities and threats associated with rapid technological change (TEECE, 2007). This is not the case of the environment of the Brazilian electricity sector, as it has natural monopolies in the distribution and transmission segments. These sectors are heavily regulated by ANEEL - the regulatory agency of Brazil's electricity sector -, which defines distribution areas among companies, and defines the companies that will carry out energy transmission. In a way, this

makes companies more "protected" from innovations than other industries. However, the Brazilian electricity sector is undergoing several changes, with intelligent networks, decentralization and new forms of electricity consumption, due to technological challenges (HONEBEIN *et al.*, 2012, EURELETRIC, 2013; FONTANA *et al.*, 2013).

Second, addressing opportunities involves maintaining and improving technology skills, when opportunities are mature, in order to invest heavily in specific technologies and projects that are more likely to reach the market. Brazilian electricity sector companies have the scale to invest heavily in new projects - mainly suppliers. However, companies of the generation, transmission and distribution sector have no interest in selling these technologies and innovations, since they are not part of their core competences.

Third, technical change is systemic and multiple inventions must be combined to create products and/or services to address the needs of consumers. This is the case in the electricity sector, which requires integrated and innovative solutions to improve energy supply to the consumer and to improve energy efficiency. In this sense, companies of the electricity sector may acquire new dynamic capabilities by the establishment of cooperation networks with startups.

There are three key characteristics of startups: they tend to work with open innovation, they have a more horizontal hierarchy and they develop a business vision (ANTHONY, 2012). Large companies can take advantage of these points as well as the ability to foster partnerships in a context of disruptive innovation. This should be done by defining a business model that can unite the best of both worlds: the agility and entrepreneurship of startups, and the resources and capabilities of large corporations (ANTHONY, 2012). Several companies have adopted the open innovation model, thus incorporating initiatives to support startups. It consists of a practice to reduce development costs, accelerate innovation processes and, at the same time, increase the impact of innovation (CHESBROUGH, 2003).

Startup programs are embedded in strategies that the literature calls Corporate Venture Capital, which consists of an open innovation modality in which larger companies finance innovation, that is, they invest in startups. Corporate Venturing can be done by means of acquiring equity interest or incubating a startup and offering mentoring to entrepreneurs who carry out the business development. According to Chesbrough (2002), there are four possible types of investments in Corporate Venture Capital: (i) Driving: when there is a rational and clearly defined strategy in which there are strong relationships between startups and the multinational operations; (ii) Enabling (permissive investment modality): carried out for strategic reasons, but when there are not always strong relationships between startups and the operational area of the company; (iii) Emergent (emerging investment modality): related to the company's operations, but with little relation to the multinational's strategy; (iv) Passive (passive investment modality): when startups don't have a strong link to the operations of the multinational and are not connected to the strategy of multinationals. This type of initiative has been adopted in the electricity sector for a few years due to the technological transformations that are impacting the world. European companies in the electricity sector have opened their innovation models through the development of startup programs. According to Livieratos *et al.* (2017), nine of the ten largest companies in the European electricity sector have initiatives to promote startups in the form of Corporate Venture Capital. All of these programs started less than a decade ago, starting in 2010.

For Esteves *et al.* (2016), the future of the electricity sector will have very different characteristics when compared to the electricity sector of the last century, such as: (i) an

energy mix based on two pillars - large producers and distributed generation – which are related to non-dispatchable energy sources with variability; (ii) an electricity network that incorporates new technologies, new control and operation techniques; (iii) an active participation of the final consumer, which can also contribute to maintaining the balance of the system; (iv) bidirectional energy flows, with decentralized control systems; and (v) distributed electricity power storage solutions with a fleet of electric cars that will inject energy into the grid. These are the cornerstones of smart grids. The electricity sector is therefore entering a new era of energy consumption and production. In this sense, it is essential to change the business model of companies that encompass the electricity sector in the world and in Brazil - from suppliers of equipment to distribution companies. In Europe, after a decade of declining innovation spending (2000's), there has been a general increase in engagement with innovative efforts by companies with an increase in R&D spending and, at the same time, proliferation of new models of innovation (BURGER *et al.*, 2015, STERLACHINI, 2006).

There are several examples of technological devices that have been developed by startups and that have contributed to incremental innovations in the electricity sector, such as applications to facilitate energy exchange between prosumers¹, conversion systems and plug-ins for electricity cars and intelligent devices for the electricity network. Companies in the electricity sector could, for example, establish partnerships with technology parks, incubators and accelerators, organize competitions and awards (hackatons) for startups. In addition, angel investors could be indicated for the technological development of the sector (LA ROVERE; MIRANDA, 2017). These initiatives can be carried out at a reduced cost and provide a number of benefits for companies, such as obtaining access to complementary technologies, human capital, training and the possibility of startups acting as intermediaries between energy distributors and prosumers.

6. STARTUP SUPPORT PROGRAMS IN THE BRAZILIAN ELECTRICITY SECTOR

Just as European companies in the European electricity sector started developing startups to encourage innovative solutions in 2010, some companies in the Brazilian electricity sector are already starting to structure concrete startups programs since 2016. Five companies are currently developing support initiatives to startups in Brazil, inspired by an open innovation approach, as a strategy to leverage dynamic capabilities in their innovation management.

They are five joint-stock companies: (i) *CPFL Energia S.A.*, a publicly held company, which is part of a group controlled by Chinese capital: the *State Grid Group*; (ii) *EDP Brasil S.A.*, a publicly-held company, which is part of a group controlled by Portugal: *EDP - Energias de Portugal*; (iii) *AES*, which is part of a group controlled by US capital, the *AES Corporation Group*; (iv) *Enel Brasil S.A.*, a privately held company, which is part of a group controlled by Italy: *Enel*; (v) *Companhia Paranaense de Energia S.A. (COPEL)*, a Brazilian publicly-traded and mixed-capital company, which its subsidiaries are *Compagas* and *Copel Telecom*, and the owner is the Paraná Government. Table 1 presents the main characteristics of these five programs.

¹ Prosumers: consumer units that are, at the same time, electricity producers.

Table 1- Startup programs in large companies of the Brazilian Electricity Sector

Program's name	Main proposals and characteristics	Key areas
CPFL INOVA ² (CPFL)	Open innovation program. 7-month program that seeks to accelerate up to 12 companies with solutions applicable to the energy and infrastructure sector. There is mentorship from Endeavor and from CPFL executives.	Operational efficiency, energy efficiency, distributed generation, energy storage, internet of things, big data/ data analytics, smart cities and customer relationship.
EDP Starter ³ (EDP)	Support program to the entrepreneurial ecosystem with the objective of developing early stage startups, starting from the concept of open innovation. The goal is to identify innovative projects with broad potential for development.	Energy storage, smart grids, digital innovation, customer-focused solutions, digital innovation, clean energy and support areas.
Energy Start ⁴ (ENEL)	Open innovation program, with the objective of investing in business development and the creation of an ecosystem of startups in several sectors. It has the proposal to improve services, generate value for customers and for society.	Digitization, internet of things, renewable energies, energy storage, smart cities, electric mobility, fintech, blockchain, energy efficiency and social development.
Liga Ventures ⁵ (AES)	Program to seek innovation projects in products, services or business models. Startup partnership with talented teams, market knowledge and technology.	Internet of Things, Energy Storage, Distributed Generation, Digital Energy Solutions, Reliability and Power Quality Tools, and Power Management.
Copel+ (COPEL) ⁶	Program with the objective of seeking new business and optimizing internal processes.	Artificial and cognitive intelligence, blockchain, drones, virtual reality and augmented reality, internet of things, process gamification, virtualization of calls and processes, big data and analytics.

2 CPFL INOVA. Available at: <https://endeavor.org.br/scaleup/cpflinova/> Accessed: 15/01/2018

3 EDP Starter. Available at: <http://www.edpstarterbrasil.com.br/> Accessed: 15/01/2018

4 Energy Start. Available at: <https://www.enel.com.br/pr/quemsomos/iniativas/archive/2017/energy-start.html> Accessed: 15/01/2018

5 Liga Ventures. Available at: <http://liga.ventures/aesbrasil/> Accessed: 15/01/2018

6 Copel+. Available at:

[http://www.copel.com/hpcopel/root/sitearquivos2.nsf/arquivos/cp_052017_startup/\\$FILE/CP%200052017.pdf](http://www.copel.com/hpcopel/root/sitearquivos2.nsf/arquivos/cp_052017_startup/$FILE/CP%200052017.pdf) Accessed: 15/01/2018

Source: Created by the authors based on data collected on the company's websites

Three of the five programs presented directly cite the open innovation approach as an inspiration and backbone for structuring the initiative in the company. Companies define the main objective of the program as creating new businesses, optimizing internal processes, improving services, generating value for customers and for society. In this sense, companies seek solutions to the new challenges arising from the technological transformations that the industry is going through.

In particular, four of the five programs aim at creating innovative projects in partnership with startups focused on energy storage, which is intrinsically related to distributed generation, also indicated by companies as a fundamental aspect, and focused on applications regarding the internet of things, which will increasingly incorporate intelligent network elements for the distribution segment. The areas cited by companies also include the development of technologies such as blockchain and big data, which are revolutionizing other sectors by making transactions and data analysis more efficient.

This innovation strategy is consolidated at a time when companies in the electricity sector are offering a growing range of services to their customers, in addition to the traditional supply of electricity. It can be affirmed that the objective of startup support programs carried out by large companies in the electricity sector is to create new products, processes, organizational forms and business models, which guarantee the consolidation of dynamic capacities for companies in the sector.

7. CONCLUSIONS

Startup support programs are opportunities for both large electric utilities and for startups to unite their capabilities, experience and quality with an aim of jointly conducting innovation processes. Thus, these programs can be a good solution for organizations to fully reach their innovative potential, generating dynamic capabilities, in a context of technological transformation of the electricity sector. Large companies in the electricity sector have therefore sought to carry out startup initiatives, based on the open innovation approach, which includes programs that lead to greater interaction with other actors, which may be more flexible and agile in a scenario in which several sectors are adopting new technologies to make their processes more efficient.

In this context, the development and good management of intangible assets and intellectual capital is increasingly recognized as fundamental to the sustained competitiveness of companies. In the European electricity sector, the largest companies of this sector have implemented startup support programs since 2010. In Brazil, starting in 2016, five electric utilities started adopting these initiatives. This study provided an initial overview of the motivation to carry out these programs, based on the concepts of open innovation and dynamic capabilities, and specifically the motivation of companies to promote such initiatives in Brazil.

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