IBJESB | IBEROAMERICAN JOURNAL OF ENTREPRENEURSHIP AND SMALL BUSINESS
REVISTA DE EMPREENDEDORISMO E GESTÃO DE PEQUENAS EMPRESAS

PUBLISHER
ANEGEPE
National Association for the Study of Entrepreneurship and Small Business Management

ISSN: 2316-2058 v.10, n.2, May/Aug, 2021 www.ibjesb.org

Research Article

Intellectual property protection by incubated companies: Using formal and non-formal methods

Luciano Benvenuti Roncalio* and Fernando Richartz

Federal University of Santa Catarina, UFSC, Florianópolis, SC, Brazil

Open access

Check for updates

Editorial Details

Double-blind review System

Article History
Received: 20 Sep., 2019
Reviewed: 18 Aug., 2020
Accepted: 26 Aug., 2020
Available online: 01 May., 2021

JEL CODE: L26, M13, O00, O30, O32, O34
ARTICLE ID: 1733

Editor-in-Chief
Dennys Eduardo Rossetto, Ph.D.
SKEMA Business School

Handling Editor
Edmundo Inácio Júnior, Ph.D.
Campinas State University, UNICAMP

Translation / Proofreading
Larah Kuenhrich Biavatti Roncalio

Cite as:
Roncalio, L. B. and Richartz, F. (2021). Intellectual property protection by incubated companies: Using formal and non-formal methods. Iberoamerican Journal of Entrepreneurship and Small Business, 10(2), Article e1733. https://doi.org/10.14211/regepe.e1733

***Corresponding author**

Luciano Benvenuti Roncalio
lbr@elan.com.br

Abstract

Objective: Survey and characterization on the use of formal and non-formal methods to protect intellectual property by incubated companies that operate in the health sector. **Methodology/approach**: Bibliographic research, research with primary sources, and comparative study of the interaction of organizations with the environment**.** The incubated companies' primary source information was obtained through face-to-face interviews in field research carried out at the Celta incubator, in Florianópolis/SC, Brazil. **Main results**: There was an intense use of non-formal methods by the companies studied. The literature adequately predicted non-formal methods adopted by companies. It was also identified that regularity in certifications with Anvisa – Brazilian National Health Surveillance Agency, constitutes an important complementary asset for the appropriation of intellectual property (Teece, 1986) for the companies studied. **Theoretical/methodological contributions**: Identification of the use of non-formal methods by companies and their composition of use with formal methods contributes to the advancement of literature and business practice. **Relevance/originality**: This study emphasized research on the use of non-formal methods to protect intellectual property by incubated companies, a topic little explored in the literature. **Social and practical contribution:** the use of non-formal methods is of particular interest to small and medium-sized companies because their implementation is under the company's control and, also, because they circumvent the time and costs incurred in the formal registration. It is recommended to expand the understanding concerning the role of complementary assets (Teece, 1986) for technology-based companies.

Keywords: Intellectual property; Non-formal methods; Value appropriation; Technology-based company; Startup company.

Resumo

Objetivo do estudo: Verificar e caracterizar a utilização, por empresas incubadas do setor de saúde, de métodos formais e não formais de proteção da propriedade intelectual**. Metodologia/abordagem**: Pesquisas bibliográfica e com fontes primárias, e estudo comparativo da interação entre as organizações e o ambiente**.** As informações primárias das empresas incubadas foram obtidas em pesquisa de campo, realizada na incubadora Celta, em Florianópolis/SC, Brasil, por meio de entrevistas presenciais. **Principais resultados**: Observou-se um intenso uso de métodos não formais e de práticas previstas na literatura, sendo a regularidade em certificações junto à Anvisa identificada como um importante ativo complementar de apropriação de propriedade intelectual para as empresas estudadas (Teece, 1986)**. Contribuições teóricas/metodológicas**: Identificação da utilização de métodos não formais pelas empresas e a sua composição com métodos formais, contribuindo, com isso, para o avanço da literatura e da prática empresarial**. Relevância/originalidade**: O estudo enfatizou a investigação do uso de métodos não formais para a proteção da propriedade intelectual por empresas incubadas – tema ainda pouco explorado na literatura. **Contribuições práticas e sociais:** A utilização de métodos não formais é especialmente interessante às pequenas e médias empresas, pois a implementação está sob o seu controle, ou seja, as instituições podem contornar prazos e custos incorridos nos registros formais. Recomenda-se, nesse sentido, ampliar a compreensão do papel dos ativos complementares (Teece, 1986) para as empresas de base tecnológica.

Palavras-chave: Propriedade intelectual; Métodos não formais; Apropriação de valor; Empresa de base tecnológica; Startup.

https://doi.org/10.14211/regepe.e1733
ISSN: 2316-2058 | © 2021 ANEGEPE Ltd. All Rights Reserved.

INTRODUCTION

An intellectual property system establishes a set of laws and rules to define rights, property and to offer protection over creative works, knowledge, inventions, innovations, and other expressions of human creativity (Jungmann and Bonetti, 2010; WIPO, 2020b).

Ownership supporting is one of the main justifications for establishing a legal system of intellectual property, as it is understood as a mechanism to encourage the inventor or innovative agent by enabling them to secure returns on the initial investment in innovation (Hall et al., 2014). The financial return for the intellectual property owner derives from the right to legally exclude others from replicating the invention and addresses a fundamental problem of ownership; this problem is derived from the knowledge production in the innovation process. The knowledge resulting from an inventive step is challenging to contain. Third parties may soon be able to use this knowledge for a fraction of the effort and cost of its initial development (Hall et al., 2014).

Still, invention and innovation may happen even when a company fails to win protection from the legal system or chooses not to seek such protection. There are several reasons why companies do not seek the legal protection offered by the formal process to protect their inventions. A new product may be able to generate value for users, secure market success, and still not meet the requirements for novelty, inventive step, and industrial application established by the formal process to apply for an invention patent. In the case of a new production process, considering the requirements for documentation and publicity that formal protection imposes, important details may be exposed to competitors who may introduce variations in the process to escape the protection's limitations. (Bogers, Bekkers and Granstrand, 2012; Hall et al., 2014).

In the strategy of maximizing the potential for the appropriation of the value generated by innovations, companies can also opt for a set of alternative and non-formal methods in order to protect their innovations. Keeping secrecy about the critical aspects of innovation, establishing confidentiality agreements, practicing short cycles of introducing new technologies and design complexity are examples of alternative, non-formal methods, that can be used to protect innovation and value appropriation (Hall et al., 2014).

The combined adoption of formal and non-formal methods is a practice that can benefit the competitive positioning strategy of small technology-based companies, for short TBC. These are companies that employ innovative technologies, generate innovations from research and development efforts and hire teams with a high proportion of personnel with technical-scientific training. They usually serve specific markets and are capable of conceiving a wide variety of design and product alternatives to meet similar demands. (Machado et al., 2001).

The TBCs operate in a complex context of intellectual property, where they coexist with the rapid technical obsolescence, short deadlines for products reach the market (time-to-market), uncertainties about the speed with which innovation will spread, integration with other technological standards adopted by customers and the rapidly changing needs of those customers (Machado et al., 2001). It is a context in which formal methods of protecting intellectual property may not be sufficient and adequate, considering the complexity and the dynamic present in it. Those methods may be complemented by alternative strategies and non-formal methods to seek the protection of intellectual property and foster value appropriation (Hall et al., 2014).

THEORETICAL FRAMEWORK

Value appropriation

In a seminal article, Teece (1986) proposes an expanded understanding regarding the appropriation of the returns of an innovation, relativizing the role of ownership of legal rights as the primary method to favor the capture of innovation value. The author argues that innovative agents, even when they have ownership rights, eventually fail to capture significant value from their own innovation, which sometimes ends up benefiting more imitators, followers, customers, or other participants in the value chain and in the business sector. To systematize his understanding, Teece (1986) conceived an analysis rationale consisting of three building blocks: The Regime of Appropriability; it deals with environmental factors, which are the nature of technology and the effectiveness of legal mechanisms for the protection of intellectual property. The Design Paradigm, which refers to the diversity of propositions introduced by different providers to address a similar need. As the market matures, the diversity of designs tends to converge on a select group of the most promising, with the market discarding the others. Finally, Complementary Assets comprise the set of capacities and services necessary to bring innovation to the market. An efficient manufacturing process, highly specialized equipment or processes, logistics and distribution, sales channels, technical assistance and after-sales, are all examples of complementary assets. When the complementary asset, considered important to take advantage of the innovative solution, is not in possession of the innovative agent, but is controlled or owned by third parties, increases the probability that these other actors, and not the innovator, capture the value generated for innovation. (Alexy, George and Salter, 2011; Pisano, 2006; Teece, 1986).

Intellectual Property

Intellectual property deals with the rights inherent to intellectual and creative activity in the industrial, scientific, literary, and artistic domains. In the analysis systematized by Teece (1986), the intellectual property belongs to the building block of the appropriation regime. For organizational purposes, intellectual property is divided into three main categories: copyright, industrial property, and sui generis protection. Copyright refers to the protection of literary, artistic and scientific works, related rights, and also a software's source code, where it plays an important role. Industrial property covers invention and utility model patents , trademarks, industrial designs, geographical indications, trade secrets, and unfair competition repression. Sui generis protection deals with specific cases such as integrated circuit topography, cultivars of a new plant variety that does not exist in nature and is obtained by research in agronomy and biosciences, traditional knowledge, and access to genetic heritage. Each of these categories is subject to specific legislation (Jungmann and Bonetti, 2010; WIPO, 2020b).

In the category of copyright, the registration of an intellectual work is voluntary. It is the author's option. Also, registration, in this case, is a procedure that grants presumed authorship over the work. A new proof of antecedence may alter the recognition of the authorship and therefore of ownership. As for the case of industrial property and sui generis protection, the registration procedure is a formality that grants to the registration holder the legal rights and exclusive guarantees to manufacture, commercialize, import, use, sell or assign the invention (Jungmann and Bonetti, 2010). The legal system for the protection of intellectual property exists passively. Protection is granted by the Government, but it is up to the titleholder to

https://doi.org/10.14211/regepe.e1733
ISSN: 2316-2058 | © 2021 ANEGEPE Ltda. Todos os direitos reservados!

guard against violations of his rights and to act, usually under civil law, to interrupt violators' actions and seek reparations for their losses (WIPO, 2004).

Formal Methods

The set of formal methods of protecting intellectual property consists of those methods that require the interested party to complete a formal registration process with an officially designated body. In the case of Brazil, formal protection is granted by INPI - National Institute of Industrial Property, under the Ministry of Economy and by SNPC - National Service for the Protection of Cultivars, under the Ministry of Agriculture, Livestock and Food Supply. INPI is responsible for the formal registration of invention patents and utility models, trademarks, industrial designs, and geographical indications. It's also responsible for registering the topography of integrated circuits, under the category of sui generis protection and for the optional registration of computer, under the category of copyright. SNPC is responsible for granting the Cultivar Protection Certificate, recognizing the formal registration of new cultivars under the sui generis protection category (Jungmann and Bonetti, 2010; Carvalho, 2006; INPI 2013b).

In the process of formal registration of intellectual property, the interested party must fulfill specific requirements to obtain ownership of the intellectual property. In the formal field, the establishment of registration ownership is essential to provide commercial exploitation of an innovative product, process, or service. One of the main arguments to justify the existence of formal protection is that exclusivity represents an incentive for innovation and mitigates the problem of appropriating an innovation. For this reason, the registration must be strategically considered by the company, which must define the form, the claims, the instruments, and the appropriate time to start the legal protection process (Jungmann and Bonetti, 2010; Thomä and Bizer, 2013).

For the purposes of this study, the formal methods identified from the bibliography are trademarks, invention patent and utility model, industrial designs, geographical indication, integrated circuit topography, and cultivars.

It should be noted that under Brazilian law, all formal methods have a determined fixed term. In other words, protection expires after a specific time, and the protected right then becomes public domain. Exceptions are the case of the trademark, whose protection expires, but can be renewed indefinitely, requiring a formal process, and the case of the geographical indication, whose protection never expires (Hall et al., 2014; Jungmann and Bonetti, 2010). As the trademark can be renewed indefinitely, in the case of a successful innovation, it can be used as a market differentiator when the patent expires (Hall et al., 2014).

Although the granting of intellectual property rights is seen as essential to stimulate innovation, it is common for smaller companies to refrain from registering their intellectual property (Thomä and Bizer, 2013). However, for innovative technology-based companies, in particular, startups that are seeking for venture capital or equity funds, a patent, besides representing an asset, also signals the quality and credibility of an innovation to potential investors (Fisher III and Oberholzer-Gee, 2013; Haeussler, Harhoff, and Mueller, 2014).

Table 1 consolidates the methods that require compliance with a formal process, therefore called formal methods, which were drafted from bibliographic sources.

Method	Description	Authors
Trademarks	It is any distinctive sign, visually perceptible, that identifies and individualizes a product or service and distinguishes it from others that are similar. Brand compatibility is required concerning the production or marketing branch of the applicant company.	(Jungmann and Bonetti, 2010; WIPO, 2004)
Patent	There are two types of patents. The Invention Patent is related to absolutely new products or processes whose requirements must meet the novelty status, for being beyond the state of the art; inventive step, so it is not evident to a subject technician; and industrial applicability. The Utility Model Patent, related to improvements on an existing product or production process; whose award criteria are less rigid compared to an invention.	(Jungmann and Bonetti, 2010; INPI 2013b; WIPO, 2004)
Industrial Design	It deals with the design associated with the ornamental shape or the ornamental set of lines and colors applied to a product, providing a new and original visual result in its external configuration and capable of industrial manufacture. It protects the external configuration of the object and only its non-functional characteristics.	(Jungmann and Bonetti, 2010; WIPO, 2004)
Geographical Indication	It refers to the protection of products originating in a specific geographical area known for having different qualities or reputation arising from their form of extraction, production, or manufacture. A representative entity of the community must request it. It is divided into Indication of Origin and Denomination of Origin.	(Jungmann and Bonetti, 2010)
Integrated Circuit Topography	Grants protection of the three-dimensional configuration of an arrangement of integrated circuit components on a piece of semiconductor material, which will be used in electronic equipment.	(Jungmann and Bonetti, 2010; WIPO, 2004)
Cultivars	Protection of new plant varieties, which are not existing in nature, resulting from research in agronomy and biosciences.	(Carvalho, 2006; Jungmann and Bonetti, 2010)

Tab. 01
Consolidation of methods requiring formal registration
Source: Elaborated by the authors.

Non-formal Methods

Formal methods are a subset of the practices that companies can adopt for the management and protection of their intellectual property. There is also another subset of methods, composed of deliberate practices, positions and strategies, which do not require formal registration and through which a company can protect its intellectual property and preserve the returns on its innovations. These are the non-formal methods of protecting intellectual property (Hall et al., 2014; Päällysaho and Kuusisto, 2011). They differ, for example, from patents or trademarks, which must comply with a formal process with the INPI to guarantee the protection and ownership of the interested party.

An effective intellectual property strategy does not necessarily is based on holding intellectual property ownership and thereby being able to sue any possible imitators and block competitors. Non-formal methods can also be effective in providing a competitive advantage by protecting innovations. These methods are appealing for small and medium-sized businesses because they avoid the costs of obtaining and maintaining formal records. It should be noted that the "non-

formal" denomination does not mean the absence of contractual instruments or obligations between the parties involved in intellectual property protection (Hall et al., 2014).

In this study, the non-formal methods identified in the bibliography are copyright, trade secrets, confidentiality agreements, technological leadership, technical complexity, selective disclosure, and complementary assets.

Copyright results from the authorship of original intellectual works in the literary, scientific and artistic fields. Books, magazines, newspapers, music, drawings, paintings, photographs, sculptures, works of architecture, films, scientific articles, journalistic articles, computer programs, video games, original databases, are examples of types of works protected by copyrights (Jungmann and Bonetti, 2010; INPI, 2013a).

In the business environment, copyright finds plenty of scope for business protection. Creations such as the content of an internet site, product catalog, manuals, and even restaurant menus are under copyrights. Products such as computer programs, game characters, scenarios or soundtracks are licensing opportunities and company assets. The architectural form of business or commercial establishments are also protected (Jungmann and Bonetti, 2010; INPI, 2013a).

For copyright, the registration of the work is voluntary, an author's option; however, he must have the means to prove authorship, including situating it in time. Thus, the record is useful for the purposes of proof, either as to the authorship or as to the creation date. It should be noted that the registration is a procedure that gives presumed authorship to a work. A new proof of priority may alter the recognition of ownership (Jungmann and Bonetti, 2010; INPI, 2013a).

Protecting an invention through secrecy and confidentiality is a recognized practice in the intellectual property system called Trade Secret. Although it is a practice supported by the legislation on intellectual property rights, trade secrets are not understood as a formal protection strategy because it does not depend on a previous process of registration, concession, or recognition. It aims to prevent the unauthorized disclosure or use of information that has economic and strategic value for a company, such as financial data, cost of production, list of suppliers or customers, technical schemes, chemical formulas, manufacturing processes or recipes, and even about plans that did not work. Secrecy and confidentiality make it possible to protect even what is not ordinarily patentable or have not reached sufficient development maturity for patentability requirements. Still, the confidentiality duration is potentially infinite, whereas the patent and other formal methods of protection have a defined expiration term (Hall et al., 2014; Jungmann and Bonetti, 2010).

Companies of all sizes employ secrecy and confidentiality; however, small companies may have this practice as more important than patents when compared to large companies (Hall et al., 2014). Technologies with a short life cycle end up generating most of their returns before their patent is granted. Without the patent grant, it is more laborious for holders to seek and enforce legal protection against copies or imitators when compared to a violation after the patent is granted. Thus, in the case of short life cycles, secrecy can be more effective than the formal patent process for technological products (Reitzig, 2004).

For a company, the use of trade secrets and secrecy presents advantages and disadvantages. Unlike formal protections, secrecy is potentially infinite in duration. Just like patents, secrecy and trade secrets are costly to maintain and enforce. It requires the company to keep a strict information control policy, impose confidentiality obligations on employees, eventually pay them remunerations above the market and always be attentive in the case of their mobility to other employers (Baldwin and Henkel, 2015; Fisher III and Oberholzer-Gee, 2013; Hall et al., 2014; Jungmann and Bonetti, 2010; Reitzig, 2004; Teece, 1986).

Another drawback, an innovation that is being kept confidential may have its ownership legally required by a third party that has legally and independently reached the same invention. Duplication of development efforts and the risk of a patent by a competitor are the two main threats to the practice of confidentiality (Hall et al., 2014; Päällysaho and Kuusisto, 2011).

Sharing of value capture with a competitor, while retaining control over the innovation, can be interesting for competitive positioning. A company may license its technology to competitors as a strategy to reduce their incentive to seek their own independent innovations. This action reinforces barriers against new entrants and reduces competitors' interest in seeking their own innovation, since they do not need to invest in research and development. It establishes a dependency relationship with the licensor and maintains the portfolio of licensed competitors under certain control. Licensing can also be used to stimulate the development of complementary products, those that facilitate the use or complement the use of a top product or core technology (Fisher III and Oberholzer-Gee, 2013).

Technological leadership and technical complexity work keeping it costly for followers and imitators to fund the development or the reverse engineering efforts necessary to keep up with a market leader who imposes a continuous innovation cycle. A rapid development cycle or a continuous flow of new product introduction helps to limit the adverse effects of imitation and also build the leader's reputation among consumers. This strategy seems suitable for small companies that are able to respond quickly and align their offer to changing market demands (Hall et al., 2014; Päällysaho and Kuusisto, 2011). The technical complexity to protect software includes safeguarding the source code by selling only the object-code, database encryption and obfuscation of the source code, in order to hinder the reverse engineering of the software. Protection by technical complexity can also be done by incorporating hidden or camouflaged codes in software, documents or photographs. These codes can be used to identify the source and prove the copyright (Päällysaho and Kuusisto, 2011).

Modular architecture in the product design can also compose practices of technical complexity. Integrable modules can have their research and development or manufacturing process distributed among different teams, plants or suppliers, making it difficult to obtain technical or project details (Baldwin and Henkel, 2015; Reitzig, 2004).

Selective disclosure is the voluntary and intentional opening of knowledge and technologies under the company's domain and that have been specifically fractioned and selected to satisfy a deliberate strategy. One of the potential applications of selective disclosure is to encourage, without the need for formal agreements, other companies to produce complementary products, which enrich the product ecosystem and end up benefiting users and stimulating the demand for the product of the company that is pulling the strategy (Hall et al., 2014; Henkel, 2006; Neuhäusler, 2009).

In line with this strategy, selective knowledge disclosure has the potential to stimulate the market and expand the number of providers in the market. This movement can be interesting when a company's appropriation regime is guaranteed by controlling the complementary assets and not the intellectual property. Also

https://doi.org/10.14211/regepe.e1733
ISSN: 2316-2058 | © 2021 ANEGEPE Ltda. Todos os direitos reservados!

related to this objective is the decision to massify a particular layer of the solution architecture where the company is not as efficient, making it more accessible to customers, and to shift competition to a layer where the company has competitive differentials, influencing the balance of appropriation in the sector, blocking or lessening the strength of competitors (Al-Aali and Teece, 2013; Teece, 2013; Fisher III and Oberholzer-Gee, 2013; Teece, 1986; West, 2003).

Selective disclosure can also be employed in the form of a defensive publishing strategy to improve the company's competitive position. This practice is interesting in the service sector, where registration is often not possible, in which the copying and imitation of methods, models, and processes are common and widespread. In this situation, the widely publicized publication can make the author recognized as responsible for the innovative method, model, or process. To some extent, this can prevent copying in sectors where companies or customers consider the reputation to be an important reference (Päällysaho and Kuusisto, 2011). In the case of technological development, the publication of knowledge raises the level of inventive step, implying greater expenditures to maintain competitiveness, and impacts the state of the art, eventually preventing protection for the technological path adopted by a competitor. This latter movement can even be adopted by the company that chooses to give up a particular technological path and makes the publication to block or disable any competitor's initiatives (Hall et al., 2014; Henkel, 2006; Neuhäusler, 2009).

Sometimes the best strategy for protecting intellectual property and capturing value does not fall precisely on the technology and knowledge present in innovation. Complementary Assets contemplates a set of additional capacities and services necessary to bring the solution to the market and enable the customer or user to maximize the benefits provided by the innovation. As complementary assets, one can refer to a strong product brand, whose registration and ownership require a formal method, but also an efficient manufacturing process, a piece of highly specialized equipment or processes, logistics and distribution, marketing, marketing channels, complementary integration services and technical and after-sales (Teece, 1986).

Depending on their relationship of dependence with the innovative product, complementary assets can be classified into generic, specialized, or co-specialized. The type of complementary asset dictates a lot about control and which agent has more potential to capture the value generated by an innovation. The power of a complementary asset, especially those specialized and co-specialized, is stronger the less rigorous the appropriation regime and the more established the dominant design paradigm (Alexy, George and Salter, 2011; Teece, 1986; West and Gallagher, 2006).

In economic sectors where legal methods of intellectual property protection are effective or where innovations are difficult to copy, the lesser the importance of controlling or integrating specialized and co-specialized complementary assets. In sectors where legal protection is weak and innovations are easily imitated, the control or integration of complementary assets is imperative to enable value capture by the innovative company (Pisano, 2006).

Table 2 consolidates the non-formal methods, which were drafted from the bibliographic sources.

METHODOLOGICAL PROCEDURES

Methodological Framework

This proposal deals with exploratory research, which, according to Gil (2002), aims to provide greater familiarity with the theme, further the improvement of ideas or the discovery of intuitions. As for technical methods or procedures to be employed, this proposal is developed with the intent to "confront the theoretical view with data from reality" (Gil, 2002). To achieve this objective, bibliographic research, interviews with primary sources and comparative studies will be used. According to Bulgacov (1998), the comparative method is used to identify

Method	Description	Authors
Copyright	It recognizes rights and exclusivity to the author of original intellectual works in the literary, scientific and artistic fields. There is also the formal registration path, but it is optional.	(Jungmann and Bonetti, 2010; INPI, 2013a)
Trade Secrets and Secrecy	Through secrecy and confidentiality, prevent the unauthorized disclosure or use of information with economic and strategic value.	(Baldwin and Henkel, 2015; Fisher III and Oberholzer-Gee, 2013; Hall et al., 2014; Jungmann and Bonetti, 2010; Reitzig, 2004; Teece, 1986)
Confidentiality Agreement and License Agreement	Agreements that define, in a relationship between parties, how confidential knowledge is shared, and how intellectual property rights are assigned, transferred, protected, and appropriated.	(Baldwin and Henkel, 2015; Bogers, Bekkers and Granstrand, 2012; Fisher III and Oberholzer-Gee, 2013; Hall et al., 2014; Jungmann and Bonetti, 2010; Teece, 1986)
Technological Leadership and Technical Complexity	Make it costly for followers and imitators to fund development efforts or reverse engineering efforts to keep up with a rapid cycle and continuous flow of new product introduction.	(Hall et al., 2014; Päällysaho and Kuusisto, 2011)
Selective Disclosure	Open or make available some company knowledge and technology that have been specifically fractioned and selected to meet a deliberate strategy.	(Al-Aali and Teece, 2013; Fisher III and Oberholzer-Gee, 2013; Päällysaho and Kuusisto, 2011; Teece, 1986; West, 2003)
Complementary Assets	This refers to the set of capabilities, accessories, and services necessary to bring the solution to the market and enable the customer to maximize the benefits provided by the innovation.	(Alexy, George and Salter, 2011; Teece, 1986; West and Gallagher, 2006)

Tab. 02
Consolidation of methods without formal registration
Source: Elaborated by the authors.

https://doi.org/10.14211/regepe.e1733
ISSN: 2316-2058 | © 2021 ANEGEPE Ltda. Todos os direitos reservados!

complex phenomena, provide an initial basis, and refine the theory. Bulgacov (1998) also mentions this method as suitable for comparing organizations' performance, establishing relationships between its variables or analytical categories.

Field Research

The field research was carried out at CELTA - Centro Empresarial para Laboração de Tecnologias Avançadas. CELTA is a business incubator stablished in 1986, located in Florianópolis – Brazil and maintained by the CERTI Foundation - Reference Centers for Innovative Technologies (CELTA, 2019).

With support from the Managing Board of the CELTA incubator, we selected incubated companies that work with products or services focused on the healthcare industry sector. In these companies, we sought to identify and conduct the research with its principal manager or a person responsible for defining the product strategies.

In the field research, visits were made to the spaces of use of companies within the incubator. The interview meetings with the companies followed a script with five basic blocks: The first block is the introduction of the interview, presentation of the researcher, of the educational institution, the nature and objectives of the research, how the research will be carried out, and the delivery of a term of confidentiality and secrecy about the answers and information collected. The second block aims to characterize the company, using a questionnaire to collect objective data, such as year of foundation, number of employees, and other specific data. The third block has an exploratory attribute, intending to obtain spontaneous responses from the interviewees. Using the form of a non-directive interview, the interviewer only suggests the themes he wants to explore and seeks the interviewee's reflections on the topic. The interviewer performs the functions of guidance and stimulation (Richardson and Peres, 1999). The fourth block employed a guided interview. In this format, the researcher knows in advance the aspects that he wishes to explore and, based on them, elaborates an induced questionary contemplating such aspects in the questions. The interviewer enunciates the questions and the respondent expresses himself on the topics guided by the interviewer (Richardson and Peres, 1999). The fifth and final block deals only with the interview's closing, with acknowledgments and the meeting's ending.

ANALYSIS OF FIELD RESEARCH RESULTS

In order to comply with the confidentiality commitment assumed with the representatives of the companies, uniquely identifiable data such as the name of the company or the name of the representative are omitted or anonymized. In support of this analysis, substitute names were adopted to refer to the six companies surveyed, which were then named as: Alpha; Beta; Charlie; Delta; Echo; Fox.

Use of formal methods of protection

The group of companies revealed some diversity in the search and use of formal methods of protection. The identified methods include patents, with both the invention case and the utility model, and trademark registration, with the protection of the company's name and specific product designations.

Method		Alpha	Beta	Charlie	Delta	Echo	Fox
Brand		■	■	■	■	■	■
Patent	Invention		■			■	
	Utility		■				
Industrial Design							
Geographical Indication							
Circuit Topography							
Cultivars							

Tab. 03
Types of formal methods used in companies
Source: Elaborated by the authors.

According to Table 3, trademark registration was the most consistently adopted formal protection method among companies. All companies sought to register their brands. A prominent case was the company Echo, which claimed to have also registered designations for products in its portfolio, denoting prominent attention to its positioning in the market and differentiation of its product.

Only Beta and Echo claimed to have filed patent applications. Beta has both an invention patent and a utility model, being unique in the latter case. Echo says that its product development process always considers the possibility of identifying opportunities for protection, either of the product or of some new technology that enables the product.

No respondents' references or mentions were found regarding the other formal protection methods, namely Industrial Design, Geographical Indication, Integrated Circuit Topography, and Cultivar Protection. In the case of Geographical Indication, no mention was expected given the context and typology of the target companies of the research.

Standpoint regarding formal protection methods

Considering the standpoint of this group of companies when dealing with intellectual property protection, it was possible to distinguish some diversity among the interviewees, according to the consolidation in Table 4.

The company Alpha does not have any patents, has no registration of its solution's main software component, and has only registered its brand under trademark. However, the respondent believes that a patent's ownership provides a better perception of the market about a company and provides protection against imitations. A similar opinion is shared by Charlie and Delta, who also have no patent deposits. Echo, which actively seeks to patent, naturally expresses a favorable attitude towards intellectual property, despite having expressed doubts about its own ability to sustain a dispute in case of a third party continued infringement. Beta states that it always seeks formal protection, either by invention patent or by a utility model. When chosen not to seek formal protection, it is because it concluded, in internal evaluation, that the invention does not meet patentability. Fox expressed disbelief regarding the formal process.

Beta and Echo companies are those in which the respondents showed greater familiarity and fluency with the topic of intellectual property in its formal aspects. This is remarkable, considering the size of the companies. Beta stated that it

https://doi.org/10.14211/regepe.e1733
ISSN: 2316-2058 | © 2021 ANEGEPE Ltda. Todos os direitos reservados!

Company	Position			Comments
	Favorable	Neutral	Contrary	
Alpha	■			It understands that a patent reinforces the company's image in the market. However, it did not register the software that is the main component of the solution.
Beta	■			Prefers to seek formal protection. When it does not do so, it is because it believes that the invention does not meet patentability requirements. An internal team carries out the entire registration process. It seeks to take advantage of the resources that INPI offers to small companies.
Charlie		■		It does not have a strong objection but considers that the formal process can be time-consuming, with maintenance costs and enforcing protection costs.
Delta	■			Believes that entitled protection improves the market's perception of the company and makes it more attractive to investors.
Echo	■			It always seeks formal protection. When it does not do so, it is because of limited financial resources or patentability issues. It seeks to protect technology and image in the market but mentions drawbacks: cost, slowness, the uncertainty of the concession, and the disclosure of technology to third parties.
Fox			■	It thinks that formal protection is not attractive because it takes time, with maintenance fees and costs to enforce protection. It prefers to act with technological leadership, always launching innovations ahead of competitors.

Tab. 04
Companies standpoint regarding formal protection
Fonte: Elaborated by the authors.

prepared all the documentation and its team carried out all the stages of the filing process for its patents, without resorting to specialized offices. It also stated that it seeks to avail itself of all the benefits offered by the INPI for small companies, such as reducing fees and priority in forwarding processes.

Motivations for seeking formal protection

All companies surveyed registered their brands, which suggests a concern to protect the distinctive character that a brand provides. Beta, Charlie and Echo, on the other hand, have expressed their motivations to seek formal patent protection in a factual and precise way. Beta and Echo already have granted patents, while Charlie is looking forward to qualifying a development to file a patent.

According to its statement, Beta seeks formal protection as a defensive strategy: to guarantee its freedom to operate without being blocked by competitors, since these are large and resourceful companies, therefore with better capability to accelerate the introduction of an innovative product and conquer the market. The company also emphasizes its attention to patent databases as an opportunity to map information on the precedence of the technology, benchmarking, technological routes already protected, and also to learn about technologies whose protection has expired and therefore can be incorporated without costs.

The company Echo is motivated by the understanding that a patent filing improves the perception of other players in the business sector in relation to the company, also projects a positive image, and represents a differential for the market. Another motivation for the company is to protect its technology and product. According to the company, it positions itself as a technical reference for customers, and the development of new products is carried out in strong interaction with the market. Thus, the company understands that its products are aligned with its customers' needs, and formal protection enters to ensure the capture of the amount invested to achieve this differential.

Reasons for not seeking formal protection

Only Fox expressed firm opposition, and vehemently, to seeking formal protection for their inventions. The reasons cited by the company include the perception that the formal system is not adequate because it takes time, incurs expensive fees for a small company, and the difficulty of enforcing protection in the case of a third-party offender. However, the company claims that it uses patent databases to do precedence research and benchmarking.

Except for Fox, the other companies positioned themselves as favorable or neutral regarding formal protection. Still, regardless of their positioning, the companies Alpha, Charlie, Delta and Echo stated that they perceive the formal patent protection process as time-consuming and costly. Charlie and Echo also complemented with mentions about the difficulty in carrying out protection in case of infraction, as they would incur costs of filing a notification, attorney expertise, lawsuits. Beta and Echo stated that some competitors are large companies or multinationals, with better resources to sustain litigation and lengthy court proceedings.

Use of non-formal methods of protection

The empirical use of non-formal methods by the surveyed companies proved comprehensive regarding the practices found in the bibliographical research. The most usual method identified was the use of secrecy and trade secrets, usually accompanied by other methods that are described below.

The use of secrecy and trade secrets by the companies surveyed is based on two varieties: First, the bonding of employees through specific clauses in the employment contract or adherence to an information security policy. Second, the concentration by the entrepreneurs, or in a very restricted people circle, of the critical knowledge of technology and business.

Five out of the six companies, Alpha, Beta, Delta, Echo and Fox, said they have confidentiality clauses in the employment contract. The companies Alpha and Delta stated that, in addition to confidentiality clauses, non-competition clauses are also included in their employment contract. Those prohibit an employee, who may leave the company, from eventually competing with the company for a certain period (quarantine) after the end of the employment contract. Beta has stated that it has a specific intellectual property reservation clause in its employment contract and in contracts with third parties.

Alpha, Beta, Delta and Fox said they have a formal information security policy. Beta added that, in its case, the information security policy is part of the requirements to implement a quality system that covers the confidentiality of exams and patient data.

https://doi.org/10.14211/regepe.e1733
ISSN: 2316-2058 | © 2021 ANEGEPE Ltda. Todos os direitos reservados!

The concentration of technologic and strategic knowledge by the entrepreneurial partners is a prevalent practice among the companies surveyed. Eventually, this characteristic stems from the very way in which technology-based companies are born: entrepreneurs who make use of their mastery of a technology or business model.

Beta understands that the partners' knowledge about the business and its market is a differential, an asset, that favors the company. In addition to this differential, Beta's representative states that the partners have the specific technical knowledge and work intensively in research and development activities.

In the case of Charlie, only the partners have the know-how about its product's technology and related manufacturing process. This situation is favored by the company's still tiny size in terms of the number of employees. The interviewed partner expressed concerns about the sharing of knowledge required to enable the company's growth and the increase in the number of people who work there.

Fox's interviewee reported that the company has three employees who have the essential product and business knowledge. These employees receive a differentiated level of compensation, share confidence in operational information, and have prestige among the company's founders.

As a practice of protecting intellectual property, technological leadership requires sustaining a rapid development cycle and a continuous flow of new product introduction. Alpha, Beta and Echo, each in their own way, have made claims that they maintain an intense relationship with their customers, quickly seeking to incorporate new requirements into the products and to position themselves as a technical reference in their field. In general, respondents judge that these characteristics reinforce the reputation and market positioning of their respective companies.

Charlie stated that it is exploring a particular niche, where few competitors are operating. It seeks to differentiate itself as a technical specialist and offer a differentiated portfolio: organic chemical-based products, an environment friendly and low-impact manufacturing process, and products less harmful to a user's health.

Only Fox explicitly declared that it has technological leadership as a strategy for market positioning and combat competition. The interviewee stated that the partners, together with the team, are able to maintain a high technical level of product. Furthermore, they continuously interact with customers, always seeking to align with market requirements and demands. The interviewee believes that these practices result in a good market reputation for the company.

Charlie, Echo and Fox stated that they have the flexibility to adapt their products and that they actively seek to develop products that meet the demands expressed by their customers. Thus corroborates the understanding from the reference literature about the small companies' advantages due to their agility to adapt and speed to meet new demands in the market.

One caution mentioned by Delta is the modularization of the product design and the manufacturing process. With modular product design, the manufacture and assembly of the modules were distributed among different teams. The final integration is in charge of a small group of people, limiting access to knowledge about the specificities of product construction.

The Beta company stated that it had filed applications for invention patents and utility models as a defensive strategy, to avoid being blocked from third-party ownership. In the guided interview stage, the interviewee was asked whether selective disclosure, through the publication of articles and disclosure of information, could be a less costly and more agile strategy to block patents from competitors or third parties.

The interviewee understood the operation of the selective disclosure method; however, he concluded that, among its competitors, there are multinational companies, with the availability of resources and the ability to mobilize in the market. If he opted for the open disclosure of technical inventions, without formal protection, he would be subsidizing the development of products by his competitors with information. So, due to their size, availability of resources and mobilization capacity, competitors would end up quickly conquering a significant market share, making Beta's product unfeasible.

This case also illustrates how the control of complementary assets can provide better conditions for capturing value to the detriment of the company that created the innovation. Beta introduced an innovation, however, had it not formally registered or if it were a weak legal regime, competitors with more robust financial resources, marketing resources, and distribution channels, would quickly be able to dominate the market and capture the value from the innovation.

Concerning complementary assets, particularly those controlled by third parties with whom the companies maintain a close relationship, the general perception is that there is little risk of imbalance in capturing value or dependence on specialized services or products provided by third parties. Although interviewees recognize the need for complementary assets to enable their products, it has not been identified the possibility of unbalancing value capture.

A remarkable aspect identified regarding complementary assets concerns the need for different types of certification and authorizations granted by ANVISA to operate services and commercialize products related to the healthcare sector.

In the Brazilian health sector, ANVISA's authorization is a condition for the operation of companies that manufacture, distribute, or importing products. It also imposes registrations and certifications for medicines, cosmetics, medical and hospital equipment and materials, prostheses, and other items related to the health sector. This certification, which requires presential inspections and reports issued by accredited institutions, both for the operation of companies and for products and equipment, is, according to the interviewees' report, a costly and bureaucratic process, with several requirements and approval stages.

The Company's Operating Permit, which authorizes the company to operate, can only be requested from ANVISA by companies legally constituted in the Brazilian territory. According to the degree of risk and the type of the product, a Local Operating License and a Certificate of Good Manufacturing Practices and Control may also be required. Commercialization or purchase of supplies, products, or equipment without ANVISA's authorizations, subjects the infringer to administrative sanctions, lawsuits, and criminal penalties depending on the severity of the case.

Regularization with ANVISA to operate in the health sector is a formal and complex process. It is not directly related to or is under the protection of the intellectual property legal. However,

https://doi.org/10.14211/regepe.e1733
ISSN: 2316-2058 | © 2021 ANEGEPE Ltda. Todos os direitos reservados!

it can be understood as a collateral form of protection for the inventive step, as a barrier to imitators or copies, and as a complementary asset.

ANVISA compliance works as a protection of intellectual property, a barrier to market access, and a fundamental condition for capturing value in this business, since the sale, operation, and even the acquisition of products and services without Agency permits and certifications are prohibited, resulting in fraud and crime. For these small companies operating in the health sector, ANVISA regularity represents a complementary asset of the specialized type; with importance according to the technological advancement of the product, the present risk, and how invasive is its application.

The interviewee from the company Echo mentioned that ANVISA's requirements act as a barrier against imitations and the import or diversion of low-cost and low-quality foreign products, notably from Chinese origin, and with potential risk to the health of final.

Table 5 consolidates the non-formal methods drafted from the bibliographic research and relates them to the companies in which they were identified.

CONCLUSIONS

This research aimed to verify and understand the use of formal and non-formal methods of protecting intellectual property by companies that focus on the healthcare industry sector and are incubated at CELTA.

Regarding formal methods, the practices identified during the research were limited to trademark registration, invention patents, and utility models. At least one industrial design record was expected, but no case was identified. No mention was expected on the other methods, namely geographical indication, integrated circuit topography, and cultivar protection, given the context and typology of the target companies of the research.

The field research found out that all companies interviewed have registered trademarks, protecting the company's brand as well as specific product designations. Two out of the six companies have already won an invention or utility model patent, a significant number considering the small sample size.

Among the reasons that companies expressed in favor of formal methods, the main reasons are the improved market positioning by patent holders, the protection of technology and the perception that the ownership of a patent makes the company more attractive to investors. All these aspects are present in the systematization of the literature.

The literature survey was very efficient in anticipating the main practices adopted in the field of non-formal methods of protection. Among interviewed companies, the field research did not find cases of third parties licensing and selective disclosure or defensive publication.

In the case of selective disclosure, in contrast to the literature survey, one of the interviewee's reflection suggests that this practice is not suitable to be adopted by small companies in a context of competition with large companies. This caveat was not found in the literature survey.

Regarding licensing, there were no cases of technology licensing for third parties, only licensing by third parties to the incubated company; however, just one case. An interviewee's reflection exposes that small businesses are created from the mastery of a specific technology. Licensing this single technology would not be interesting as it is fundamental to the company's growth.

Trade secrets, secrecy and confidentiality are practiced by all interviewed companies. The highlight goes to one of the companies that said it also incorporated a non-competition clause in its employment contract in the hope of imposing a quarantine when the employee leaves the company. Two major sets of practices were identified: a) clause in the employment contract, with observance to an information security policy or non-competition clause. b) The concentration by the entrepreneurs, or by a restricted group, of the key technology and business knowledge. In the latter group, one of the companies stated that it provides higher compensations for the group of employees who hold essential knowledge. The literature had also assumed this practice as a way for companies to promote loyalty among these employees.

Technological leadership and modularization are practices adopted by some companies. In addition, they seek to maintain a constant communication channel with their customers and the market to collect subsidies to the development and evolution of products. They stated that they have the flexibility to adapt their

Method	Companies						Comments
	Alpha	Beta	Charlie	Delta	Echo	Fox	
Copyright	■	■		■	■		It does not use it deliberately; it is implicit in manuals, software, and drawings.
Trade Secrets and Secrecy	■	■	■	■	■	■	Two forms were identified: (a) clause in the employment contract, adherence to an information security policy or non-competition clause. (b) The concentration by entrepreneurs of critical technology and business knowledge.
License Agreement and Non-disclosure Agreements		■		■	■		It has been verified that there are only confidentiality agreements with suppliers and development partners.
Technological Leadership and Technical Complexity				■		■	A case of deliberate technological leadership strategy and a case of technical complexity via modularization of the project.
Selective Disclosure							An interviewee commented that the practice is not adequate. Risk of large competitors adopting its technology and quickly gaining market share.
Complementary Assets	■	■	■	■	■	■	Highlighting the compliance to ANVISA acts, with different levels of permission and certifications.

Tab. 05
Consolidation of the identified non-formal methods
Source: Elaborated by the authors.

https://doi.org/10.14211/regepe.e1733
ISSN: 2316-2058 | © 2021 ANEGEPE Ltda. Todos os direitos reservados!

products and actively seek to develop products that meet the demands expressed by their customers. Thus, corroborates the understanding of the literature about the advantages attributed to small companies due to their agility to adapt and speed to meet new demands in the market.

The importance of complementary assets, among non-formal methods, was characterized by the different levels of certification and regulatory compliance to ANVISA – the Brazilian National Health Surveillance Agency. The certifications required for regularity to ANVISA rules are a crucial element to enable value capture from innovations in the health sector. Products, equipment or services to the healthcare sector, however advanced or effective, cannot be commercialized without certification. It thus constitutes a complementary asset of the specialized type. One of the interviewees perceives ANVISA's regularity requirements as a barrier against imitations and imports of low-cost and low-quality foreign products. An unfair competition that also poses a potential risk to the health of final users.

For the future unfolding and evolution of the research, it is suggested to expand the number of companies studied, including other market sectors present in the incubator, and also a horizontal study covering different innovation centers to obtain a better representation of technology-based companies.

It is also recommended to deepen the understanding of complementary assets' role in small innovative companies – startup companies. These companies are usually born from a specific technology or business model. A better understanding of the role of complementary assets can help to make better predictions about the company's potential success and how to create a complementary context for these ventures to thrive.

Finally, it is suggested a combined action between incubators and the INPI, the body in charge of industrial property registries in Brazil, with the objective of presenting better clarifications to the incubated companies about the mechanisms and facilities offered by this body for small companies. Some of the negative perceptions that entrepreneurs have regarding formal methods are no longer valid. INPI and the Brazilian Federal Government have been adopting a set of measures, with an emphasis on the needs of small companies, reducing bureaucracy, complexity, costs and time process analysis.

Authors' statement of individual contributions

Roles	Authors Contributions	
	Roncalio, LB	Richartz, F
Conceptualization	X	X
Methodology	-	X
Software	-	-
Validation	X	X
Formal analysis	X	X
Investigation	X	X
Resources	X	X
Data Curation	X	X
Writing - Original Draft	X	X
Writing - Review & Editing	X	X
Visualization	X	X
Supervision	-	X
Project administration	X	X
Funding acquisition	-	-

Conflit of interest statement

We, Luciano Benvenuti Roncalio; Fernando Richartz, authors of the paper entitled "INTELLECTUAL PROPERTY PROTECTION BY INCUBATED COMPANIES: USING FORMAL AND NON-FORMAL METHODS", declare that we have no financial and non-financial conflicts of interest. Florianópolis, SC, Brazil, March 21st, 2021.

REFERENCES

Al-Aali, A. Y., & Teece, D. J. (2013). Towards the (strategic) management of intellectual property: Retrospective and prospective. California management review, 55(4), 15-30. https://doi.org/10.1525/cmr.2013.55.4.15

Alexy, O., George, G., & Salter, A. (2011, January). From sensing shape to shaping sense: A dynamic model of absorptive capacity and selective revealing. In Academy of Management Proceedings (Vol. 2011, No. 1, pp. 1-6). Briarcliff Manor, NY 10510: Academy of Management. https://doi.org/10.5465/ambpp.2011.65869638

Baldwin, C. Y., & Henkel, J. (2015). Modularity and intellectual property protection. Strategic management journal, 36(11), 1637-1655. https://doi.org/10.1002/smj.2303

Bogers, M., Bekkers, R., & Granstrand, O. (2012). Intellectual property and licensing strategies in open collaborative innovation. In Open innovation in firms and public administrations: Technologies for value creation (pp. 37-58). IGI global. https://doi.org/10.4018/978-1-61350-341-6.ch003

Bulgacov, S. (1998). Estudos comparativo e de caso de organizações de estratégias. Organizações & Sociedade, 5(11), 53-76. https://doi.org/10.1590/s1984-92301998000100001

Carvalho, S. M. P.; Salles-Filho, S. L. M.; Paulino, S. R. (2006). Propriedade intelectual e dinâmica da inovação na agricultura. Revista Brasileira de Inovação, v. 5, p. 315-340, 2006. https://doi.org/10.20396/rbi.v5i2.8648932

CELTA Centro Empresarial para Laboração de Tecnologias Avançadas. Website Institucional. Disponível em . Consultado em: 14/04/2019. https://doi.org/10.1590/s1413-99362007000100003

Fisher III, W. W., & Oberholzer-Gee, F. (2013). Strategic management of intellectual property: an integrated approach. California management review, 55(4), 157-183. https://doi.org/10.1525/cmr.2013.55.4.157

Gil, A. C. (2002). Como elaborar projetos de pesquisa. São Paulo, 5(61), 16-17.

Haeussler, C., Harhoff, D., & Mueller, E. (2014). How patenting informs VC investors – The case of biotechnology. Research Policy, 43(8), 1286-1298. https://doi.org/10.1016/j.respol.2014.03.012

INPI - Instituto Nacional da Propriedade Industrial (2012). Diretriz de Exame de Patentes de Modelo de Utilidade. DIRPA - Diretoria de Patentes. Maio, 2012. https://doi.org/10.16928/2316-8080.v9n2p.41-66

INPI - Instituto Nacional da Propriedade Industrial (2013a). Expressão criativa: uma introdução ao direito de autor e aos direitos conexos para pequenas e médias empresas / Instituto Nacional da Propriedade Industrial. Rio de Janeiro: INPI, 2013. 88 p.; il. https://doi.org/10.17771/pucrio.acad.16043

INPI - Instituto Nacional da Propriedade Industrial (2013b). Inventando o futuro: uma introdução às patentes para as pequenas e médias empresas / Instituto Nacional da Propriedade Industrial. Rio de Janeiro: INPI, 2013. 68 p.; il. https://doi.org/10.17771/pucrio.acad.16043

INPI - Instituto Nacional da Propriedade Industrial (2018). Indicadores de Propriedade Industrial 2018. / Jorge, M. F., Lopes, F. V., Assis, F. L., Travassos, G., Freitas, V., Nonato, A. C., Orind, V., Carvalho, S. P.. Rio de Janeiro: Instituto Nacional da Propriedade Industrial - INPI, 2018. https://doi.org/10.17771/pucrio.acad.16043

Jungmann, D. D. M., & Bonetti, E. A. (2017). A caminho da inovação: proteção e negócios com bens de propriedade intelectual: guia para o empresário, Brasília: IEL, 2010. 125 p.: il.

Hall, B., Helmers, C., Rogers, M., & Sena, V. (2014). The choice between formal and informal intellectual property: a review. Journal of Economic Literature, 52(2), 375-423. https://doi.org/10.1257/jel.52.2.375

Henkel, J. (2006). Selective revealing in open innovation processes: The case of embedded Linux. Research policy, 35(7), 953-969. https://doi.org/10.1016/j.respol.2006.04.010

Lei nº 9.279 de 14 de maio de 1996. Diário Oficial da União de 15/05/1996, pág. 8353. Disponível em https://www.planalto.gov.br/ccivil_03/leis/l9279.htm. Acesso em 08/08/2020.

Machado, S. A., Pizysieznig Filho, J., Carvalho, M. M. D., & Rabechini Junior, R. (2001). MPEs de base tecnológica: conceituação, formas de financiamento e análise de casos brasileiros. São Paulo: Sebrae-SR.

Musskopf, D. B. (2017). A visão baseada em capacitação e os documentos de patentes: os modelos de utilidade como resultado de capacitações não-dinâmicas. 2017. Rio de Janeiro: IE/Universidade Federal do Rio de Janeiro. Tese (Doutorado em Políticas Públicas, Estratégias e Desenvolvimento). https://doi.org/10.1590/1807-01912016223524

Neuhäusler, P. (2009). Formal vs. informal protection instruments and the strategic use of patents in an Expected-Utility framework (No. 20). Fraunhofer ISI discussion papers innovation systems and policy analysis.

Päällysaho, S., & Kuusisto, J. (2011). Informal ways to protect intellectual property (IP) in KIBS businesses. Innovation, 13(1), 62-76. https://doi.org/10.5172/impp.2011.13.1.62

Pisano, G. (2006). Profiting from innovation and the intellectual property revolution. Research policy, 35(8), 1122-1130. https://doi.org/10.1016/j.respol.2006.09.008

Reitzig, M. (2004). Strategic management of intellectual property. MIT Sloan Management Review, 45(3), 35-40.

Richardson, R. J. (2017). Pós-Graduação-Metodologia-Pesquisa Social: Métodos e Técnicas-Métodos Quantitativos e Qualitativos. Editora ATLAS SA-2015-São Paulo.

Teece, D. J. (1986). Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. Research policy, 15(6), 285-305. https://doi.org/10.1016/0048-7333(86)90027-2

Thomä, J., & Bizer, K. (2013). To protect or not to protect? Modes of appropriability in the small enterprise sector. Research Policy, 42(1), 35-49. https://doi.org/10.1016/j.respol.2012.04.019

West, J. (2003). How open is open enough? Melding proprietary and open-source platform strategies. Research policy, 32(7), 1259-1285. https://doi.org/10.1016/s0048-7333(03)00052-0

West, J., & Gallagher, S. (2006). Challenges of open innovation: the paradox of firm investment in open-source software. R&D Management, 36(3), 319-331. https://doi.org/10.1111/j.1467-9310.2006.00436.x

WIPO - World Intellectual Property Organization. (2020a). Utility models. Disponível em https://www.wipo.int/patents/en/topics/utility_models.html. Acesso em 08/08/2020

WIPO - World Intellectual Property Organization. (2020b), First Publication 2004). What is intellectual property? (Vol. 450). Geneva, Switzerland: Wipo. Recuperado de https://www.wipo.int/edocs/pubdocs/en/wipo_pub_450_2020.pdf

WIPO World Intellectual Property Organization. (2004). Wipo intellectual property handbook: policy, law and use (Vol. 489). Geneva, Switzerland: Wipo. Recuperado de http://www.wipo.int/freepublications/en/intproperty/489/wipo_pub_489.pdf

AUTHOR BIOGRAPHIES

Luciano Benvenuti Roncalio *has a Master's degree in Intellectual Property and Technology Transfer from UFSC - Universidade Federal de Santa Catarina, Brazil. Graduated degree in Business Administration from ESAG - UDESC. Specialization in Marketing from FGV Management. Extension in Skills for the Development of Innovations by UFSC. Scrum Alliance Product Owner certification in agile development; PRINCE2 Practitioner in project management. He is currently responsible for project management, business process modeling, and technological innovation management with an emphasis on digital convergence at the CERTI Sapientia Institute.. E-mail: LBR@elan.com.br*

Fernando Richartz *is currently professor at the Department of Accounting Sciences at UFSC - Universidade Federal de Santa Catarina, Brazil. He holds a Ph.D. in Accounting (2016), a Master's degree in Accounting (2013), and a Bachelor of Science degree in Accounting from PPGC - UFSC. Researcher at the Cost Management Group. He currently teaches Undergraduate courses of Accounting Sciences, Master's degree in Management and Control, and Master's degree in Intellectual Property and Technology Transfer. He also has experience in the private sector, where he worked as an analyst of industrial intelligence at the Observatório da Indústria Catarinense from the Federation of Industries of the State of Santa Catarina and as an executive of Investe SC - Investment Attraction Agency of Santa Catarina.E-mail: fernandorichartz@gmail.com*