UNIVERSIDADE ESTADUAL DO OESTE DO PARANÁ
PROGRAMA DE PÓS-GRADUAÇÃO EM ADMINISTRAÇÃO
MESTRADO PROFISSIONAL

WESTERN PARANÁ STATE UNIVERSITY
PROFESSIONAL MASTER'S IN ADMINISTRATION

FATORES INFLUENCIADORES E RESULTADOS DE PROJETOS DE INOVAÇÃO ABERTA EM UMA COOPERATIVA DE TRABALHO MÉDICO

INFLUENCING FACTORS AND RESULTS OF OPEN INNOVATION PROJECTS IN A MEDICAL WORK COOPERATIVE

[TRADUÇÃO INGLESA]

EVERTON ANTONIO GARBOÇA

CASCAVEL
2021

EVERTON ANTONIO GARBOÇA

FATORES INFLUENCIADORES E RESULTADOS DE PROJETOS DE INOVAÇÃO ABERTA EM UMA COOPERATIVA DE TRABALHO MÉDICO

INFLUENCING FACTORS AND RESULTS OF OPEN INNOVATION PROJECTS IN A MEDICAL WORK COOPERATIVE

[TRADUÇÃO INGLESA]

Dissertation presented in partial fulfilment of the requirements for the degree of **Master of Science in Administration** in the Department of Administration, Western Paraná State University.
Dissertation Supervisor: Dra. Elizandra da Silva

Dissertação apresentada ao Programa de Pós-Graduação em Administração (PPGAdm) – Mestrado Profissional, da Universidade Estadual do Oeste do Paraná, como requisito parcial para obtenção do grau de **Mestre em Administração**.
Orientador (a): Dra. Elizandra da Silva

CASCAVEL
2021

International Cataloging-in-Publication Data
UNIOESTE Library System

Garboça, Everton Antonio.
Influencing factors and results of open innovation projects in a medical work cooperative/ Everton Antonio Garboça; Supervisor, Elizandra da Silva; [Translation of Jaqueline Motter de Oliveira], 2021.
112 f.

Dissertation (Degree in of Master of Science in Administration) – Department of Administration, Western Paraná State University, 2021

[English version of: Fatores influenciadores e resultados de projetos de inovação aberta em uma cooperativa de trabalho médico]

1. Sustainability. 2. Open Innovation. 3. Innovation Perfomance. 4. Market Performance. I. Silva, Elizandra da. II. Oliveira, Jaqueline Motter de. III.Title.

unioeste
Universidade Estadual do Oeste do Paraná

EVERTON ANTONIO GARBOÇA

Fatores influenciadores e resultados de projetos de inovação aberta em uma cooperativa de trabalho médico

Dissertação apresentada ao Programa de Pós-Graduação em Administração em cumprimento parcial aos requisitos para obtenção do título de Mestre em Administração, área de concentração Competitividade e Sustentabilidade, linha de pesquisa Sustentabilidade, APROVADO(A) pela seguinte banca examinadora:

Orientador(a) - Elizandra da Silva

Universidade Estadual do Oeste do Paraná - Campus de Cascavel (UNIOESTE)

Ivano Ribeiro

Universidade Estadual do Oeste do Paraná - Campus de Cascavel (UNIOESTE)

Victor Manoel Pelaez Alvarez

Universidade Federal do Paraná (UFPR)

Marcelo Roger Meneghatti

Universidade Estadual do Oeste do Paraná - Campus de Cascavel (UNIOESTE)

Cascavel, 29 de março de 2021

THANKS

I thank God for the gift of life, health, and protection, and for all blessings in the form of inspiration, persistence, and light on the path taken in this challenge.

I thank the representatives and collaborators of the State University of Western Paraná for the opportunity given, through this important master's program, which enables so important training in our region free of charge.

I thank the teachers of the program for all the knowledge passed on, for the contribution and companionship during this journey. In particular, I thank the teacher and advisor Elizandra da Silva for believing in my potential since the selection as a special student of her discipline of Technology and Innovation Management and later in the selection of this project, always with great understanding, zeal, patience, and professionalism for the research to be completed successfully.

I thank the members of the board, professors Ivano Ribeiro, Marcelo Roger Meneghatti, and Victor Manoel Pelaez Alvarez, for the rich suggestions and various contributions that strengthened this work.

I thank my colleagues (Class 2019), by the shares, experiences, pains, and companionship in all difficult times. You have been and will always be special.

I thank the representatives of startups, Sebrae, Unioeste and the Unimed Cascavel employees and managers, who were fundamental in sharing information and perceptions that led to the analysis and results of this research.

I thank the representatives of Unimed Cascavel for the openness and contribution, always giving support and encouragement for the research to be completed and used in the future in a practical way by the cooperative, especially superintendent Luciana Salete Lazzari, for her professionalism, serving as an example to be followed as a researcher and administrator. You are and always will be a source of inspiration.

And mainly, I thank my parents, Antonio and Silmara, who taught me from an early age that, through education, work, determination, and humility, any dream can come true and this was only possible by the education and example received from them. I thank my little sister Maria Clara, who is the light of our family and who rejoices our days and will have a bright future ahead. And finally, I thank my wife Thasyara for companionship, love, complicity, and unconditional support, at all times of this trajectory, pushing and strengthening me so that the ultimate goal could be achieved. Father, mother, sister and, my dear wife, without you none of this would have been possible. It's for you, always. I love you.

GARBOÇA, Everton Antonio. (2021). Fatores influenciadores e resultados de projetos de inovação aberta em uma cooperativa de trabalho médico. 112f. Dissertação (Mestrado Profissional em Administração) – Programa de Pós-Graduação em Administração (PPGADM) – Universidade Estadual do Oeste do Paraná, Cascavel - PR, 2021.

RESUMO

A inovação aberta consiste na exploração de conhecimentos provenientes de fora da organização, em que agentes internos e externos trabalham em sinergia para melhoria de processos e a criação de novos produtos e serviços potencializando a competitividade e a sustentabilidade nas organizações. O objetivo deste estudo foi analisar os fatores influenciadores e os resultados gerados por projetos de inovação aberta, desenvolvidos por uma cooperativa de trabalho médico. Para isto, esse estudo teve uma abordagem qualitativa, utilizando a estratégia de estudo de caso, consistindo na definição de grupos de análise baseados na literatura e na realização de análise documental e entrevistas com 12 agentes internos e 7 externos que participaram dos projetos de inovação aberta executados pela organização nos últimos três anos, sendo os principais: duas *hackathons* (maratonas de desenvolvimento), parcerias com *start-ups* e criação de um *hub* de inovação em conjunto com o Sebrae Cascavel e Unioeste. Dentro do grupo de fatores influenciadores relacionados a estrutura organizacional os resultados observados foram um atendimento parcial de todos os itens, evidenciando que a cooperativa pode ainda implementar setores, equipes e lideranças focadas nos projetos para evolução dos resultados. Já no grupo de redes de relacionamento, cultura e estratégia, notou-se também um atendimento parcial em itens como processos, comunicação e incentivos, que ainda possuem uma estruturação e implementação com limitações. Nesse grupo, destaca-se o item de redes de relacionamento que teve um resultado com atendimento total, sendo assim, um ponto forte identificado dentro das dinâmicas de inovação aberta. Já no grupo de desempenho inovador destacou-se o não atendimento dos itens de quantidade de produtos novos e aproveitamento destes. Por outro lado, um destaque positivo encontrado está relacionado aos ganhos organizacionais, onde a cooperativa apresentou bons resultados, com indicadores de recuperação de receitas de aproximadamente R$ 500.000,00 com ferramentas desenvolvidas por meio dos projetos de inovação aberta. O grupo ligado ao desempenho de mercado apresentou os piores resultados, com não atendimento em diversos itens, demonstrando outra lacuna a ser explorada pela cooperativa, principalmente no que tange ao desenvolvimento de projetos que impulsionem os novos produtos. Por fim, o grupo de desempenho operacional demonstrou um destaque positivo no item de qualidade e melhoria de processos. Assim, pode-se inferir que os projetos de inovação aberta possuem diversas oportunidades de melhorias a serem implantadas em praticamente todos os grupos analisados, mas considerando que ainda são projetos com pouco tempo de implantação, já demonstram resultados positivos e cenários promissores a médio e longo prazo. Esta pesquisa contribui de forma prática para elaboração de estratégias vinculadas ao desenvolvimento da inovação aberta, produzindo resultados mais efetivos para a organização e públicos externos envolvidos, como os órgãos de fomento da inovação, *start-ups* e universidades da região, promovendo a evolução da inovação no contexto regional em que a cooperativa está inserida. Além disso, oferece uma proposta estruturada para análise da inovação aberta, que pode ser replicada por outras cooperativas do ramo da saúde, cooperativas de outros ramos de atuação e até outros tipos de organização que desenvolvam projetos ou ações neste tema, visando alcançar resultados mais efetivos.

Palavras-chave: Sustentabilidade; Inovação Aberta; Desempenho de Inovação; Desempenho de Mercado; Desempenho Operacional.

GARBOÇA, Everton Antonio. Influencing factors and results of open innovation projects in a medical work cooperative. 2021. 112f. Dissertação (Mestrado Profissional em Administração) – Programa de Pós-Graduação em Administração (PPGADM) – Universidade Estadual do Oeste do Paraná, Cascavel - PR, 2021.

ABSTRACT

Open innovation consists of exploring knowledge from outside the organization, where internal and external agents work in synergy to improve processes and create new products and services, enhancing competitiveness and sustainability in organizations. The aim of this study was to analyze the influencing factors and the results generated by open innovation projects developed by a medical work cooperative. For this, this study had a qualitative approach, using the case study strategy, consisting of the definition of analysis groups, based on the literature, in the performance of documentary analysis and interviews with 12 internal and 7 external agents who participated in open innovation projects, executed by the organization in the last three years, the main ones being: two *hackathons* (development marathons) , partnerships with *start-up*s and the creation of an innovation *hub* in conjunction with Sebrae Cascavel and Unioeste. Within the group of influencing factors, related to the organizational structure, the results observed were a partial fulfillment of all items, evidencing that the cooperative can still implement sectors, teams and leaders focused on projects for the evolution of results. In the group of relationship networks, culture, and strategy, there was also a partial service in items such as processes, communication and incentives, which still have a structure and implementation with limitations. Still in this group, we highlight the item of relationship networks that had a result with total service, thus being a strong point identified within the dynamics of open innovation. In the innovative performance group, the non-attendance of the items of quantity of new products and the use of these products stood out. On the other hand, a positive highlight found is related to organizational gains, where the cooperative presented good results, with revenue recovery indicators of approximately R$ 500,000.00, with tools developed through open innovation projects. The group linked to market performance presented the worst results, with the non-attendance in several items, thus demonstrating another gap to be explored by the cooperative, especially with regard to the development of projects that propel the new products. Finally, the operational performance group showed a positive highlight in terms of quality and process improvement. Thus, it can be inferred that open innovation projects have several opportunities for improvement to be implemented in practically all the groups analyzed, but, considering that they are still projects with a short implementation time, they already demonstrate positive results and promising scenarios in the medium and long term. This research contributes in a practical way to the elaboration of strategies linked to the development of open innovation, producing more effective results for the organization and external audiences involved, such as innovation promotion agencies, *start-ups* and universities in the region, promoting the evolution of innovation in the regional context in which the cooperative is inserted. In addition, it offers a structured proposal for the analysis of open innovation, which can be replicated by other cooperatives in the health sector, cooperatives from other branches of activity and even other types of organization that develop projects or actions in this subject, aiming to achieve more effective results.

Keywords: Sustainability; Open Innovation; Innovation Performance; Market Performance; Operational Performance.

LIST OF FIGURES

LIST OF FRAMES

SUMMARY

1 INTRODUCTION

Innovation is considered a critical success factor for organizations, as companies, considered innovative, tend to obtain more results and, consequently, have faster growth (Tidd & Bessant, 2015; Hatak *et al.*, 2016; Maciuliene & Skarzauskiene, 2016). The model of generic innovation, considered traditional, has as a premise to acquire advances in knowledge and innovations in new products and services, based on a limited number of resources and technology (Chesbrough, 2003; De Paulo, 2017; Ferrari, Scaliza & Jugend, 2019).

With the advance of competitiveness, this model of classical innovation, considered closed, began to prove inefficient to meet the rapid dynamics of the market, demonstrating not to be flexible and, consequently, not to be effective in the face of the needs imposed by the market to organizations (Bekkers & Tummers, 2018; Sivam *et al.*, 2019).

A different model to the one presented is that of *Open Innovation*, which, as a basic concept, exploits knowledge external to the organization (Chesbrough, 2003), in order to create a larger portfolio of technologies (Cassiman & Valentini, 2016; Popa, Soto & Martinz, 2017) and options that propel innovation (Frank *et al*., 2019; Hansen and Garcia, 2018).

With the implementation of Open Innovation, the operational flows to innovate work freely (Chesbrough, 2014), transforming knowledge received from external agents to accelerate the innovation process (Lassen, 2017; Kim & Schim, 2018; Yun & Liu, 2019).

This dynamic provides the creation of products and services in order to explore new markets (Alvarez-Aros and Herrera, 2018, Sivam *et al.*, 2019), to enhance the results of these innovations with the generation of value and competitive advantage (Frizzo, 2018; Zhou, Yao & Chen, 2018; Bacon, Williams & Davies, 2019; Lazarenko, 2019), through a more solid, dynamic and efficient culture of entrepreneurship (Comissão Europeia, 2016; Alvarez-Aros & Herrera, 2018; Sivam *et al.*, 2019).

The activities and projects related to the implementation of Open Innovation have been encouraged and pointed out as fundamental by renowned associations of innovation research around the world, as is the case of the Organization for Economic Cooperation and Development (OECD) and the European Innovation Commission (EU). These organizations recommend that the implementation of Open Innovation should take place in order to achieve new solutions through integrated and multidisciplinary innovation policies, which are based on a greater balance and efficiency of production between internal and external sources of organizations (Comissão Europeia, 2014ª; OCDE, 2008; Comissão Europeia, 2012a, 2013e).

The use of Open Innovation has been growing and being implemented in multinational companies in the context of the triple helix, with the participation of companies, universities, and public institutions (Chesbrough & Bogers, 2014; Ivascu, Cirjaliu & Draghici, 2016; Vieira; Fernandes, Ferreira & Peris-Ortiz, 2019; Cheah & Ho, 2020). It is still being implemented in a timid manner in small and medium-sized companies (Hamilcar & May 2018; Fernandes, Ferreira & Peris-Ortiz, 2019, Hero & Linfors, 2019, Jugend *et al.,* 2020), but with opportunities for use, if they are stimulated and have technical and financial support (Rosa, Chimendes & Amorim, 2020).

Some studies analyzed demonstrate the existence of a direct relationship between openness with collaboration from external partners and advancement in innovation projects (Geri, Gafni & Bengov, 2017; Fernandes, Ferreira & Peris-Ortiz, 2019). These actions end up impacting the sustainability of organizations (Bogers, Chesbrough & Strand; 2020), end up impacting the transformation of the company's business, with the support of *start-ups* (Steiber & Alänge, 2020), with the support of universities (Johnston, 2020), with interaction, and end up impacting the financing and public support for innovation (Cheah & Ho, 2020; Jugend *et al.*, 2020).

One aspect found in studies on the subject concerns the positive impact that organizational structure and culture, focused on Open Innovation, can produce in reference to the innovation capacity of companies (Rangus & Slavec, 2017; Flor, Cooper & Oltraa, 2018). This direct impact may be related to the performance of leaders in order to encourage employees to participate in Open Innovation projects (Badir, Frank & Bogers, 2019; Naqshbandi & Tabche; 2019), with the clear formalization of the operational flows of Open Innovation development, with the responsibilities of each employee for the production and implementation of ideas (Liu *et al*., 2020) and with the understanding that human, structural and relational capital enhance the success of Open Innovation projects, implemented by the organizations (Barrena-Martínez *et al.*, 2019).

Another aspect found concerns the relationship between the use of Open Innovation and its results in relation to its innovation performance, with the creation of new products and services (Lopes & Carvalho, 2018; Sotello *et al.*, 2018; Rauter *et al.*, 2019, Zhou *et al.*, 2019; Lee & Yoo, 2019; Lacerda & Van den Bergh, 2020), to the Market Performance, with sales growth (Stefan & Lars Bengtsson, 2017), to the increase in customer satisfaction and the positive market perception by customers (Restreplo-Morales & Loaiza and Vanegas, 2019).

Still, in relation to these aspects, another group is the Operational Performance, with the increase of revenues and the reduction of costs (Rubera, Chandrasekaran & Ordanini, 2016),

the increase of the quality of the processes (Cassiman & Valentini, 2016; Zanjirchi, Jalilian & Mehrjardi, 2019; Singh *et al.*, 2019) and the evolution of effectiveness in the applicability of innovations formulated by the Open Innovation model (Burcharth, Knudsen & Sondergaard, 2017; Popa *et al.*, 2017; Moretti & Biancardi, 2018; Pollok, Lüttgens & Piller, 2019).

Therefore, it demonstrates the importance that the application of Open Innovation can bring to the performance of organizations so that, if the influencing factors and results are known, they can be analyzed continuously in order to improve work dynamics and results of the organization that promotes them.

1.1 RESEARCH PROBLEM

Given the theme of evaluation of the results that Open Innovation projects can generate, some studies have an influence of the organizational structure on the results achieved by these projects (Brocco & Groh, 2009; Tidd & Bessant, 2015; Scaliza, 2015; Harel, Schwartz & Kaufmann, 2019). In a complementary way, we found factors related to relationship networks, culture, and strategy that also influence the results achieved by Open Innovation projects (Stal, Nohara & Chagas, 2014; Scaliza, 2015).

Some studies indicate different perspectives regarding results and that this type of innovation can generate in the general performance and in the aggregation of value for companies promoting this type of work. Some studies show that Open Innovation achieves gains and has a positive impact on organizational performance (Atuahene-Gima & Wei, 2011; Hung & Chou, 2013; Mazzola, Bruccolere & Perrone, 2012; Parida *et al.*, 2012; Popa, Soto & Martinz, 2017; Rangus *et al.*, 2017; Zhou, Yao & Chen, 2018). However, other studies bring as a result a negative impact to the performance of organizations that used Open Innovation in their processes and work dynamics (Laursen & Salter, 2006; Caputo *et al.*, 2016).

The identification of the influencing factors and the difference between results presented in different studies demonstrate a theoretical gap regarding the dynamics of identifying the results that Open Innovation can generate, especially in terms of the existence of procedures and metrics that compile attributes related to the types of performance of Open Innovation and the factors that influence these results.

Linked to this gap of identification, in a consolidated way, of the results of Open Innovation and of how these results are influenced by organizational factors, this same gap was observed, in a practical way, in the cooperative object of study, where projects, linked to Open

Innovation, have been running for three years, however, the detailed results are not yet known and, consequently, there is no concrete analysis on these projects, which may be generating satisfactory results or not for the organization. Without this knowledge about the results, according to the cooperative's managers, it faces a limitation with regard to possible future projections and decision-making. Therefore, in the first instance, clear elucidation and presentation of the results that the projects are generating are necessary, so that, with this information, it is possible to project evolutions and make decisions about the future of these projects in the organization under study.

Thus, this study was developed in a cooperative of medical work, called “Unimed de Cascavel”. This cooperative has 31 years of existence and since 2018 it has implemented Open Innovation projects in its routines, namely: two *hackathons*, partnerships with *start-ups* to produce technological solutions and, an innovation HUB within a university in the region where it operates.

According to reports of the cooperative, referring to these initiatives (UNIMED, 2018d; UNIMED, 2019d; UNIMED, 2020e), the company does not have evaluation metrics on the results achieved. This factor contributes to the relevance of the study, in order to contribute to this practical gap in evaluating the results of the projects, developed by the cooperative, as well as generating data and information that can be applied to other cooperatives.

Therefore, this study arises from a theoretical gap on procedures that systematically analyze the results from Open Innovation projects, as well as the factors that influence these results, which is also a concrete demand of the medical work cooperative that was studied.

1.1.1 Research Question

What are the influencing factors and the results generated by Open Innovation projects in a medical work cooperative?

1.2 OBJETIVES

1.2.1 General

Analyze the influencing factors and the results generated by Open Innovation projects, developed by a medical work cooperative.

1.2.2 Specifics

a) Describe the Open Innovation projects of the organization considering their purposes and their form of implementation;
b) to raise, together with those involved in Open Innovation projects, the influencing factors of organizational structure, relationship networks and culture, and the operational, innovation and, market results produced by these projects in the cooperative;
c) identify the operational, innovation, and market results generated by the Open Innovation projects already implemented.

1.3 JUSTIFICATION

The use of Open Innovation for Bogers, Chesbrough, and Strand (2020) occurs due to some aspects, such as, for example, the mobility of experienced and skilled people, who disseminate the knowledge acquired in previous companies they have been through, the speed and dynamics of the market, which impose increasingly competitive scenarios and make organizations search for innovations in products and services in a more agile way, and also the greater interaction between internal and external agents of the organizations, creating possibilities for collaboration and production of innovation, in a faster and more flexible way.

With regard to the use of Open Innovation in the practical context of organizations, Scaliza (2015) mentions that large companies stand out in the use of Open Innovation with consolidated *cases*, such as 3M, Dell, Fiat, P&G, IBM, and Natura. They have collaboration practices between internal agents and external agents, exchanging knowledge and experiences in order to create, through partners, new products, services, and organizational improvements.

Studies, found in the literature on the subject, show that the results that Open Innovation can produce are generally studied in isolation in different groups of analysis, such as Innovation Performance, with the creation of new products and services (Lopes & Carvalho, 2018; Sotello *et al.*, 2018; Rauter *et al.*, 2019, Zhou *et al.*, 2019; Lee & Yoo, 2019; Lacerda & Van Den Bergh, 2020), **Market Performance**, with sales growth (Stefan & Lars Bengtsson, 2017), increased customer satisfaction and positive market perception by customers (Restreplo-Morales, Loaiza & Vanegas, 2019) and **Operational Performance**, with increased revenues and cost reduction (Rubera, Chandrasekaran & Ordanini, 2016), increase in the quality of

processes (Cassiman & Valentini, 2016; Zanjirchi, Jalilian & Mehrjardi, 2019; Singh *et al.*, 2019) and evolution of effectiveness in the applicability of innovations, formulated with Open Innovation projects (Burcharth, Knudsen & Sondergaard, 2017; Popa *et al.*, 2017; Moretti & Biancardi, 2018; Pollok, Lüttgens & Piller, 2019).

Given the context of expansion and growth in the use of Open Innovation, Scaliza (2015) cites that there is an opportunity to carry out studies that compile all these types of performance (innovation, market, and operational), performing analysis in a systemic way in organizations that use this type of initiatives. In addition to this opportunity, according to studies on the subject, Brazil has few studies applied to local organizations, according to Scaliza (2015), occupying the 20th place in the world ranking of production of applied research on Open Innovation and, according to the study by Le *et al.* (2019), not even remaining among the 15 countries with productions on Open Innovation in the world.

Therefore, from the theoretical point of view, the present study has as justification to collaborate with the scientific production on the implementation of Open Innovation in Brazilian organizations, measuring the results in a systemic and not only isolated way, as is common in studies conducted until then, where the results are analyzed against a specific type of performance (market, innovation, operational) and not in front of all, in an integrated manner. In addition to this justification, there is also the contribution of the study to demonstrate data and information, which can be used and replicated by other researchers in studies referring to other cooperatives and organizations, which develop Open Innovation projects and aim to analyze their results, to improve their organizational performance.

From a practical point of view, this study is justified to elucidate a need for knowledge about the results that Open Innovation projects are generating in the medical health cooperative, object of study since these projects have been developed for three years, have investments in considerable resources, processes, and acquisitions, and have never been analyzed in a systemic way.

Linked to the knowledge of the results, there is the justification of, after the measurement, having subsidies with data and information so that the organization can focus its efforts and improve the results already achieved for the next projects.

Finally, this study also contributes with a useful structure to evaluate the results on Open Innovation, which can be replicated in other medical cooperatives in Brazil as well as in organizations from other sectors, which have Open Innovation projects, similar to those analyzed in this research, serving as support for measuring results and implementing improvements in the context of these other companies.

1.4 STRUCTURE OF THE DISSERTATION

The present study was divided into five chapters. Chapter 1 contains the introduction, whose objective was to contextualize the content of the complete study, followed by the research problem, the general objective, and the specific objectives, ending with the justification and contribution of the technical production. Chapter 2 presents the theoretical and practical references on the studied topic, being subdivided into subsections, being: Open Innovation; Innovation Performance; Influencing factors in the results and Similar Experiences in Brazil and in the World. Chapter 3 discusses the methodological aspects used in the study. In Chapter 4, the context of the cooperative, object of study, and the phenomenon studied will be presented, that is, the projects linked to Open Innovation of this organization. And finally, Chapter 5 presents the conclusion obtained by the research, Chapter 6 the practical contributions, and Chapter 7 the final considerations of the study.

2 THEORETICAL AND PRACTICAL REFERENCES

In this chapter, the theoretical bases assumed for the construction of the study are explored. At first, it concentrates on research and the main pillars pertinent to Open Innovation, with its evolution in organizational environments and its current characterization. Then, it presents the developments of important points on the subject with the three types of results that can be measured, according to the theory, with the development of Open Innovation projects, being: Innovation Performance, Market Performance, and Operational Performance. In addition to these three types of results, we also present the predominant factors, found in the theory pertinent to the theme, that influences the results of Open Innovation within organizations. Finally, we highlight similar experiences on the topic in Brazil and in the world, with current research scenarios on Open Innovation and its application aimed at evaluating its results in organizational environments.

2.1 OPEN INNOVATION

Open Innovation has aspects related to the more generic concepts linked to traditional innovation. At broad levels of discussion, pure innovation can be considered a key factor for organizations seeking results and growth, in front of their competitors and within the market in which it operates (Tidd & Bessant, 2015; Maciuliene & Skarzauskiene, 2016; Hatak *et al.*, 2016). Still in this aspect, the innovation considered traditional has as its basic premise the concentration of efforts and resources limited to the so-called organizational boundaries, that is, all the material produced based on innovation within a company, is limited to the knowledge of the actors that are inserted in this company, without the participation of other actors, external to this internal environment of creation and development (De Paulo, 2017; Ferrari & Scaliza; 2019).

With the growth of competition between organizations and their promoted innovations, the Open Innovation model emerges, which essentially has the objective of expanding resources and knowledge to the company's external borders, exploring these factors and options with the involvement of other actors from outside the institution (Cassiman & Valentini, 2016; Roldan, Hansen & Garcia, 2018; Frank *et al.*, 2019).

This movement of transition between the saturation of traditional innovation and the use of Open Innovation took place at the beginning of the 20th century, with the first research and

publications on the subject carried out by Chesbrough (2003). For him, this advanced model of innovation emerged due to the needs of the globalized world market, where organizations need to reinvent themselves in a short time, modifying processes, products and the way they relate to their customers. Still according to Chesbrough (2003), in his first researches on how to apply Open Innovation, it was understood that the development of processes and practices, linked to internal or classic innovation, were not being sufficient to meet the rapid dynamics of the market, mainly for being based on a "closed" model of development.

According to Chesbrough (2012), there are considerable advantages of comparing the implementation of classical innovation with Open Innovation, such as the recognition that not all employees, highly specialized, work in the company and therefore, to strengthen innovation processes, it needs to obtain the knowledge of external professionals; traditional R&D, where innovations and projects are carried out strictly with internal knowledge, can be opened and shared with external knowledge, with the aim of adding value to these innovations; this sharing of internal knowledge, inherent to innovation, with the sum of external efforts can add value and create competitive advantages to the organization.

The use of collaboration and knowledge sharing are important factors in Open Innovation, where the partnership of the organization's internal actors with external actors began to be applied in practice and collaboration became crucial to respond to the speed needs imposed by the competitive market in which the companies were inserted (Kim & Pennings, 2009). Along with the aspects of collaboration and knowledge, some studies began to return results with additional added value because they were carried out with collaborative participation, thus demonstrating the effectiveness of applying the Open Innovation model given the results expected by the actors participating in this process (Dahlander & Gann, 2010; Chiaroni, Chiesa & Frattini, 2010; Mortara & Minshall, 2011; Chesbrough, 2012).

For Open Innovation to happen effectively, connections and relationships with the external environment must be structured taking into account the premises of so-called innovation networks. According to Rasera and Balbinot (2010), in the context of organizations, a network represents a form of intermediate structure between the company and the external world, where the principles of bureaucratic structure and inflexible hierarchy are redefined to enable interaction between processes related to the coordination of the organization's activities. Tied to these aspects then arises a movement called, by some authors, collaborative innovation, which concentrates a group of people, formed in the network, who work together to achieve common goals (Chen & Guan, 2012). In this context, according to Di Pietro, Prencipe, and

Majchrzak (2018), for Open Innovation to be successful, knowledge sharing and networking are key factors for achieving the proposed objectives.

To complement these concepts, Chesbrough (2014) collaborates by naming the two models of Open Innovation that can be used by organizations, the first being called "from the outside in", where companies share their problems and aspirations with the external environment, with the objective of collecting efforts and external knowledge to produce innovation and the second, called "from the inside out", where the promoter organization shares the innovation considered ready for other companies in the external environment to take advantage of these innovations and produce others from them.

The implementation of this type of initiative, all over the world, has been promoted and pointed out as fundamental by renowned associations of research in innovation, as is the case of the Organization for Economic Cooperation and Development (OECD) and the European Innovation Commission (EU). These organizations mention that the implementation of this dynamic must occur to find new solutions, through integrated and multidisciplinary innovation policies, which are based on a greater balance and efficiency of production between internal and external sources of the organizations. (OCDE, 2008; Comissão Europeia, 2012a, 2013e; Comissão Europeia, 2014a).

In addition, some studies show that the use of this innovation model has been growing and being implemented in recent years on a larger scale by companies considered large or multinational (Chesbrough & Bogers, 2014; Ivascu, Cirjaliu & Draghici, 2016; Fernandes, Ferreira & Peris-Ortiz, 2019; Cheah & Ho, 2020), and on a smaller scale by small and medium-sized companies (Hamilcar & May, 2018; Fernandes, Ferreira & Peris-Ortiz, 2019, Hero & Linfors, 2019, Jugend *et al.*, 2020).

Open Innovation has been used in large companies as a leading role in their strategy and, according to Brunswicker & Chesbrough (2018), the model most adopted today is the so-called “from the outside in”, where the promoting organization of Open Innovation receives external knowledge to promote innovation in its processes, products and services, thus accelerating its innovation dynamics.

On the adoption of Open Innovation in micro, small and medium-sized companies, Restrepo-Morales, Loaiza & Vanegas (2019) found that this implementation is still timid, thus returning still a poor and underutilized result when compared to the adoption of Open Innovation in companies with a higher investment power.

Regarding the use and research of Open Innovation around the world, Le *et al*. (2019) developed a study that presents an exponential growth in research related to Open Innovation

in recent years, with the beginning of this constant evolution in mid-2007 and the consolidation of growth between 2011 and 2017, as shown in Figure 1 below.

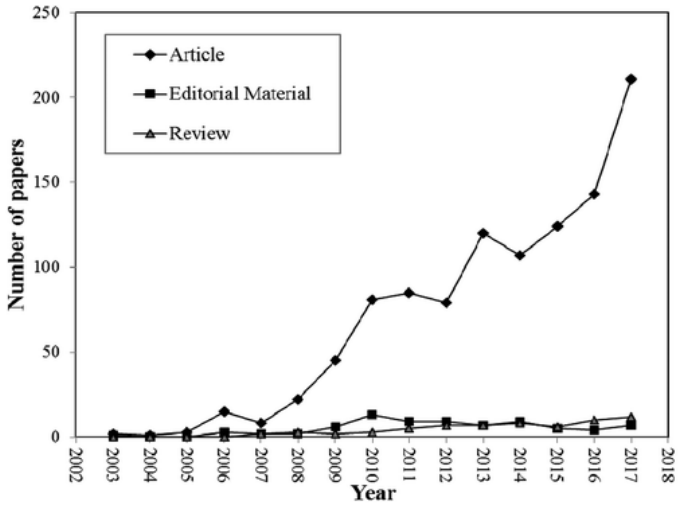

Figure 1. Evolution of scientific studies on Open Innovation
Source: Le *et al.* (2019, p. 7).

The authors still present the main countries with regard to the realization of studies and application of Open Innovation around the world as well as the incentive to use this model of innovation through public policies. The results demonstrate leadership of European countries in the productions, followed by the USA. Regarding incentives in the production of this type of innovation, according to Le *et al*. (2019), we highlight the fact that the European Union (EU) has launched in recent years the so-called "Innovation Union", as one of the seven emblematic initiatives of the "Europe 2020 Strategy", and also the fact that the theme Innovation Open to have been selected as one of the three main political objectives in 2015 within the scope of European Union research and innovation (Le *et al.*, 2019).

Still on the advances in the use and research of Open Innovation, Bogers, Chesbrough, and Moedas (2018) developed a study that aimed to research the challenges that the theme of Open Innovation will have for the coming years. According to them, the implementation of Open Innovation will become even more intense on the part of companies, mainly propelling innovation related to technological trends, such as digitization and automation, which will directly impact the processes and products of companies that implement this model in their innovation practices.

In the current practical context of the implementation of Open Innovation, Lee and Yoo (2019) propose that the adoption of this model, if combined with the entrepreneurial orientation and support of the company's top management, can generate broadly positive results related to the organization's innovation performance.

The implementation of Open Innovation, using sources of external knowledge, generates a significant return to the innovation performance of the organizations that implement them (Lacerda & Van der Bergh, 2020). Already to Sotello *et al.* (2018) the success pertinent to the development of practices related to Open Innovation depends on some factors that companies, which develop this type of innovation, should observe, such as: maintaining an internal structure for the effective relationship of innovations with the external environment, highlighting innovation within the organizational strategy, having adequate processes to support Open Innovation practices and stimulating culture and innovative structure within the organization.

With regard to Market Performance, Stefan and Bengtsson (2017) highlight that companies, which implement Open Innovation as a permanent practice, can evolve in indicators of sales growth and positive perception on the part of their customers, especially if the dynamics of opening innovation involve external collaboration with universities for the development of new products and services. They also point out that this dynamic has a high degree of uncertainty and risks and, therefore, it must be well worked out between the promoting company and external organizations participating in the process.

Finally, regarding the Operational Performance that Open Innovation can provide, Moretti and Biancardi (2018) found in studies with organizations, which have Open Innovation practices, that the development of this model results in an improvement in the operational indicators of financial, economic, and human resources performance of these companies. Contributing to this perspective, Bogers, Chesbrough, and Strand (2020) found that this type of initiative can directly impact the Operational Performance of the organizations that implement it, providing opportunities for improvements in operational processes and enhancing the overcoming of previously untreated challenges, effectively collaborating with the sustainability of the organization.

Based on the conceptual pillars and the evolution of the theme presented, the focus of this study was directed to the three types of performance found and to the factors that influence these results, through the implementation of Open Innovation in organizations. This unfold will be presented in the following items.

2.2 OPEN INNOVATION PERFORMANCE

Open Innovation has become in recent years a strategic source for obtaining competitive advantage and evolution in what corresponds to the management of organizations (Sivam *et al.*,

2019). This evolution is directly connected with what several authors call the "Open Innovation performance", which has as its premise to evaluate the result of several factors, implemented jointly, such as processes, knowledge flows, social and economic environment. With the implantation of Open Innovation, as a strategy to leverage the performance of organizations, these factors work freely, transforming products and services in order to create new markets and competitive advantage, through a more solid, dynamic, and efficient culture of entrepreneurship (Comissão Europeia, 2016; Alvarez-Aros & Herrera, 2018, Sivam *et al.*, 2019).

The performance, acquired through the application of Open Innovation, depends on several factors and phenomena, intrinsic to the entry and out flows of knowledge of the company. In addition to the practices and processes that can be established, the adoption of Open Innovation requires relevant changes in companies so that the expected performance is actually achieved (Salter *et al.*, 2014). In general terms, the expected results are directly linked to the acceleration of internal processes of development and the potentialization of profits from innovation (Van de Vrande *et al.*, 2009).

Within the performance perspectives, some types stand out for potential measurements of gains that can be acquired. In the next topics will be presented the three types, found in the literature, which concentrate the groups of measurement of the results of Open Innovation, which are (1) Innovative Performance, (2) Market Performance and (3) Operational Performance.

2.2.1 Innovative Performance

The innovative performance has as a premise to evaluate the effectiveness of the basic activities generated by this type of project in relation to the result of pure innovation produced by the promoting company, through analysis of the products and services generated and their applicability, degrees of novelty, improvement of the capacity of technology and productivity of the organization (Ruan, Fang & Hong, 2011; Scaliza, 2015).

Some authors point out that the evaluation can be carried out by concentrating the following elements to analyze the Open Innovation performance of organizations:

Quantity of products and processes developed through Open Innovation	Realization of this analysis considering the growth in the number of products and improvement in the processes developed through Open Innovation projects (Xu *et al.*, 2012; Stal, Nohara & De Freitas, 2014; Desidério & Popadiuk, 2015; Scaliza, 2015);

The applicability or real use of products and processes developed through Open Innovation	Realization of evaluation about the solutions that effectively have the use and applicability to its stakeholders (Scaliza, 2015; Lopes & Carvalho, 2018; Sotello *et al.*, 2018)
Organizational gains	Measurement through the ability to produce benefits through the implementation of the developed solutions, which can be qualitative or quantitative gains, as long as they are perceived by the stakeholders (Scaliza, 2015; Lopes & Carvalho, 2018; Sotello *et al.*, 2018).

Frame 1. Elements: Innovative Performance
Source: The author (2020).

In short, for Scaliza (2015) this type of performance represents the company's ability to produce new products and services, but in addition to applying them and extracting positive results with these applications.

2.2.2 Market Performance

The second factor that makes up the basis of the measurements, referring to the performance that Open Innovation can generate in the organizations that implement them, is called Market Performance. There are several forms and elements that can compose the measurement of this factor tied to the performance of Open Innovation, such as:

New Products	Generation of impact in the *mix* of companies, with the objective of diversifying and inserting these new products in the market (Vanhonacker *et al*., 2013; Barge-Gil, 2013; Scaliza, 2015);
Customer satisfaction	Generation of positive impact in increasing satisfaction, mainly in aspects directly linked to the company's levels of innovation (Gomes & Kruglianskas, 2009; Santos, Zilber & Toledo, 2012; Bueno & Balestrin, 2012; Loaiza & Vanegas, 2019);
Sales Growth	Generation of sales growth through products and services generated by Open Innovation (Vanhonacker *et al.*, 2013; Scaliza, 2015; Kim & Schim, 2018);
Market *Share*	Impact in increasing Share compared to competitors who do not have Open Innovation projects (Gebauer, Fuller & Pezzei, 2013; Vanhonacker *et al.*, 2013; Barge-Gil, 2013; Scaliza, 2015);

Frame 2. Elements: Market Performance
Source: The author (2020).

Connected to these factors, the organization promoting Open Innovation, for the generation of new products and for direct impact on aspects related to the market in which it operates, should create tangible benefits to its customers, thus achieving satisfactory results related to Market Performance, arising from the practice of Open Innovation (Vanhonacker *et al.*, 2013).

To finalize the approaches of the three types of performance, which comprise the measurement of results that Open Innovation can promote in organizations, Operational

Performance will be addressed in the following item, which is related to more systemic results and that impact more broadly the management of companies.

2.2.3 Operational Performance

Operational Performance is built with the sum of several factors, and the implementation of innovation can have a significant relationship with the improvement of some indicators belonging to the operating structure of the companies, being: costs, revenue, profit, quality, flexibility and time for the development of new products and services (Subramanian & Nilakanta, 1996; Ghalayini, Noble & Crowe, 1997).

Connected to this idea, Jabbour *et al*. (2012) complement that the development of projects, through Open Innovation, can bring positive impacts to several indicators of organizations.

One of these indicators is the operational cost: we seek to reduce these costs in organizations, based on the development of Open Innovation projects (Scaliza, 2015; Cassiman & Valentini, 2016; Burcharth, Knudsen & Sondergaard, 2017; Li *et al.*, 2018). Another indicator, which can be enhanced with the implementation of Open Innovation, is operational revenue: we seek an increase in these revenues, based on the development of innovation projects (Scaliza, 2015; Moretti & Biancardi, 2018). Some recent practical studies demonstrate that the implementations, coming from the projects linked to Open Innovation, impact the reduction of costs and on the increase of operating revenues, thus having a direct relationship with the operational result of the organization (Silva & Zilber, 2013; Michelino *et al.*, 2014; Burcharth, Knudsen & Sondergaard, 2017; Moretti & Biancardi, 2018).

According to Burcharth, Knudsen, and Sondergaard (2017) the implementation of the Open Innovation practice, if well worked, mainly based on the participation of internal employees in the process of relationship with external agents, has a direct impact on the increase in operational revenues of organizations, through the generation of new products. For Moretti and Biancardi (2018), the development of Open Innovation has even more impact, not only on increasing revenues but also on reducing costs, thus improving the financial and economic performance of the organization.

In addition to these financial indicators, we can also mention the quality indicator, applied to process improvement, where the objective is the evolution of attributes such as agility, automation, reduction of redundant jobs, acquired through Open Innovation projects (Jabbour *et al.*, 2012; Scaliza, 2015).

Finally, there are complementary factors that can be achieved with the implementation of Open Innovation in companies, such as optimization and flexibility to change; the ability to reduce time and optimize the development process; the launch of products or process improvement, through Open Innovation projects (Jabbour *et al*., 2012; Scaliza, 2015).

In addition to the three types of performance, mapped in the literature, there are still other influencing factors that can impact the result of the implementation of Open Innovation in organizations. The main factors found will be presented in the next item.

2.3 INFLUENTIAL FACTORS IN THE RESULTS OF OPEN INNOVATION

In order for the results to be achieved, through the implementation of Open Innovation in each of the types of performance presented in the previous items, there are some factors that can positively or negatively influence these results, depending on the way in which they are worked (Scaliza, 2015; Rangus & Slavec, 2017; Flor, Cooper & Oltraa, 2018).

Among these factors, the following stand out: the organizational structure of the company and how this structure supports the practices and processes of Open Innovation (Ismail & Monsef, 2012); the organizational culture, which should be focused on creating an environment that enhances the development of innovation (Hogan & Coote, 2014); relationship networks and knowledge sources, which will be used to produce the interaction between the internal environment and the external environment, with the objective of producing Open Innovation (Burcharth, Knudsen & Sondergaard, 2014); the alignment between the expectations of internal and external agents in this interaction process (Helo & Lindfors, 2019); the innovation strategy; the investments that organizations will allocate to the development of Open Innovation practices (Pitassi, 2014; Varrichio, 2016).

The type of organizational structure that companies have is considered an essential and relevant factor for the adoption of Open Innovation strategies (Chiaroni, Chiesa & Frattini, 2011; Mortara & Minshall, 2011). This structure should include characteristics of high flexibility, autonomy so that decision-making is faster and controls less rigid, thereby fostering speed in the practices of execution of the projects (Shalley & Gilson, 2004; Wang *et al.*, 2005).

Connected to these concepts of flexibility and to organizational structures, focused on Open Innovation practices, Ismail and Monsef (2012) created a Conceptual Model, which has as a key premise the factors they considered essential for an organizational structure adapted to the implementation of this type of strategy, where the premises of Open Innovation are included in the company's organizational processes, as shown in Figure 2.

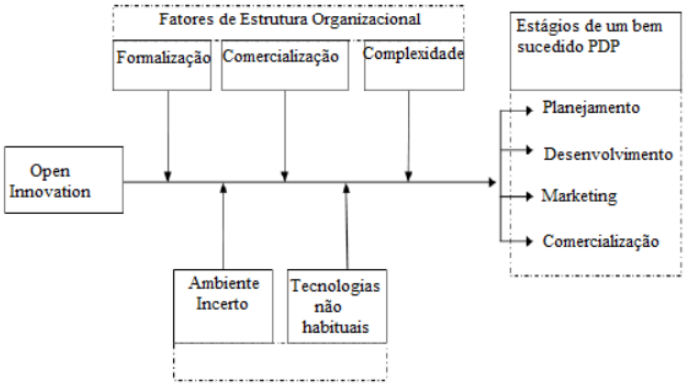

Figure 2. Organizational structure focused on Open Innovation
Source: Adapted from Ismail and Monsef (2012, p. 10).

Tied to the model presented by Ismail and Monsef (2012), Scaliza (2015) defines four key aspects for the implementation, monitoring, and improvement of Open Innovation, in view of the organizational structure, namely: (1) Sectors for management of Open Innovation; (2) Teams for the development of Open Innovation; (3) Formalized leadership ahead of Open Innovation projects; (4) Integration of multidisciplinary teams.

With regard to the existence of sectors for the management of Open Innovation, the creation of specific areas in the organizational structure of the company, which have resources and exclusive or partial dedication to the development of innovation, can positively influence the results obtained with these practices (Brocco & Groh, 2009; Chiaroni, Chiesa & Frattini, 2011; Scaliza, 2015; Hitchen, Nylund & Viardot, 2017).

On the other hand, the creation and existence of teams, allocated in the organization, which have, in the description of their job positions and responsibilities, activities related to the development of Open Innovation projects, make this direct connection focus on the development of innovations and, consequently, effective results within the market, innovation and operation perspectives of the company (Brocco & Groh, 2009; Chiaroni, Chiesa & Frattini, 2011; Ismail & Monsef, 2012; Scaliza, 2015).

Likewise, for the strengthening of the organizational structure and processes related to Open Innovation, the existence of formalized leadership to conduct projects can have a direct impact on the results achieved with the solutions developed (Brocco & Groh, 2009; Love & Roper, 2009; Scaliza, 2015).

In addition to these factors, the existence of integrated multidisciplinary teams for the execution of Open Innovation projects can enhance the results, through the sharing of different knowledge, overcoming the difficulties of creating and implementing these projects

(Chesbrough & Bogers, 2014; Faccin & Brand, 2015; Tidd & Bessant, 2015; Scaliza, 2015; Harel, Schwartz & Kaufmann, 2019).

Finally, the organizational structures and operationalization flows of works and projects, linked to Open Innovation, should absorb different types of knowledge (Chesbrough & Bogers, 2014, Tidd & Bessant, 2015; Harel, Schwartz & Kaufmann, 2019) always based on continuous interaction (Hitchen, Nylund & Viardot, 2017) and cooperation between internal and external actors involved in this opening process (Silva, Bagno & Salerno, 2014; Faccin & Brand, 2015; Singh *et al.*, 2019; Froehlich & Konrath, 2019).

Organizational culture is another important factor that can influence the results obtained by the implementation of Open Innovation practices. Hogan and Coote (2014) built a model (Figure 3) that presents what they called "layers of organizational culture", focused on Open Innovation. These layers include the relationship of values, norms, and behaviors that enhance the practice of Open Innovation within companies, as shown below:

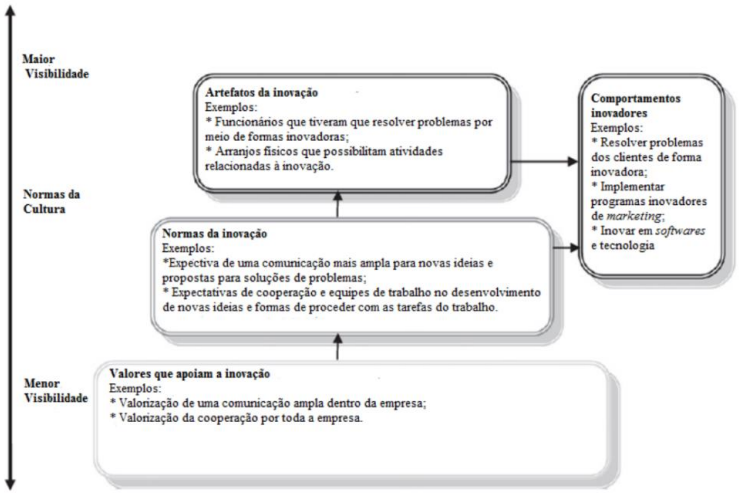

Figure 3. Influencing factors in the relationship between Organizational Culture and Open Innovation
Source: Adapted from Hogan and Coote (2014).

In view of these concepts, Scaliza (2015) defines four key aspects for implementing, monitoring, and improving Open Innovation in the face of the organizational culture, namely: (1) Structured processes related to the development of Open Innovation; (2) Adequate communication; (3) Incentive mechanisms for participating actors; (4) Relationship and interaction networks.

With regard to structured processes, they must clearly contain operating rules and operating flows, defining the responsibilities and actions necessary of each actor involved in the projects, whether internal or external (Hogan & Coote, 2014, Scaliza, 2015). Already related to the proper communication, the processes and the entire development dynamics of projects should have wide dissemination, making the information easily and objectively accessed by all

participants in the development of Open Innovation in companies, strengthening and instigating the active participation of these agents in the innovation process (Uzkurt, Kumar & Kimzan, 2013; Hogan & Coote, 2014, Scaliza, 2015).

Additional to structured processes and proper communication are the incentive mechanisms, which should include factors that encourage the participation of internal and external actors in projects, which can be carried out with different forms of recognition, the main ones being: financial, awards, gifts, promotions and professional valorization (Lindergaard & Callari, 2011; Scaliza, 2015).

On the existence of formalized partnerships with external agents, organizations need to have this bond with "outside" partners in order to expand their knowledge and interactions that drive innovation (Burcharth, Knudsen & Sondergaard, 2014). This openness enhances new ideas, ways of thinking and operationalizing, in order to reinvigorate and increase the organization's innovation production (Uzkurt, Kumar & Kimzan, 2013). The creation of relationships with external agents, together with the exchange of information and data with these agents, has a positive correlation with Innovative Performance, making organizations that create projects that aggregate these factors, to have greater innovation results than companies that do not practice projects of this type (Laursen & Salter, 2006; Xu *et al.*, 2012).

Complementing this idea, it is essential that the organization, which practices the Open Innovation model, has different sources of knowledge, such as, for example, partnerships with *academia* (educational institutions) and other important external agents, such as *start-ups* and innovation promotion bodies (Bierly & Chakrabart, 1996; Lichtenthaler, 2009; Jong & Slavovab, 2014).

Another important point of prominence, in the relationship networks and sources of external knowledge, concerns the alignment of expectations between the agents involved, thus strengthening the equal search for results, whether from the promoting company or from all the other external agents who participate in the work. (Ivascu, Cirjaliu & Draghici; 2016, De Vries, Tummers & Bekkers, 2018; Helo & Lindfors, 2019).

The way in which the company directs its organizational culture can directly impact its innovative posture. Organizations that have a more flexible posture, with mechanisms that foster new ways of thinking and open to external factors, tend to achieve greater results through projects linked to Open Innovation (Büschgens, Bausch & Balkin, 2013; Uzkurt, Kumar & Kimzan, 2013; Hogan & Coote, 2014).

Finally, it is worth mentioning that it is important that the organization's strategy and specific investments for the development of Open Innovation are connected with the company's

future plans, thus making the strategic objectives of the organization achieved, using as support the projects carried out through Open Innovation (Faria & Fonseca, 2014; Pitassi, 2014; Varrichio, 2016).

In the next item, studies similar to the objective of this work will be presented, including analyses on the types of performance of Open Innovation as well as on the influencing factors in these results, in order to signal and present the current panorama of practical research on the subject and direct the relationships and evolutions, to which this work intends to contribute, both in the theoretical and practical context, linked to the implementation of Open Innovation in organizations.

2.4 SIMILAR EXPERIENCES IN BRAZIL AND IN THE WORLD

In this item are presented the productions related to the theme of this research. In order to analyze the experiences of the implementation of Open Innovation and the results relevant to these studies in Brazil and in the world, an analysis of the scientific production of the last 15 years was carried out between November/2019 and March/2020, through a study using a systematic literature review as a method.

Researches were carried out, linked to the database of Sucupira Platform of Capes (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior), with searches in national and international journals, related to the evaluation area "Public and Business Administration, Accounting sciences and Tourism" and the theme "Innovation". Some criteria were used to perform the searches, such as classification in the qualis strata, keywords related to the theme of Open Innovation, and time of publication (last 15 years). Subsequent to the execution of the searches, filters of inclusion and exclusion of the works that would be analyzed were used, such as: (1) Analysis of titles; (2) Keyword analysis; (3) Analysis of abstracts and (4) Final selection. Applying the filters of inclusion and exclusion of articles, 30 articles published in national journals and 61 in international journals were analyzed.

Among the set of studies selected for analysis, several articles were premised on the measurement of the efficiency of the models adopted, pertinent to Open Innovation within organizations, making a relationship between this efficiency and the O**rganizational Structure of the company** under study. These studies had the perception and conclusion that there are several ways of applying these models, where the degree of maturity of application of innovation has a direct influence on the efficiency of the results obtained, especially if linked to the organizational structure focused on Open Innovation. The cases of the studies are:

(Shalley & Gilson, 2004; Wang *et al.*, 2005; Law & Ngai, 2008; Chiaroni, Chiesa & Frattini, 2011; Mortara & Minshall, 2011; Wu *et al.*, 2012; Amponsah & Adams, 2017; Cândido & Sousa, 2017; West & Bogers, 2017; Arbussã & Llach, 2018; De Vries, Tummers & Bekkers, 2018; Roldan, Hansen & Lema, 2018; Silva Castellanos, Ferney & Agredo, 2018; Albats & Podmetina, 2019).

Another class found, similarly in several studies of the selected portfolio, concerns the correlation between Open Innovation and the **Relationship networks, strategy, and culture** of the companies. These studies use theory as a basis and suggest adaptations of procedures, routines, and norms, linked to the company's culture, which can enhance the results of Open Innovation projects. These studies are represented by the articles: (Abualrub & Alghamdi, 2012; Silva, Bagno & Salerno, 2014; Faria & Fonseca, 2014; Hogan & Coote, 2014; Pitassi, 2014; Stal, Nohara & Chagas Jr., 2014; Faccin & Brand, 2015; Desidério & Popadiuk, 2015; Ivascu, Cirjaliu & Draghici, 2016; Varrichio, 2016; Hitchen, Nylund & Viardot, 2017; De Oliveira & Leocádio, 2017; Alvarez & Herrera, 2018; Lopes & De Carvalho, 2018; Sotello *et al.*, 2018; Froehlich & Konrath, 2019; Harel, Schwartz & Kaufmann, 2019; Singh *et al.*, 2019; Restrepo-Morales, Loaiza & Vanegas, 2019).

Some studies selected in the analysis portfolio focused on measuring results for organizations through the application of Open Innovation processes and dynamics, factors consistent with the purpose of this study. Among these studies, it can be highlighted that the implementation of these processes and dynamics generated positive impacts and results for the organizations studied, mainly in three aspects of performance, being: Market Performance, Innovation Performance, and Operational Performance.

Among these studies, we highlight those that had an impact on **Innovation Performance** with the creation of new products and services (Lopes & Carvalho, 2018; Sotello *et al.*, 2018; Lee & Yoo, 2019; Rauter *et al.*, 2019, Zhou *et al.*, 2019; Lacerda & Van Den Bergh, 2020), **Market Performance** with sales growth (Stefan & Lars Bengtsson, 2017), increased customer satisfaction and positive perception of the market by customers (Restreplo-Morales, Loaiza & Vanegas, 2019) and **Operational Performance** with increased revenues and reduced costs (Rubera, Chandrasekaran & Ordanini, 2016), increased quality of processes (Cassiman & Valentini, 2016; Singh *et al.*, 2019; Zanjirchi, Jalilian & Mehrjardi, 2019) and evolution of effectiveness in the applicability of innovations, formulated through the Open Innovation strategy (Burcharth, Knudsen & Sondergaard, 2017; Popa *et al.*, 2017; Moretti & Biancardi, 2018; Pollok, Lüttgens & Piller, 2019).

Regarding studies focused on measuring the results of Open Innovation, according to Scaliza (2015) and Rosa, Chimendes, and Amorim (2020), there is a gap that there are still no significant numbers of scientific productions that have, as their objective, the measurement of results in applied cases, including studies, focused on Brazilian companies, according to Bogers, Burcharth, and Chesbrough (2019). These findings justify and collaborate with the objectives of this study, which focuses on evaluating the results of Open Innovation in a Brazilian organization, in a systemic and not only isolated way, in view of the performance of innovation, market, and operational that this strategy can generate, including other factors mentioned that were found in the searches, such as organizational structure, strategy, relationship with external agents and organizational culture.

2.5 CHAPTER CONSIDERATIONS

In view of the theoretical bases and surveys presented, it is possible to observe that there are factors that influence the results that Open Innovation projects can generate in organizations. Within these factors, it is possible to highlight the importance of having an organizational structure aligned with the development of Open Innovation, with a clear definition of sectors, leaders, and work teams that will operationalize these projects. Another highlight is related to the need for a rooted culture that promotes and fosters innovation, with structured processes, objective communication, and mechanisms to encourage participation in projects. Tied to culture, it is essential that there are also networks of relationship with external partners and a strategy focused on the development of Open Innovation, thus ensuring a solid basis for project execution and achieving the results expected by the organization promoting this type of initiative.

These results are concentrated, according to the literature and studies found, on three pillars that can be measured within the processes and dynamics of a company, namely: Market Performance, Innovation Performance, and Operational Performance. Each pillar of these has factors and key elements, which must be implemented and monitored in order to ensure effectiveness in the execution of Open Innovation projects.

Thus, it is concluded that, in order to obtain the results related to Open Innovation projects in each type of performance, it is necessary that the promoting organizations have components linked to Open Innovation that strengthen their structure, processes, and organizational culture.

From this information, it was possible to assemble a set of influencing factors and the descriptors of possible results to be achieved through Open Innovation. Its abstract is presented in Frame 3 below.

Analysis Group	Influencing factors and descriptors of the results of Open Innovation
Organizational Structure focused on Open Innovation	Sectors for Open Innovation management (Brocco & Groh, 2009; Chiaroni, Chiesa & Frattini, 2011; Scaliza, 2015; Hitchen, Nylund & Viardot, 2017).
	Open Innovation Development Teams (Brocco & Groh, 2009; Chiaroni, Chiesa & Frattini, 2011; Ismail & Monsef, 2012; Scaliza, 2015).
	Formalized leadership (Brocco & Groh, 2009; Love & Roper, 2009; Scaliza, 2015).
	Integration of multidisciplinary teams (Chesbrough & Bogers, 2014; Faccin & Brand, 2015; Tidd & Bessant, 2015; Scaliza, 2015; Harel, Schwartz & Kaufmann, 2019).
Relationship networks, culture, and strategy focused on Open Innovation	Structured processes (Hogan & Coote, 2014, Scaliza, 2015).
	Communication (Uzkurt, Kumar & Kimzan, 2013; Hogan & Coote, 2014, Scaliza, 2015).
	Incentive mechanisms (Lindergaard & Callari, 2011; Scaliza, 2015).
	Relationship networks (Chesbrough, 2012; Büschgens, Bausch & Balkin, 2013; Uzkurt, Kumar & Kimzan, 2013; Hogan & Coote, 2014; Stal, Nohara & Chagas, 2014; Scaliza, 2015).
Market Performance	New products (Vanhonacker *et al.*, 2013; Barge-Gil, 2013; Scaliza, 2015).
	Clients satisfaction (Gomes & Kruglianskas, 2009; Santos, Zilber & Toledo, 2012; Bueno & Balestrin, 2012; Loaiza & Vanegas, 2019).
	Sales Growth (Vanhonacker *et al.*, 2013; Scaliza, 2015; Kim and Schim, 2018).
	Market *Share* (Gebauer, Fuller & Pezzei, 2013; Vanhonacker *et al.*, 2013; Barge-Gil, 2013; Scaliza, 2015).
Operational Performance	Operational costs (Scaliza, 2015; Cassiman & Valentini, 2016; Li *et al.*, 2018; Burcharth, Knudsen & Sondergaard, 2017).
	Operating Revenues (Scaliza, 2015; Moretti & Biancardi, 2018).
	Quality of process improvement (Jabbour *et al.*,2012; Scaliza, 2015).
Innovation Performance	Quantity of products and processes developed (Xu *et al.*, 2012; Stal, Nohara & De Freitas, 2014; Desidério & Popadiuk, 2015; Scaliza, 2015).
	Use of developed products and processes (Scaliza, 2015; Lopes & Carvalho, 2018; Sotello *et al.*, 2018).
	Organizational gains (Scaliza, 2015; Lopes & Carvalho, 2018; Sotello *et al.*, 2018).

Frame 3. Influencing factors and descriptors of the results of Open Innovation
Source: The author (2020).

With the relationship between the influencing factors and the types of results, together with all the items selected to be evidenced in this research, the chapter of theoretical reference is finalized. In the next chapter, the methods used to operationalize the works are presented, in order to ensure that the research objectives were achieved.

3 METHODS

This chapter aims to present the methods adopted to carry out this study, being listed the research design, the field of study, the detailed presentation of the influencing factors and descriptors of results used in the research, the collection procedures, and, finally, the data analysis procedures.

3.1 RESEARCH DESIGN

To achieve the objective of this work, the qualitative approach was selected that, according to Creswell (2007), has characteristics related to the analysis of a phenomenon that occurs in a single scenario, where the researcher performs an immersion and seeks more details involving himself with real experiences, of what is being studied, to achieve the objectives proposed in the work. Qualitative research is interpretive and holistic, and the researcher, after data collection, necessarily performs a personal interpretation to arrive at the results with a broad view of the studied phenomenon.

The qualitative approach is applied to perform the interpretation of concrete cases in their temporal and local particularity, taking as a premise the real activities within this specific context to be analyzed (Flick, 2009). Tied to this, the purpose of the type of study is not to count quantities as a final result (Gil, 2008).

In relation to its objectives, this research is classified as descriptive, establishing a correlation between the studied variables and describing in detail the characteristics of the studied phenomenon (Richardson *et al.*, 1999; Vergara, 2004).

The research strategy adopted was the case study, in which detailed and systematic information about a phenomenon is gathered (Patton, 2002), focusing on understanding a real applied context (Eisenhardt, 1989) and exploring the case in-depth, through data from multiple sources of evidence, which may include direct observations, interviews and documentary analyze (Voss, Tsikriktsis & Frohlich, 2002; Martins, 2008).

The choice of this research strategy is related to the benefit of understanding in-depth contemporary real events (Miguel, 2007) and also, according to Yin (2001, p. 28), when "a question like 'how' or 'why' is asked about a contemporary set of events".

According to Yin (2005), the case study strategy can be implemented in one or more units, thus having as characteristic to be single or multiple. In this sense, this research is

characterized as a single case study, because it has, as an objective, to evaluate the projects applied in a single organization as well as the results and factors influencing Open Innovation.

3.2 FIELD OF STUDY

The field of study of this research consists of a medical work cooperative located in the west of Paraná, which acts as a health plan operator and has executed Open Innovation projects. This cooperative has Open Innovation projects developed in the last three years and still does not have mechanisms for controlling and measuring results. This evidences the importance for the organization of this research since the aim was to perform an analysis of these results in order to assist managers in decision-making about these projects. According to the Unimed Management Report (UNIMED, 2020d), the cooperative has 31 years of existence and, according to internal reports provided by the organization for this research, in December 2020 had 89,564 customers, 583 cooperative doctors, and 265 employees. The service network that performs the support services for this cooperative is formed by 23 hospitals, 27 laboratories, and 109 clinics.

Within the field of study, the phenomenon analyzed is related to Open Innovation projects executed by the cooperative, of which it stands out: the *hackathons* carried out in 2018 and 2019 and the partnerships with *start-ups* for the development of solutions and the creation of an Innovation Hub, also focusing on fostering innovation in partnership with an educational institution in the region. The main actors involved in these projects and who were selected to participate in the study were: members of the cooperative, members of the academic community (students and professors from universities in the region), and members of start-ups and regional agents to foster innovation (Sebrae, trade associations, and regional innovation system).

3.3 INFLUENCING FACTORS AND DESCRIPTORS OF THE RESULTS OF OPEN INNOVATION

For this research, two groups of factors that influence the results of Open Innovation were raised in the literature and adapted, which are: a) organizational structure focused on Open Innovation; b) relationship networks, culture, and strategy focused on Open Innovation.

In addition, three groups were adapted that can be considered descriptors of Open Innovation performance, which are: a) Innovative Performance; b) Market Performance; c) Operational Performance.

In the Group "**Organizational structure focused on Open Innovation"** are allocated the factors that should include characteristics of high flexibility and operational functioning dynamics. These factors are implemented in Open Innovation projects, in addition to other foundations, connected to a structuring that favors the development of innovation within the organization (Brocco & Groh, 2009; Tidd & Bessant, 2015; Scaliza, 2015; Harel, Schwartz & Kaufmann, 2019). These factors as well as the evidence that was analyzed in this research are summarized in frame 4 below.

Analysis Group: Organizational structure focused on Open Innovation	
Influencing factors	**Evidence analyzed**
Sectors for managing Open Innovation	Specific areas or sectors in the company's organizational structure that have resources and exclusive or partial dedication to the development of Open Innovation (Brocco & Groh, 2009; Chiaroni, Chiesa & Frattini, 2011; Scaliza, 2015; Hitchen, Nylund & Viardot, 2017).
Teams for the development of Open Innovation	Teams allocated in the organization that has, in the description of their job positions and responsibilities, activities related to the development of Open Innovation projects (Brocco & Groh, 2009; Chiaroni, Chiesa & Frattini, 2011; Ismail & Monsef, 2012; Scaliza, 2015).
Formalized leadership	Formalized leaderships to conduct the development of Open Innovation projects (Brocco & Groh, 2009; Love & Roper, 2009; Scaliza, 2015).
Integration of multidisciplinary teams	Development of Open Innovation projects, carried out by multidisciplinary teams, composed of internal actors, from different areas of the company, integrated with external actors (Chesbrough & Bogers, 2014; Faccin & Brand, 2015; Tidd & Bessant, 2015; Scaliza, 2015; Harel, Schwartz & Kaufmann, 2019).

Frame 4. Factors of the group Organizational structure focused on Open Innovation
Source: The author (2020).

In the group **Relationship networks, culture, and strategy aimed at Open Innovation** the dynamics of openness, encouragement, and relationship flows that must be implemented by the company promoting the projects are concentrated so that the expected results are achieved (Stal, Nohara & Chagas, 2014; Scaliza, 2015). The factors that make up this group and the evidence that was analyzed are presented in Frame 5 below.

Analysis Group: Relationship networks, culture, and strategy aimed at Open Innovation	
Influencing factors	**Evidence analyzed**
Structured processes	Open Innovation development processes structured with clear operating rules and operating flows, with responsibilities and necessary actions of each actor involved, whether internal or external (Hogan & Coote, 2014, Scaliza, 2015).
Communication	Broad communication and dissemination of operationalization as well as information

	pertinent to all actors involved in Open Innovation projects (Uzkurt, Kumar & Kimzan, 2013; Hogan & Coote, 2014, Scaliza, 2015).
Incentive mechanisms	Incentive mechanisms, with forms of recognition that encourage the participation of internal and external actors in the projects, which can be carried out with different forms of recognition, being: financial, awards, gifts, promotions, professional valorization (Lindergaard & Callari, 2011; Scaliza, 2015).
Relationship networks	Formalized partnerships, based on sharing flows, with a description of the ways of interactions that are carried out between partners, including meeting models, data allowed to be shared and the responsibilities of each actor (internal or external), involved in the development of the projects (Chesbrough, 2012; Büschgens, Bausch & Balkin, 2013; Uzkurt, Kumar & Kimzan, 2013; Hogan & Coote, 2014; Stal, Nohara & Chagas, 2014; Scaliza, 2015)

Frame 5. Factors of the group Relationship networks, culture, and strategy aimed at Open Innovation
Source: The author (2020).

Regarding the groups of descriptors that measure the types of performance of Open Innovation, the first is I**nnovative Performance**, in which the main premise is related to the verification of the effectiveness of basic activities generated by the Open Innovation dynamics in relation to the result of pure innovation produced by the promoter company (Scaliza, 2015; Lopes & Carvalho, 2018; Sotello *et al.*, 2018). The factors constructed, as well as the evidence that was analyzed in this group, are listed in Chart 6 below.

Analysis Group: Innovative Performance	
Result descriptors	**Evidence analyzed**
Quantity of products and processes developed	Growth in the annual number of products and improvement in the processes developed through Open Innovation projects (Xu *et al.*, 2012; Stal, Nohara & De Freitas, 2014; Desidério & Popadiuk, 2015; Scaliza, 2015).
Use of developed products and processes	Solutions that effectively have the use and applicability for its users, based on the evaluation of these users on the effectiveness and applicability of the products and processes developed (Scaliza, 2015; Lopes & Carvalho, 2018; Sotello *et al.*, 2018).
Organizational gains	Registration of organizational gains through implementations and developed solutions, which can be any type of gain, qualitative or quantitative, as long as it is perceived by its users (Scaliza, 2015; Lopes & Carvalho, 2018; Sotello *et al.*, 2018).

Frame 6. Analysis descriptors of the Innovative Performance group
Source: The author (2020).

The second group of the descriptors of performance types is the **Market Performance** whose premise is to analyze the relationship between the innovations produced through Open Innovation and the market impacts that this type of action can cause for the promoting company (Vanhonacker *et al.*, 2013; Scaliza, 2015; Kim & Schim, 2018). For this, the factors and evidence analyzed in this group were listed, according to Frame 7 below.

Analysis Group: Market Performance	
Result descriptors	**Evidence analyzed**
New products	Increase in the annual number of products launched by the company, with the aim of diversifying and inserting these new products on the market (Vanhonacker *et al.*, 2013; Barge-Gil, 2013; Scaliza, 2015).
Clients satisfaction	Increase in the annual satisfaction rate of the organization's customers, mainly in relation to issues related to the company's innovation, according to the perception of the clients surveyed (Gomes and Kruglianskas, 2009; Santos, Zilber & Toledo, 2012; Bueno & Balestrin, 2012; Loaiza & Vanegas, 2019).
Sales Growth	Growth in the annual number of sales and revenues, linked to products and services generated by Open Innovation (Vanhonacker *et al.*, 2013; Scaliza, 2015; Kim & Schim, 2018).
Market *share*	Growth in market share of companies that innovate with Open Innovation projects through comparative competition reports and market research (Gebauer, Fuller & Pezzei, 2013; Vanhonacker *et al.*, 2013; Barge-Gil, 2013; Scaliza, 2015).

Frame 7. Descriptors of analysis of the group Market Performance
Source: The author (2020).

Finally, the last descriptive group on innovation results is the group called **Operational Performance**. This is built with the sum of several factors, and the implementation of innovation can have a significant relationship with the improvement of some indicators belonging to the structure of the operation of the companies, being: costs, revenue, profit, quality, flexibility, and time for the development of new products and services (Scaliza, 2015; Cassiman & Valentini, 2016; Burcharth, Knudsen & Sondergaard, 2017; Li *et al*., 2018). To operationalize the analyses pertinent to this group were listed the factors and evidences presented in Frame 8.

Analysis Group: Operational Performance	
Result descriptors	**Evidence analyzed**
Operational costs	Decrease in total annual operating costs in an organization based on the development of Open Innovation projects (Scaliza, 2015; Cassiman & Valentini, 2016; Li *et al.*, 2018; Burcharth, Knudsen & Sondergaard, 2017).
Operating Revenues	Increase in annual operating revenues based on the development of Open Innovation projects (Scaliza, 2015; Moretti & Biancardi, 2018).
Improvement in the quality of processes	Improvement in the quality of processes with the evolution of attributes such as agility, automation, reduction of redundant jobs, acquired through Open Innovation projects and perceived by the users of these developed projects (Jabbour *et al.*,2012; Scaliza, 2015).

Frame 8. Descriptors of analysis of the Operational Performance group
Source: The author (2020).

From the presentation of these groups, we concluded that the group of influencing factors, composed of structure, culture, strategy, and relationship networks, ends up impacting the results acquired within the three types of performance, that is, the more efficiently worked the influencing factors, the better the results obtained within the types of performance, and these results are reverted to strengthen the influencing factors and, consequently, they positively

impact the future results to be achieved with Open Innovation projects. This relationship can be visualized in the research design built for this work.

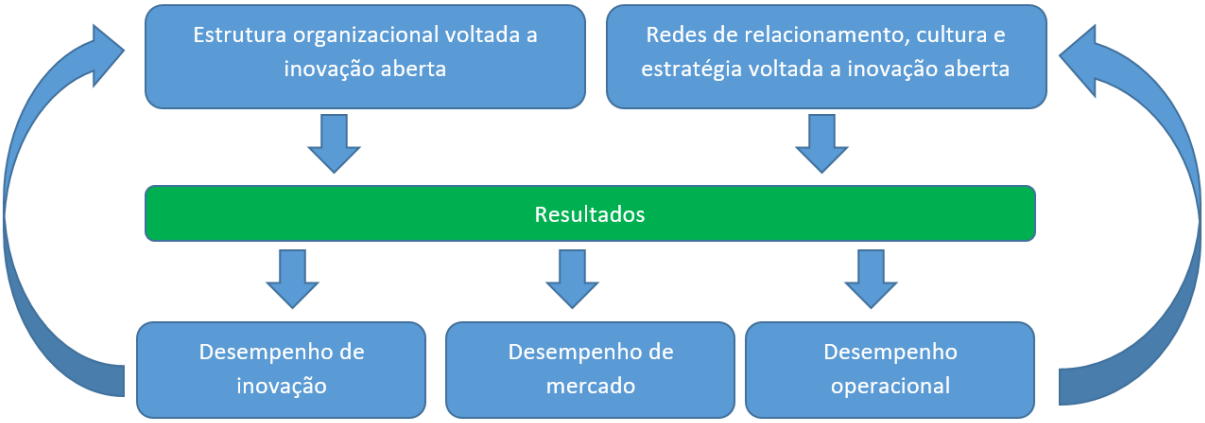

Figure 4. Research design
Source: The author (2020).

3.4 DATA COLLECTION PROCEDURES

In qualitative research, one or more forms of data collection should be used, which can be observations, document analysis, interviews, visual and audio materials (Creswell, 2007). To Da Silva *et al*. (2017) qualitative research must necessarily be multi-method.

This care is important to increase credibility and reliability of the data obtained in case studies, in a process of data triangulation (Yin, 2005; Martins, 2008), because from the collection and crossing of information, using different perspectives and sources, the results found in the research are solidified (Eisenhardt, 1989; Martins, 2008).

Thus, to comply with these recommendations, we chose to use as sources of data collection in this research: documents of the organization and interviews with internal and external actors, participants of the Open Innovation projects developed by the cooperative.

According to Creswell (2007), documentary collection may involve minutes, private documents, records, e-mails, letters. These collection sources allow the researcher to access information necessary for the study and strengthen the evidence found in other sources (Yin, 2005).

For the documentary research in this study, internal documents of the organization were selected, related to the Open Innovation projects. These documents were requested from the organization's administrative superintendence via e-mail at the beginning of October 2020 to be analyzed later, as highlighted in Frame 9.

Document type	Number of documents analyzed	Collection period
Organizational chart	1	January/2021
Job position Description (Sector linked to innovation)	1	January/2021
Reports of Open Innovation projects	3	December (2018)/ December (2019)/ December (2020)
Contracts/Terms of Partnership linked to Open Innovation projects	1	December (2018)/ December (2019)/ December (2020)
GRI (*Global Reporting Initiative*) management reports	1	December (2018)/ December (2019)/ December (2020)
Management reports	3	December (2018)/ December (2019)/ December (2020)
Customer satisfaction surveys	3	December (2018)/ December (2019)/ December (2020)
Market Research (*Share*)	3	December (2018)/ December (2019)/ December (2020)

Frame 9. Documents to be analyzed in the research
Source: The author (2020).

The interview is considered fundamental and is one of the most important sources of data in a case study (Yin, 2010) and, in research that has as an object of study an organization, it is suggested that it be carried out with individuals of the company, individuals who have extensive knowledge about the processes and activities that are being investigated (Freitas & Jabbour, 2011). The interviews for the study were conducted in person or online, using technological resources. All were recorded and transcribed because, according to Voss, Tsikriktsis, and Frohlich (2002), this recording procedure in its entirety, and later transcription for analysis gives robustness and greater reliability to the data obtained.

In addition to the individual interviews in this research, group interviews were applied with direct participants of the cooperative's Open Innovation projects, and two groups of these individuals were selected for the interviews: (1) employees and (2) representatives of *start-ups*. For Voss, Tsikriktsis, and Frohlich (2002) this type of interview consists of bringing together participants who have knowledge about the researched theme, providing greater consistency in the data obtained.

For the individual interviews, semi-structured scripts were used, composed of open questions, which served as the basis for guiding the dialogue. These interviews were scheduled via e-mail and telephone contact, and took place during the month of November/2020, being face to face (at the cooperative's administrative headquarters, located at Avenida Barão do Cerro Azul, 594 – Cascavel, PR) with the managers of the cooperative and online (using the *Microsoft*

Teams tool) with representatives of Sebrae and Unioeste, lasting approximately one hour. To record the meetings, a laptop computer was used, for pertinent notes collected in the conversation, and a portable recorder, to archive the entire dialogue.

In its beginning, the interviews were premised on the request for permission from the voice record, with a brief explanation of the research proposal, which is the measurement of the results achieved by the Open Innovation projects, developed by the cooperative.

After this introduction, as already presented, the themes related to **influencing factors** and **result descriptors** selected for this research were addressed, based on the predefined scripts, openly, as the conversation flowed. At the end of the interview, thanks were made for the participation of the interviewees and it was agreed that the results after analysis and completion of the research would be shared with all participants, as a knowledge and potential applications in the organization, object of the case.

In interviews applied to internal and external groups, being employees and representatives of *start-ups*, respectively, the group interview technique was used, where semi-structured scripts were used, which were also composed of themes, which guided the conversations in the group. Following the premises and good practices related to the execution of research using a group interview, whose guidelines designate that they be carried out with the participation of six to ten people (Dias, 2000), for the internal group, nine cooperative analysts were selected, who actively participated in all Open Innovation projects over the last three years. For the external group, nine representatives of the *start-ups* who also participated in the cooperative's Open Innovation projects during this period were selected.

The participants were invited via e-mail and telephone to meetings that also took place in November/2020, in-person (also at the cooperative's administrative headquarters), for the group of employees, and online (using the *Microsoft Teams* tool) for the representatives of the *start-ups*. Both meetings had a two-hour duration agenda so that all topics could be addressed and all participants could have the opportunity to express their opinion on these topics. As in the individual interviews, a portable computer was used for pertinent notes collected in the conversation and a portable recorder to record the entire dialogue.

Below is a summary frame of the interviewees, the technique used, and the code for identifying the analysis, separating the Internal and External groups, being II(Internal interview), IG(Internal group), EI(External interview), and EG(External group).

Audience	Actors involved	Technique used	Interview Code
	Administrative and market manager	Individual interview	II1

Internal (4 Interviews)	Operational Manager	Individual interview	II2
	Personnel manager	Individual interview	II3
	A group composed of employees participating in the projects (nine senior analysts, who actively participated in all the cooperative's projects)	Group Interview	IG4
External (3 Interviews)	State manager of Sebrae (Active participant in the cooperative's Open Innovation projects, carried out in partnership with Sebrae)	Individual interview	EI1
	Professor responsible for NUPEACE (Núcleo de Pesquisas Avançadas em Administração, Ciências Contábeis e Ciências Econômicas) at the State University of West of Paraná. (Active participant in the cooperative's Open Innovation projects, carried out in partnership with the university)	Individual interview	EI2
	A group composed of representatives of the main *start-ups* formed in the Open Innovation projects that the cooperative executes	Group Interview	EG3

Frame 10. Interview groups for data collection
Source: The author (2020).

In order to synthesize the research configuration, a Methodological mooring matrix was used to demonstrate the coherence of the connections established between the purpose of the study, the techniques to be implemented for data collection and analysis and the achievement of the research objectives. This instrument is composed of a matrix structure relating the definitions of the research with the decisions that will guide the conduct of the study (Telles, 2001). The Methodological mooring matrix of this study is exposed in Frame 11.

Specific objectives	Data collection technique	Factors and descriptors analyzed	Justification
Describe the organization's Open Innovation projects, considering their purposes and form of implementation	Documentary research	-	Complete mapping of Open Innovation projects developed by the cooperative
To raise with those involved in Open Innovation projects the factors that influenced the results achieved	Documentary research; Individual and group interviews	1. Operational Structure focused on Open Innovation; 2. Relationship networks, culture, and strategy focused on Open Innovation;	Mapping of the main factors that influenced the success or failure of projects related to Open Innovation, according to the analysis groups of the study
Identify the results generated by the Open Innovation projects implemented	Documentary research; Individual and group interviews	1. Innovative Performance; 2. Market Performance; 3. Operational Performance.	Identification of the main results achieved by the cooperative, according to the analysis groups of the study

Frame 11. Methodological mooring matrix of the research
Source: The author (2020).

3.5 DATA ANALYSIS PROCEDURES

The case study strategy has data analysis as the most difficult stage (Freitas & Jabbour, 2011), as the researcher can follow a flexible format and will depend much more on its interpretation in relation to the data collected to achieve the objectives proposed for the study (Yin, 2010). The researcher can interpret the data through groups selected for research and, finally, create connections to reach the conclusions necessary for the research (Creswell, 2007).

To strengthen this analysis process Borges, Hoppen, and Luce (2009) suggest that the researcher examine the thematic context of the research, creating groups to obtain data, and tabule this information obtained through these groups.

This process was developed in the research, guided by the 5 analysis groups that were found in the literature, adapted, and applied in this study. In order to carry out the analysis, at first, fluctuating readings were taken to fully understand the data collected, the highlights within these data, pertinent to the analysis groups, and the compilation of materials for the composition of the analysis *corpus*.

After the completion of the *corpus* of analysis, we went to the exploration phase of the material. This second phase focused on the construction of connections and summary of the data collected in relation to the analysis groups previously found in the literature. For the operationalization of this stage, all data were organized in an electronic spreadsheet, separating analysis groups and descriptors selected for research, the potential evidence to be searched and the excerpts found in the materials that were connected with these evidences.

Finally, the third and final stage consisted of the treatment of the results, where we sought to identify, through comparative analysis, aspects considered similar or different and, thus, to make inferences and interpretations based on all the data collected in the study, considering the interviews with internal and external agents of the organization as well as all documents selected for research.

To perform this last stage, we used a classification criterion of each item studied within the analysis groups, based on the search for evidence in the collected data that indicated the care compared to what the literature on Open Innovation recommends. Three levels of care were used: (1) not assisted; (2) partially assisted and (3) assisted.

After these frameworks, to facilitate understanding, summary frames of each analysis group were elaborated, identifying within each item the evidence found and the degree of care, thus demonstrating which items have total service and need only maintenance and, mainly,

which items do not have care and, thus, need implementations of improvement by the organization.

3.6 LIMITATIONS OF RESEARCH METHODS AND TECHNIQUES

According to Creswell (2003) there are three forms of limitation that can occur in a research, being: a) method chosen, b) form of data collection and, c) way of data analysis.

Regarding data collection, some limitations arose during the study, mainly related to the interviews, regarding the availability of the interviewees' schedules and the divergences or the lack of knowledge about some elements researched. Another relevant and limiting point was related to the number of participants interviewed, this being a sample of representatives of the groups involved in the Open Innovation projects, carried out by the cooperative, and not all participants, which could bring different perceptions and data than those achieved in the study.

Regarding the method and data analysis, although an effort has been maintained to plan the steps, execute and carry out the analyzes, according to this planning, one cannot completely avoid the risk of the researcher's lack of perception and subjective interpretations in some step performed. To mitigate these limitations, the objective was to perform the analyses always guided by the groups found in the literature and, as far as possible, to triangulate data using different sources (documents, individual interviews and group interviews).

4 CONTEXT OF THE PROJECT OR PROBLEM SITUATION

The problem situation of this research was linked to the need for a medical work cooperative - Unimed Cascavel - that carries out Open Innovation projects in its organizational context for three years, but does not have metrics that present the results of the strategies and, consequently, has limitations of analysis on potential developments of these projects.

The cooperative, founded in 1989, is considered a medium-sized operator, according to the classification of the regulatory agency ANS - Agência Nacional de Saúde Suplementar (2020) - which considers medium-sized operators that have between twenty thousand and one hundred thousand beneficiaries in its client portfolio. According to a management report (UNIMED, 2020d), provided by the company on December 31, 2020, the date of the last annual closure, the cooperative presented 90,088 customers, with a staff of 613 cooperative doctors and 265 employees. The provider network has accredited 23 hospitals, 27 laboratories, and 109 clinics. As a business, the cooperative is a health plan operator. It is currently considered one of the four largest health cooperatives in Paraná and has become a national reference in recent years, for projects and awards won based on its organizational evolution.

The organization has an area of operation in 23 municipalities, located in the western region of Paraná, with an administrative headquarters located at Rua Barão do Cerro Azul, 594, Cascavel-PR, where the administrative sectors, responsible for the entire management operation of the company, operate. In addition to the administrative headquarters, the cooperative has two health care centers, one of which is located on Avenida Tancredo Neves, Cascavel-PR, and the other in Cafelândia, a city that is part of the company's area of operation. These health centers have an assistance feature, providing health care to customers.

One of the strategic pillars of the cooperative is related to innovation. According to a management report (UNIMED, 2021c), the cooperative believes that innovation is one of the premises linked to the medicine of the future, and to comply with these premises, it invests in innovative projects that can help the development and evolution of the organization's management. Among these projects are internal innovation, carried out since 2016, and more recently, Open Innovation.

The origin of Open Innovation projects, developed by the cooperative studied, occurred in mid-2018, when, according to GRI (*Global Reporting Initiative*) report (UNIMED, 2021c), the strategic planning formalized for the management of the triennium (2018 – 2021), a premise was built related to innovation development. This premise was mainly motivated by the directors' longing to promote innovation consistently, using resources and materials external to

the organization, pillars linked to Open Innovation. This premise was formalized with a specific strategic objective in the strategic map of the cooperative, being: "Develop innovation programs". After the formalization of this strategic objective, following the unfolding of the strategy for the triennium, a project was prioritized to meet this specific goal, which was the project called "I *Hackathon* Unimed Cascavel".

In 2018 was carried out the **first Open Innovation project** of the cooperative, which was a hackathon, developed in partnership with Sebrae and educational institutions in the region. According to reports of Open Innovation projects (UNIMED, 2018d), the main objective was to promote innovation in an open way, with the aim of solving administrative problems of the cooperative, which ended up impacting the company's stakeholders and that were not having satisfactory results with the work that was being developed until then. The main theme of the problems presented was related to "adding value to the organization's customers, employees, suppliers, and cooperative members".

This first *hackathon* was held in the cooperative's structure, starting on a Friday afternoon (10/19/2018) and ending on Sunday night (10/21/2018), with the participation of 70 professionals from the areas of health, technology, management and design. According to project reports (UNIMED, 2018d), these students and professionals, participating in the marathon, formed nine working groups, and each working group developed a challenge proposed by the cooperative.

The dynamics of the *hackathon* involved first a moment of knowledge about the needs of the cooperative. The teams had the help of technicians (UNIMED employees) and mentors (renowned experts in the market) to develop the ideas. As a prepared structure, the event stood out in providing full meals (breakfast, lunch, dinner, snacks), physical activities and a space with mattresses, for rest (where many spent the night). It was approximately 53 hours of marathon. In addition to the physical structure, this first *hackathon* featured mentors from companies such as: IBM, Robô Laura, Waze, Coblue and R-DICOM, who assisted the teams in developing solutions efficiently and resolutely.

In all, nine challenges were proposed to the participants, which were divided into: three challenges linked to the areas of customer relationship, three linked to the areas of relationship with cooperative members and three to the dynamics of relationships with providers and suppliers. Of the challenges proposed, two solutions were negotiated and subsequently implemented by the cooperative.

After the development of this first project, the cooperative developed the following year (2019) its **second Open Innovation project**, which was another ***hackathon*** (very similar to

the first project). According to reports of Open Innovation of the cooperative (UNIMED, 2019d), this second *hackathon* focused on projects and solutions related to process improvement. It was developed again in partnership with Sebrae and educational institutions in the region.

This edition had a larger structure, being held at the administrative headquarters of Sebrae Cascavel, starting on a Friday afternoon (08/02/2019) and ending on Sunday night (08/04/2019), with the participation of 92 professionals in the areas of health, technology, management and design, who were divided into eleven working groups, each group being responsible for a challenge proposed by the cooperative. This project used the same premises of the first edition, gaining a greater impact of participation, moving the region's innovation ecosystem. According to the project reports (UNIMED, 2020e), it took more than 55 hours of development and event.

The project once again featured mentors from renowned companies in the market, being highlighted: Robô Laura, Agência Turbo, Waze, Ifood, Coblue e R-DICOM. The challenges proposed to the participating teams also increased in comparison to the previous project, with 11 challenges proposed to the participants, which were divided into five challenges linked to the areas of customer relationship, three linked to the areas of relationship with cooperative members, and three to the dynamics of relationships with providers and suppliers. Of the challenges proposed, two solutions were negotiated and subsequently implemented by the cooperative.

Another Open Innovation initiative, developed by the cooperative, was that of **partnerships developed with *start-ups*** after the *hackathons*, with the negotiation of solutions outside the scope of the event. According to reports of Open Innovation of the cooperative (UNIMED, 2020e), these partnerships were signed with two *start-ups* that stood out at the events. The cooperative intended, through these companies, to solve other problems of its daily life that had not been put into practice in the *hackathons*.

These *start-ups* became suppliers close to the cooperative, mainly to speed up and dynamize the company's innovation processes that were not served by the internal information technology team. As a product of these partnerships, between 2019 and 2020, two technological solutions related to the cooperative's financial area were negotiated, which were implemented and became fixed processes of the cooperative's routines, focusing on automation and process improvement.

Finally, the latest Open Innovation project, developed by the company, is called the "**Innovation Hub**", which is a Public-Private Partnership between the cooperative, a public

education institution in the region (Universidade Estadual do Oeste do Paraná - Unioeste) and Sebrae Cascavel. According to the contract signed between those involved (UNIMED, 2020a), this partnership started right after the second *hackathon* (held in 2019) and was implemented in March 2020. It was premised on the adequacy of space within the partner university for the development of innovative projects proposed by the cooperative, challenges in which students and researchers of the university are invited to work.

The solutions developed can be acquired by the cooperative. All workflows, regulations, and counterparts between the partners involved have been documented, and until the present time of the research, only one challenge has been launched and is being faced. According to reports of Open Innovation productions (UNIMED, 2020e), this challenge is related to the creation of a solution for managing partnerships of the cooperative, focusing on providing its customers with discounts in partner companies, as a kind of advantage club.

All projects that have been developed since 2018 do not have a structured measurement of results, a fact that originates the need for the cooperative to know these results, as well as having subsidies to analyze and map potential improvements for the future of the initiatives.

These premises are related to the specific objectives of the study, focused on identifying the results of these Open Innovation projects and on the influencing factors that impacted these results, thus justifying the relevance of the study to the cooperative.

5 ANALYSIS AND INTERPRETATION OF RESULTS

This chapter presents the results found in the research, with the execution of the descriptive phase of analysis on the collected materials, based on the analysis groups mapped for this study. First, the findings were presented following this order: (1) Organizational Structure; (2) Relationship networks, culture, and strategy; (3) Innovative Performance; (4) Market Performance and (5) Operational Performance. Each group was analyzed in detail based on the elements that compose them.

After the presentation of the results by the analysis group, a compilation of the data and information found was also carried out, in order to concentrate the main findings and outline an overview of the results of Open Innovation obtained by the cooperative.

5.1 ANALYSIS GROUP: ORGANIZATIONAL STRUCTURE FOCUSED ON OPEN INNOVATION

In this analysis group, evidence was sought related to the organizational structure of the company under study, mainly about the alignment of the current structure and the premises of Open Innovation development.

The first influencing factor analyzed was the existence of sectors or areas for the management of Open Innovation. In the interviews, it can be seen that, both for individual and internal group interviews and for individual and external groups, there is an area within the cooperative, called “Project Nucleus”, which is responsible for conducting the projects and initiatives, linked to Open Innovation. This finding is evident in excerpts found in II1 "[...] there is a specific area responsible for the formal process that is Project Nucleus [...]"; II2 “[...] the cooperative has a specific area that addresses innovation, the “Project Nucleus” sector [...]” and IG4 “[…] Well, within UNIMED Cascavel does have areas, the one that leads the most projects is an area called the Project Nucleus [...] ”, demonstrating that it is a consistent perception, both of representatives of the strategic level interviewed, as well as of those of the tactical and operational level, who agree that the area cited is responsible for the Open Innovation initiatives developed in the cooperative. It is worth mentioning that both groups of respondents mention that the area does not have an exclusive dedication to these initiatives, thus making it clear that this process is a partial activity that the sector performs, as can be seen in the excerpts of II3 "[...] there is a sector, the Project Nucleus, which started small, with two people and has been developing over time [...]" and IG4 "[...] Within the Project Nucleus then there is the team that

assists from the organization of this Open Innovation, the *hackathons*, and the partnerships themselves with *start-ups*, but I think we would still have to evolve in having specific representatives within the areas to be able to develop these innovation projects after implementation [...]".

External interviewees also cite the area as being responsible for the interactions, from the organization of the *hackathons* to the subsequent partnerships and the continuity in the Open Innovation process with these agents, as can be seen in excerpts from EI1 "[…] There is a sector that concentrates information and interactions, called Projects. They make this link with the areas that demand the tool that we developed [...] " and EI2 "[...] I see that Unimed has a specific sector to deal with issues related to innovation, having as direct contact the coordinator of the Project Nucleus [...]".

In the current organizational chart of the company, no area has been identified that, in its name, clearly has a connection with innovation. There is, in fact, the Project Nucleus area, mentioned in the interviews as responsible for Open Innovation initiatives, as highlighted below in the presentation of the current organizational chart of the cooperative.

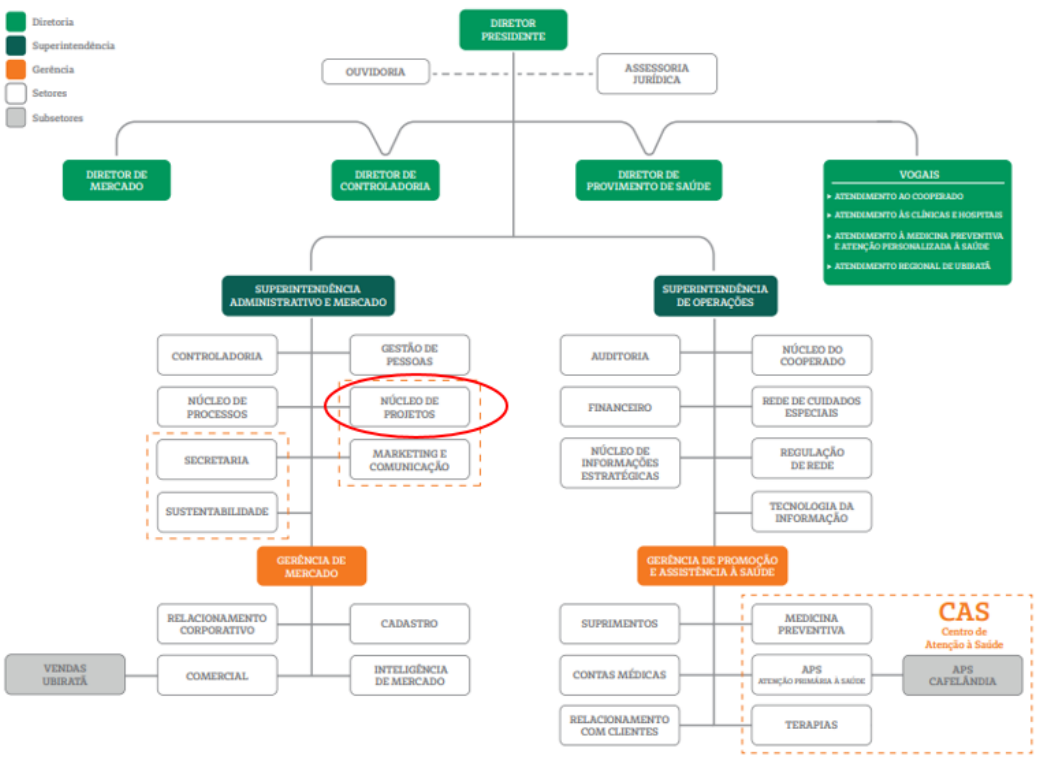

Figure 5. Organization Chart of the Company: Evidence on the sector responsible for Open Innovation
Source: UNIMED (2021c).

The existence of specific areas or sectors in the organizational structure, which have resources for the development of Open Innovation, is an essential factor for the results to be

effective (Brocco & Groh, 2009; Scaliza, 2015). These results can be even more expressive if these areas or sectors have exclusive dedication, thus focusing on activities and, consequently, better results (Chiaroni, Chiesa & Frattini, 2011; Hitchen, Nylund & Viardot, 2017).

The organization partially fulfills the premises of this element because it has a sector with a partial dedication to the development of these projects, thus dividing the focus of the activities developed. In addition, employees working in this sector also have a partial dedication to the development of Open Innovation projects, with the central focus of their activities on the execution of other processes belonging to the area, a factor considered insufficient in view of the premises of this item, with based on the literature.

The second factor influencing the analysis was related to the teams for the development of Open Innovation. Activities performed by two job positions belonging to the sector were identified in the description of job positions in the sector of Project Nucleus (UNIMED, 2021b), being that of “Coordinator of the Project Nucleus” and that of “Senior Project Analyst”. Specifically for the job position of coordinator, the following activities were observed: "Manage the projects and innovation actions of the cooperative", "Manage the planning and execution of the cooperative's innovation programs" and "Submit the projects for committee analysis". For the job position of analyst, the activities found were: "To set up a presentation on the implementation of projects for the superintendence/board, when necessary" and "Manage criteria and operation of the cooperative's innovation programs".

In the interviews, it can be seen that both for the group of managers and for the group of technical collaborators interviewed, there are teams that carry out this process, but for them, there are evolutions and improvements to be implemented so that Open Innovation is leveraged in the cooperative, mainly obtaining more human resources and teams, focused specifically on the development of these projects and not in parallel with routine activities, as is done today, as noted in II1 "[...] if we want to move the process forward, we need improvements. We would need to have a focused and specific team for this process, to have an innovation laboratory. In short, we do but we do not have a focus [...]" and II3 "[...] it can be said that we have teams ahead of these processes and we are at good levels, but we can still achieve more, with the evolution of the internal team [...]".

It is worth noting that there is a greater emphasis on these aspects, especially in the opinion of the technical group, which is at the forefront of implementations and developments, with highlights in the IG4 interview being "[...] Financial sector representative: I believe that improvements in this sense need to be implemented [...]" and "[...] Medical accounts sector representative: A specific sector for this should head the project, but in each cell have some

representative to develop, because it would be even much easier to organize schedule, for collection, to see if it is going forward or not [...]".

For the interviewed external agents there is a consensus in the opinion that there are teams for the development of Open Innovation since all workflows and interactions were carried out effectively, in the opinion of these interviewees, with highlights in EG3 "[…] The entire team that participated in the problem was available, in case we needed to talk about something and such [...] "and EI2" [...] I realized the team that develops these initiatives was very engaged, always trying to do the processes of the partnership quickly and assertively [...] ".

The existence of teams directly allocated to the development of Open Innovation is a preponderant and essential factor for the results achieved to be efficient, since the organization needs people focused on these activities, thus giving importance and fluidity to these initiatives (Ismail & Monsef, 2012; Scaliza, 2015). In addition, it is important that these activities are formalized and are part of the description of job positions and the employees' activity plan, making the initiatives be worked clearly and routinely within the company's processes (Brocco & Groh, 2009; Chiaroni, Chiesa & Frattini, 2011).

As in the previous influencer factor, the cooperative complies with part of the premises, because the teams responsible for conducting the Open Innovation projects of the cooperative do not have exclusive dedication and there is still a lack of resources (people) that develop these processes in a focused way, thus enhancing the quality of deliveries and the results to be achieved. Moreover, it is necessary that global activities are formalized in a complete way, since the evidence found represents small activities and not the complete reality of the projects that have already been developed by the cooperative in the period analyzed.

The third influencing factor analyzed was related to **to formalized leadership** for the development of Open Innovation. For this factor, investigations were also carried out in the documents related to the description of job positions and activities of employees and it was found that within the previously mentioned job position of "Coordinator of the Project Nucleus", there is the activity "Manage the planning and execution of the cooperative's innovation programs". From this, it can be concluded that, although it is not explicit about Open Innovation, this leadership is responsible for conducting the related activities of the cooperative.

In the interviews, both in the view of internal and external participants, the coordinator of the area of Project Nucleus is cited as responsible for the process of Open Innovation development in the cooperative, with emphasis on the development of *hackathons*, in which this leadership was responsible for the projects, from its conception to completion and

subsequent continuity, as highlighted by II1 “[…] There is leadership in the area of the Project Nucleus that, in a way, is formalized, proof of this is the conduct of *hackathons* and continuity in projects [...]", II2 "[...] The leadership responsible for these activities is the Coordinator of the Project Nucleus, who accompanied the projects from the beginning to the moment [...]", II3 "[...] There is a coordinator who is at the head of Open Innovation projects [...]", IG4 "[...] With regard to leadership, there is particularly on the issue of the Project Nucleus sector [...]", EI1 "[...] The interactions are carried out with the support of the Coordinator of projects, who participated from the first conversation and directed the development of *hackathons* and partnership later [...]" and EG3 "[...] the leadership of these projects by Unimed I see in the figure of the project area manager [...]".

It is noteworthy that, according to the description of the job position (UNIMED, 2021b), this leadership has other activities under its responsibility, such as Strategic Planning, Projects, Quality, and all part of Marketing and Communication, thus having a partial dedication to the development of Open Innovation projects in the cooperative.

Organizations that have formalized leaderships tend to achieve solid and robust results with Open Innovation projects since the conduct of these activities will be carried out effectively and the processes will be put into practice according to the guidance and direction of this leadership (Brocco & Groh, 2009; Love & Roper, 2009; Scaliza, 2015).

It is noted about this element that the organization has a formalized leadership, which is recognized by internal and external participants, but which also demonstrates a scenario of partial service with regard to its dedication, which today is shared with other demands.

The fourth and last influencing factor, analyzed by this group, was related to the **integration of multidisciplinary teams** for the development of Open Innovation. In this factor, no evidence was found in the cooperative documents that prove the formal and continuous existence of the use of multi-disciplinary teams for the development of projects related to Open Innovation.

This lack is consolidated in the analysis of the interviews carried out, where there are some divergences about this factor. For the superintendents, who are at the highest level of the cooperative's management, there is a perception that the teams have this freedom to be able to carry out work in an integrated manner with other colleagues, even citing intercooperation as a success factor of these processes. As highlighted by II1 "[...] there are models of committees in the cooperative, generating this alignment, the synergy of the teams and the intercooperation, which is one of the competencies of the cooperatives [...]" and II2 "[...] some sectors of operations have autonomy to talk to each other and with sectors of other superintendences

and/or managements [...]". However, when analyzing the perception of the HR manager and the group of employees, who are closer to operational levels, a divergence is noted regarding the existence of this integration, even with citations related to communication noises, lack of time for these projects and little specific focus for Open Innovation initiatives, especially the excerpts from II3 "[...] I believe that it could happen, depending on the interest of the areas, with a common goal, but I do not see this happening in a frequent way, because today we have a group of managers or analysts, who are very focused on the routines of the job position [...]" and IG4“ […] Ah, we identified the problems, created projects, but, when implementing them, we had, I don't know if a resistance or a question of time, process, in short, of the sectors [...]

For external agents, what is perceived is that in the *hackathons*, which had a short duration and the internal professionals were focused on the development of innovations, there were satisfactory interactions of multisciplinar groups of the cooperative, as mentioned in EG3 " [...] There, on the day of the *hackathon*, everything was excellent, the staff made themselves available […]" and EI1“ […] The cause of the success of the *hackathons* was the involvement of interested parties, everyone got involved, exposing the needs of the sector to the participants [...] ”. However, when analyzing the continuity of these projects, which have a long-term character, we notice some aspects that are consistent with what was exposed by the internal operational groups, where the integration of multidisciplinary teams could occur more effectively, as can be seen in the EI2 “[…] There is integration to a certain extent, but I think it could evolve, involving more professionals and working in an even more multidisciplinary way on these projects [...]”.

The development of projects related to Open Innovation with the participation of multidisciplinary teams, that is, that have diverse knowledge and complement each other, brings robustness and effectiveness in the production of innovation to organizations (Chesbrough & Bogers, 2014; Scaliza, 2015; Harel, Schwartz & Kaufmann, 2019). These teams can be formed by components from different sectors, with different opinions and visions, but which together promote integration and agility in the delivery of solutions through Open Innovation (Tidd & Bessant, 2015).

Regarding this aspect, it is perceived that the cooperative has interaction mechanisms, such as committees and groups that work according to specific needs. However, it is noted that there are no groups selected to work on Open Innovation projects continuously, with components from different sectors, bringing competencies and skills that complement each other and add robustness to the developed projects.

In order to synthesize the data and evidence found in this analysis group and present the main results of the analyzed elements, a summary was elaborated that can be visualized in Frame 12.

Analyzed Element	Evidence found: Interviews	Evidence found: documentary	Degree of attendance of the factor
Sectors or areas for the management of Open Innovation	II1; II2; II3; IG4; EI1; EI2; EG3: “Project Nucleus” with partial dedication	Organization chart with the presentation of the sector Project Nucleus	partially assisted
Open Innovation Development Teams	II1; II3; IG4; EG3: Existence of teams with partial dedication and in need of improvement EI2 e EG3: Existence of teams with satisfactory service	Description of two cooperative job positions (Coordinator of the Project Nucleus and Senior Project Analyst) with some mapped and formalized activities	partially assisted
Formalized Leadership	II1; II2; II3; IG4; EI1; EI2; EG3: Leadership of the “Project Nucleus” area with partial dedication EI1, EI2 e EG3: Existence of project leadership that leads to interactions	Job position description of the project coordinator with the activity of "Managing the cooperative's innovation projects"	partially assisted
Integration of multidisciplinary teams	II1; II2: Existence of committees and freedom for teams to create II3 e IG4: No integration, causing problems in the projects EI1 e EG3: Existence of integration in the events, but with disruptions in the sequence of the processes	Not found	partially assisted

Frame 12. Summary of results: Analysis group Organizational Structure
Source: The author (2020).

This first analysis group presented results that demonstrate a partial service of the cooperative in relation to the elements analyzed. For the most part, the organization has processes and activities already developed, but still require several improvements to obtain an effective and satisfactory result.

5.2 ANALYSIS GROUP: RELATIONSHIP NETWORKS, CULTURE, AND, STRATEGY FOCUSED ON OPEN INNOVATION

The second group used as the basis for carrying out the analyzes was composed of attributes of relationship networks, culture, and strategy, linked to Open Innovation. This

analysis group was composed of four influencing factors that were detailed and analyzed in view of the practices developed by the cooperative.

The first influencing factor analyzed was related to the way in which **Open Innovation processes are structured**. According to (UNIMED, 2021a), it was identified that the Open Innovation process is foreseen in the value chain of the "Project Nucleus" sector, as highlighted in Figure 6.

Figura 6. Company Value Chain: Evidence on process mapping
Source: (UNIMED, 2021a).

Investigations were also carried out in the cooperative's standard operational procedures and identified that, according to (UNIMED, 2021d), the process is not yet widely mapped in this type of document. Finally, documents were investigated presenting rules for the functioning of partnerships, regulations of events and negotiations, and other information on these processes. According to (UNIMED, 2018e; UNIMED, 2019e), regulations used for the two *hackathons* promoted by the organization were identified, as well as, according to (UNIMED, 2020a), contracts that establish rules and responsibilities for partnerships and negotiations carried out between the company and external agents, participants in these Open Innovation initiatives.

In the interviews, a similar view of the internal groups on the evolution of these processes in the analyzed period is observed, even mentioning that it is a process that is being implemented in the organizational culture of the cooperative, as can be seen in II3 "[...] the processes were structured as needed. Of course, the culture left by the *Hackathons* started the

perception of innovation, as we say: a seed of innovation was planted [...]" and II2 "[...] there are processes related to Open Innovation that are being rooted in recent years and are disseminated in all sectors [...]". Another important point is related to perception, both by the group of respondents at the strategic and operational level, that these processes are still implemented at a basic level and that they must be improved, as II1 "[…] I believe there is always something to improve in the processes because people are never stopped, but always evolve [...] "and IG4" […] I think it exists in parts because the Project Nucleus is what starts this Open Innovation process, but I think there would be issues to evolve [...] ".

In the view of external agents, the processes are generally well structured, with well-defined and transparent rules and operating flows, as evidenced in EI1 "[...] I consider that the processes implemented in our partnership had a good experience because they had scope, deliveries, schedule, and indicators, facilitating the process and necessary steps [...]" and EI2 "[...] About the processes, I think it is all well organized because we have everything formalized through terms of partnership that contains the collective and individual responsibilities of each member representing the parties, university, cooperative and educational institution [...]".

Both the views of the internal groups and those of the external groups are connected with those found in the documents. Internal formalizations, with standard operating procedures and with flows, still have points to evolve while formalizations with external partners are already well consolidated, with contracts that determine the interactions between the organization and the external agents participating in the projects.

Within this context, for Open Innovation to produce satisfactory results, it is essential that initiatives have clear processes, with the transparent declaration of responsibilities of each involved, whether from inside or outside the promoting company (Hogan & Coote, 2014, Scaliza, 2015).

It is observed that the cooperative has some structured processes but still in an initial and superficial way, according to evidence found in standard operational procedures of the cooperative (UNIMED, 2021d). These findings demonstrate weaknesses in procedures and policies that can present in a simple way how these activities should be developed in the daily life of the company and, thus, enhance the possibilities of these initiatives to have better results. Regarding interactions and processes with external agents, it was found that the cooperative has more strengthened processes, according to partnership contracts (UNIMED, 2020a). These contracts meet requirements related to legal formalizations that are essential in these types of partnerships, which is a positive factor that should be considered.

The second influencing factor analyzed in this group was related to the **Communication**, used for the propagation and dissemination of the Open Innovation projects, promoted by the company. In this factor, no evidence was found in documents of the cooperative that proves the formal existence of any specific process or flow for the continuous realization of communication and dissemination of the Open Innovation projects. In the reports of the Open Innovation projects, specific publications were found, specifically in the form of articles on the events (UNIMED, 2018d; UNIMED, 2019d) and the launch of the Innovation HUB, developed in partnership with Sebrae and Unioeste (UNIMED, 2020e).

This lack of formalization in communications can also be seen in the interviews carried out. Both in the interviews with internal agents and in those with external agents, it was seen that the communications of the events, whether the *hackathons* or the launch of the HUB, had a greater emphasis, as highlighted in II3 "[…] I think the communication of the *hackathons* and the launch of the space in partnership with Unioeste was efficient and extensive [...]" e IG4 "[…] I think that from the standpoint of the *hackathon* event, both internal and external disclosure was excellent [...] ", but that continuity, whether with the negotiated projects or even with other complementary disclosures, did not exist or need to be worked on in a more efficient and constant manner, as highlighted by IG4 "[…] From the point of view post-hackathon, implementation of improvements, partnerships with *start-ups*, I think it still has a lot to evolve, both for the internal public and for the external public [...]", EG3 "[…] Look, speaking for me, honestly, I haven't seen much disclosure about what happened there with us, and I don't know if it's because I'm not as involved as the west boys, but speaking for me, I don't see so much disclosure in this matter, that Unimed has partnered with other companies or brought products from outside [...]". Finally, in EI1 "[...] I think the results and continuities of the projects can be better explored [...]".

The wide communication and dissemination of the rules, mode of operation, and results of the projects is a crucial factor for producing the engagement of the actors involved in the Open Innovation projects (Uzkurt, Kumar & Kimzan, 2013; Hogan & Coote, 2014). These disclosures and communications must have a defined periodicity and use different channels so that different stakeholders can be reached (Scaliza, 2015).

The organization does a good job of publicizing the events but does not have continuity, periodically, in communications and disclosures to reach more effectively the stakeholders, especially concerning disseminating the results of these partnerships and initiatives. and, thus, further, engage those involved and potential new participants in future participation within the projects.

The third factor analyzed within this group was **incentive mechanisms** so that both internal agents of the company and external agents participated in the Open Innovation projects promoted. In the documentary analysis, it can be observed that for the events (*hackathons*) there were mechanisms of financial incentives to external participants, which were *start-ups* and students. These mechanisms were foreseen in the marathon regulations, according to (UNIMED, 2018e), being: the *I Hackathon*, which took place in 2018, provided for in item number 13 – "From the Award", provided for the following bonuses:

a) Winning Group - 1st Place: R$ 5.000,00
b) Group - 2nd Place: R$ 2.000,00
c) Group - 3rd Place: R$ 1.000,00

In turn, the 2019 regulation, as (UNIMED, 2019e), also in item 13 – "From the Award", provided for the following bonuses:

a) Winning Group - 1st Place: R$ 6.000,00
b) Group - 2nd Place: R$ 3.000,00
c) Group - 3rd Place: R$ 1.000,00

In addition to these financial incentive mechanisms, another mechanism identified in the regulation of *hackathons*, more precisely in item nine of them, was that of negotiating the rights of solutions created after the event, being: “[solutions created at the event are the property of the teams and not from Unimed Cascavel]" and "[Unimed Cascavel may negotiate after the event the purchase of the solutions created that are of most interest to the teams and as decided by Unimed]", thus bringing to these teams market opportunities of future gains, subsidized by the cooperative. For the internal groups, no evidence was found, in the documents analyzed, about some type of incentive, financial or not, that has been made available and applied by the cooperative.

This scenario was confirmed in the interviews with the external and internal participants. It is observed that, for participants outside the cooperative, the criteria and incentive mechanisms were clear and transparent, cited by Sebrae representatives, Unioeste representatives, and *start-ups* representatives, as a positive factor within the Open Innovation projects promoted by the company, as highlighted by EI1 "[...] I believe that the incentive mechanisms were satisfactory, due to the clarity of the information, because the cooperative made clear and explicit what it wanted and how much it was willing to grant [...]" and EI2 "[...] All the incentive mechanisms of the projects are clear and very transparent, thus motivating

students to participate in the challenges, which can generate business and even a future for them [...]".

Another highlight on incentive factors, mentioned by these external agents, was related to the organization of events and partnerships. The cooperative promoted an "innovation experience" and maintained, even after the event, a relationship with the teams and participants, with emphasis identified in EG3 “[…] The issue that Unimed has to trade the products that were developed during the *hackathon* is very important. Several others that we participated in were only there at that time and then there was no progress in the negotiations or had a contribution, or anything forward [...]”.

For the internal group, it is noted that the mechanisms are still subjective and unstructured, both before and after the events (*hackathons*), making it so that these agents do not have clear mechanisms of motivation and recognition to participate in Open Innovation projects, as highlighted in IG4 "[...] This is a point that can evolve for employees because there is really no extra incentive for our participation in these initiatives [...]". Still in this context, the only incentive mechanisms, mentioned by the internal group, are related to the participation of innovation movements, motivated by experience and by what this can generate in its continuity, with the production of innovation and “doing different”, as highlighted at II2 “[…] There are incentives concerning the participation of employees in *hackathons*, where a kind of "healthy dispute" was generated between the sectors to see which would have the best performance in the relationship between their problems and the *start-ups* that came to solve these problems. [...]”.

Incentive mechanisms are fundamental for engagement and motivation to all participants in the Open Innovation initiatives that a company promotes (Scaliza, 2015). These mechanisms can be applied in different ways, being: financial, awards, gifts, promotions, professional valuation (Lindergaard & Callari, 2011). Among these, it is observed that the cooperative used financial mechanisms and awards for external participants, but does not have incentives for internal participants, such as, for example, criteria for professional promotion and valorization to participants who stand out in these Open Innovation projects.

The last factor analyzed in this group was that of **relationship networks** that the cooperative has for the development of Open Innovation. Within the documentary analyses were found documents that prove the formalization of partnerships that the cooperative has, containing operationalization flows, responsibilities, and specific rules of each partnership, as is the case of the contract and regulation of the partnership with Sebrae (UNIMED, 2018e) and Unihub (UNIHUB, 2020a). The main partners of the organization, found in these documents,

are Sebrae and the State University of West of Paraná - Unioeste. According to the partnership contract itself (UNIMED, 2018e), Sebrae is the cooperative's oldest partner, from the first *hackathon*, which was developed in 2018, to the present day. It acted as an organ for fostering innovation, providing a kind of consultancy for the cooperative in the dynamics of implanting and developing Open Innovation.

According to (UNIMED, 2020a) Unioeste is the newest partner of the organization, formalizing the partnership in 2020 with the implementation of the Innovation HUB, a space that aims to promote innovation with practical and real challenges of the cooperative, which are made available so that students and researchers of the university can work and create services and products to solve these challenges.

As already mentioned, both in the formalization of the partnership with Sebrae (UNIMED, 2018e) and with Unioeste (UNIMED, 2020a), are foreseen, in contracts, terms of scientific cooperation, and regulations signed between the organizations. This type of partnership is important so that the dynamics of Open Innovation are accelerated (Chesbrough, 2012), especially when there are flows of sharing and clear interactions, with specific responsibilities and objectives for each partner involved in this relationship network (Hogan & Coote, 2014; Stal, Nohara & Chagas, 2014).

This panorama of objective formalization of partnerships, which form the current relationship network of the cooperative, was confirmed in the interviews carried out. Both for internal and external interviewees, it was observed in this regard that the cooperative develops clear processes and has been evolving year by year, adding external actors to the organization so that problems are solved and innovation occurs in an open manner, as highlighted in II1 "[…] Without the partnerships, I think that we would not have evolved in these projects, since, for the first year, it would not have been possible to carry out the *hackathon* without the Sebrae partnership with its knowledge and expertise, and the other partnerships that solidified the event and the others held [...]", IG4 "[…] From the point of view of formalization, then all these *start-ups* and all these developments have a contract that is approved with our Legal Department, the Board and the areas and even the part of the branch of the partnership that was made with Unioeste and Sebrae also has this formalization […]" and EI2 "[…] from the first conversation to the unfolding of the partnership, contact with the cooperative has always been very effective. Doors were opened for innovation to happen within the university [...]".

Another important point is that the internal and external views converge with regard to the importance of partnerships for all involved. The managers and employees of the cooperative affirm the importance of the partners in the evolution of Open Innovation projects and, equally,

the partners also affirm that the organization has a fundamental role in the partnerships, for the objectives of these institutions in fostering innovation in the region, with highlighted in II2 "[…] there are partnerships with Sebrae, Unioeste, and *startp-us* where Unimed opened up through the *hackathons* taking their problems to the outside environment so that these agents outside the cooperative could contribute to solving these problems. This was a key factor to reap the results we already have, even with a little time for these projects [...]" e EG3 "[…] this type of partnership for us of a beginning start-up is very important, also because sometimes we, as a company, we have a vision: "oh, for me to have a business that will work, I'll have to invent a totally revolutionary business". And in fact, Unimed has problems and many manual processes, and a lot that can be innovated. So this has brought a business vision for us because it is not necessary to have a fantastic business to make the business work [...]".

Relationship networks give vent to Open Innovation initiatives and are crucial to success in achieving the goals of all involved (Büschgens, Bausch & Balkin, 2013; Uzkurt, Kumar & Kimzan, 2013). This is a process that must be increasing, involving more actors so that projects gain robustness and thus produce greater results (Hogan & Coote, 2014; Scaliza, 2015).

Given these aspects, it is noted that the cooperative complies with the basic requirements on the theme of creation and development of its relationship networks, having, in just over two years, entered into partnerships with different actors and, according to the results reports of its projects of Open Innovation (UNIMED, 2020e), already reaps results with these partnerships, through solutions implemented in their daily lives and with others that are still under development.

In order to summarize the data and evidence found in this analysis group and present the main results of the analyzed elements, a synthesis was elaborated that can be visualized in Frame 13.

Analyzed Element	**Evidence found: interviews**	**Evidence found: documentary**	**Degree of attendance of the factor**
Structured processes	II1; II2; II3; IG4: Structured processes but with needs for strengthening and improvements EI1; EI2: Processes with well-defined rules and workflows.	- Value chain with processes mapped on the cooperative's relationship with *start-ups*; - SOPs on the processes still under elaboration; - Regulations and contracts mapped and widely disseminated	partially assisted
Communication	II3; IG4: Focus on hackathons communications	- Punctual articles and disclosures about the events	partially assisted

	IG4; EG3; EI1: Lack of communication of post-event results		
Incentive mechanisms	EI1; EI2; EG3: Clear, transparent, and effective incentive mechanisms II2; IG4: Lack of incentive mechanisms for internal agents	- Mechanisms for external agents provided for in regulations and contracts	partially assisted
Relationship networks	II1; II2; IG4; EI2; EG3: Solid, formalized, and important partnerships for all involved.	- Cooperation contracts and terms that clearly formalize partnerships	assisted

Frame 13. Summary of results: Analysis group Relationship networks, culture, and strategy
Source: The author (2020).

The second analysis group presented results that also demonstrate a partial service of the cooperative concerning the elements analyzed. As in the first group, there are still superficial and premature actions that need to be strengthened so that the results are enhanced through these Open Innovation projects. A positive highlight is related to the factor of the relationship networks, where the organization already presents results that are recognized, both by internal audiences and by external audiences involved in Open Innovation projects, mainly related to the partnerships signed and that are producing results through solutions applied to the daily life of the cooperative (UNIMED, 2020e).

5.3 ANALYSIS GROUP: INNOVATIVE PERFORMANCE

The third group concerns the descriptor of results linked to Innovative Performance. This group was composed of three elements that were detailed and analyzed using documents from the cooperative and interviews with internal and external agents involved in the projects.

The first element concerns the **quantity of products and processes developed** through Open Innovation. According to the results reports of the Open Innovation of the last years (UNIMED, 2018d; UNIMED, 2019d; UNIMED, 2020a), it is observed that the cooperative had implementations, mainly linked to the improvement of processes through technological solutions produced within the dynamics of Open Innovation, with the development of *software* in partnership with *start-ups*. In all, six solutions were developed in the analyzed period, linked to different areas and objectives, but all linked to process improvement.

According to the 2019 results report (UNIMED, 2019d), four solutions were developed in partnerships with *start-ups*. The first implemented solution was called *SGC – Sistema de Gerenciamento de Cobranças* (Collection Management System), whose implementation

occurred in April 2019. The goal of the solution was to automate the collection process of Unimed's defaulting customers, using automatic tools: SMS, whatsapp and e-mail triggers.

The second solution implemented was named *Sadu - Sistema de Avaliação de Atividades* (Activity Evaluation System), implemented in June 2019. According to (UNIMED, 2019d), this solution had as main objective to improve the performance evaluation system of employees of the sector of information technology of the cooperative.

The third solution implemented was called *Automação de confirmação de consulta e pesquisa Satisfação* (Automation of query confirmation and Satisfaction survey), implemented in September 2019. According to (UNIMED, 2019d), the objective of this solution was the automation of the flow of sending and confirmation of consultation of the Clinic, of attention customized to the health of the cooperative's workers as well as the post-consultation satisfaction survey (previously this flow was done manually).

Another solution implemented was called *Renegociação de Devedores – Campanha "Black Friday"* (Debtors Renegotiation - "Black Friday" Campaign), implemented in December 2019. According to (UNIMED, 2019d), the main objective of this solution was to recover values from the customer portfolio or excluded from 2015 to 2019, with an online self-service platform, easy to access, fast and resolutive, where with just five clicks the user finished the service and settled their financial pending with the cooperative.

According to the results report of the 2020 innovation projects (UNIMED, 2020e), two other tools were implemented in the cooperative's routine through a partnership with start-ups. One of them was called *Glotic – Gestão do Recurso de Glosas* (Disallowance Resources Management), implemented in May 2020. As found in (UNIMED, 2020e), the objective of this solution was to manage the disallowance resources, a vital process in the daily life of the cooperative, in an automated, integrated and traceable way among all agents involved in the process (Unimed, cooperative and providers).

Finally, the last solution, implemented in the cooperative's routine, was called *Negociação de débitos dos contratos ativos – Pagamento no cartão de crédito –* (Debt negotiation of active contracts - Payment by credit card -) implemented in May 2020. According to the results report (UNIMED, 2020e), the objective of the solution was the implementation of another digital negotiation channel so that payments of outstanding amounts could be paid entirely online and on the credit card, facilitating the interaction of the beneficiaries in their negotiations during the pandemic period (COVID 19).

Investigations were also carried out on these elements in interviews with internal groups of the cooperative. There is a convergence with the evidence found in the reports of the projects

used, where both managers and employees, cite the improvement of processes as again acquired through Open Innovation, as highlighted in II1 "[...] I remember several processes that were improved with the solutions created, mainly in the financial area [...]", II2 "[...] In just over two years we had several processes optimized with the tools created with *start-ups*, producing gains with agility, automation, in short, improving cooperative processes [...]" and II3 "[...] I realize that the Open Innovation projects were focused on software that improved the cooperative's processes, in various areas such as finance, medical accounts, and others [...]".

Regarding the number of products, no evidence was specifically found that the Open Innovation projects have impacted the growth of these products within the cooperative. This is a point that deserves to be highlighted, because the cooperative obtained results in its Innovative Performance with the production of technological solutions that optimized processes, but that in products did not obtain any innovation, thus demonstrating a lack related to this theme.

It is important to emphasize that Open Innovation should generate process improvements, but mainly promote growth in the development of product innovation (Xu *et al*., 2012; Stal, Nohara & De Freitas, 2014), a factor that has not yet been evidenced in the organization and can be worked with greater emphasis. The growth in the production of new products and processes must happen continuously, always counting on the partnership of external agents, performing prototypes, tests and implementation in the market in a systemic way (Desidério & Popadiuk, 2015; Scaliza, 2015). In view of this, it is perceived that the cooperative can direct efforts so that new health care products and models are thought, bringing innovations also in this sense and not only in processes, as has happened so far in the Open Innovation projects promoted.

The second element of this group was related to **the use of the products and processes developed**. For the analysis of this factor, documentary research was also carried out in reports of the Open Innovation projects (UNIMED, 2019d; UNIMED, 2020e), developed by the cooperative and, for synthesis, a comparison was made between the challenges generated in each *hackathon* and the number of solutions and projects that ended up being finalized.

For each *hackathon* a set of challenges was listed to be proposed to the participating teams. Those who achieved prominence were invited to finalize and negotiate with the cooperative. Analyzing these aspects, it is observed that for the first *hackathon*, held in 2018, nine challenges were proposed, and from this marathon, two solutions were negotiated and implemented in the company's routines. In the second edition, 11 challenges were proposed and of these, two were negotiated and put into practice by the cooperative. In addition to these figures, projects that had direct negotiation with *start-ups* were taken into account, with scope

elaboration outside the events of the *hackathons*. Two cases were found in these results documents (UNIMED, 2020e) that had direct negotiations in partnerships signed with *start-ups*, which were negotiated and finalized in the company's routines. To illustrate the real use of these solutions, Frame 14 was elaborated, which includes the number of challenges proposed and the solutions that were actually implemented and used, with the percentage of implementation of each of these events.

Event or Direct Negotiation	Challenges proposed	Availed/applied solutions	Percent of utilization
Hackathon 2018	9	2	22%
Hackathon 2019	11	2	18%
Direct negotiations with *start-ups* - *Post hackathons*	2	2	100%

Frame 14. Summary of Results: Real use of the solutions developed
Source: The author (2020).

Still in the analysis referring to this factor, evidence was sought in the internal and external interviews, carried out mainly with the group of employees and with the representatives of the *start-ups*, in order to identify a scenario that explained the utilization results presented.

In general, some factors were cited as crucial, either for the success of the implantations and the use of the solutions or for the failure of the projects that did not evolve and were not implemented. For the managers and the group of employees, the main aspects that contributed to the success of the implemented solutions were: engagement of the *start-up* that selected such challenges, support from the direct internal management so that the challenge was indeed implemented, and daily interaction so that the project, according to the interviewees, "got off the ground" and in fact was implemented, as highlighted in IG4 "[…] I think there were several factors that leveraged the projects we managed to implement, but mainly the engagement of the boys from the *start-up*, who rolled up their sleeves and became very involved in the projects, coupled with the support of our manager who ended up helping a lot [...]". For the group of interviewees from the *start-ups*, the success factors emphasized were: partnership with the cooperative's internal team to understand the problem, clearly design the scope, routine communication, and support from the cooperative in the development of the project, as can be seen, observe in EG3 "[…] the biggest highlight I think is the engagement of Unimed's internal staff who always served us quickly and requests, whether by phone, W*hatsApp* or even face-to-face when needed [...]".

About the projects that did not go forward, the internal group interviewed cited the lack of time to closely monitor *start-ups* and the lack of focus for project development as highlighted

in IG4 “[…] To evolve I think it goes through what has been commented, to focus on these projects and not develop them in parallel with the routine demands, so ends up limiting time and we were unable to give due attention so that more projects like these are developed [...]”.

In view of the above, it is noted that within the events "*hackathons*" the effectiveness of implementation, in view of the proposed challenges, was low since less than 25% of the solutions were actually used, thus falling below the expectations of the managers of the cooperative who reported in the interviews that they expected use of at least half of the proposed challenges. Still in this respect, for the use, in fact, to be considered real, the solutions developed, together with the Open Innovation projects, must have applicability and be used by its stakeholders (Lopes & Carvalho, 2018; Sotello *et al*., 2018). It is noted that, of the amount presented, if added all the challenges proposed in the analyzed period and the solutions that, indeed, were applied, the result can still be considered low.

The third and last element analyzed in this category was **organizational gains**, obtained through the Open Innovation projects that the cooperative carries out. It is understood as organizational gain, linked to Innovative Performance, any type of result, qualitative or quantitative, as long as recognized by its stakeholders (Lopes & Carvalho, 2018; Sotello *et al*., 2018). First, inquiries were made in the reports of the cooperative's Open Innovation projects on the six solutions implemented in the analyzed period, in order to identify any type of qualitative or quantitative gain cited in the reports of each solution.

According to (UNIMED, 2019d), in the first solution called ***SGC – Sistema de Gerenciamento de Cobranças –*** (Collection Management System), there were qualitative gains such as the unification of collection actions; expansion of automated actions; improvement in the payment of the Unimed customers, which is maintaining an average of 98%, even in turbulent times (pandemic). Regarding quantitative gains, there is a reduction in man-hour work of approximately R$10,200.00 a year, coming from the automation of the process.

According to (UNIMED, 2019d), in the second solution called ***Sadu – Sistema de Avaliação de Atividades –*** (Activity Evaluation System) qualitative gains were found: monitoring of processes carried out by employees in real-time; performance evaluations; demand alignments, with tracking of time and deliveries, and stimulating productivity through monitoring. Regarding quantitative gains, this solution had no measured and identified returns.

The third solution called ***Automação de confirmação de consulta e pesquisa Satisfação*** (Automation of query confirmation and Satisfaction survey), according to (UNIMED, 2019d), had as the main qualitative gains: automation of the flow and control of shipments and use of *WhatsApp* tool, facilitating interaction with the beneficiary. Regarding the quantitative gains, a

reduction in man hour work of around R$ 4,200.00 a year was identified, with the automation of the process.

Another solution called ***Renegociação de devedores – Campanha "Black Friday"*** (Debtor Renegotiation – "Black Friday" Campaign), according to (UNIMED, 2019d), had qualitative gains related to innovation in the collection process and automation in this process, made by a robot, which optimized the entire flow. Regarding quantitative gains, we highlight a cost avoided with the payment of commissioning to outsourced collection companies in the amount of R$ 9,700.00 and an amount recovered with the platform in the amount of R$ 81,000.00.

The fifth solution analyzed was the so-called ***Glotic – Gestão do Recurso de Glosas*** (Disallowance Resources Management), implemented in May 2020. As found in (UNIMED, 2020e), there were qualitative gains, related to the ease of access by all agents involved, to transparency, to communication more effective with providers and cooperative members, in addition to automating the stages of the operational flow of this process. There were no quantitative gains related to this solution in the analyzed reports.

Finally, the last solution analyzed, called "***Negociação de débitos dos contratos ativos – Pagamento no cartão de crédito*****"** (Debt negotiation of active contracts – Payment on credit card), implemented in May 2020, according to (UNIMED, 2020e), had the following main qualitative gains mapped: innovation in the negotiation process in the pandemic period, being the only Unimed of Paraná to automate this process, the ease for regularization by customers and the guarantee of access to services to these customers, even in the critical period of the pandemic. Regarding the quantitative gains found in the document analysis, there was an expressive result referring to the value negotiated with the use of the platform, which reached the amount of R$ 468,703.21.

In addition to these gains, cited and found in the document analysis, searches were carried out in the internal interviews, in order to cross-check the information and identify whether the perception of the organization's managers and employees were consistent with the data found in the documents. It is noticed a convergence in the interviewees' perceptions regarding qualitative gains related to the automation of processes, the propulsion of the culture of internal innovation, the pioneering in projects promoted by Open Innovation, putting the cooperative in evidence, even demonstrating that this flexible form of dynamics of Open Innovation ended up influencing other projects that the cooperative executed in the last year [such as changing the ERP (Enterprise Resource Planning), mentioned by two managers], as highlighted in II3 "[…] There are noticeable gains, because we are in a model in which we are

a reference in many management practices, awards and recognitions, and there would be no way to stay at this level without processes and gains of innovation [...]" and II2 "[...] Another highlight is that this type of innovation opened doors for larger projects, such as the exchange of ERP, which arose after the discussions of financial projects and which highlighted the need to exchange this important system [...]".

As quantitative gains, the cost reduction and revenue recovery that the developed solutions ended up generating for the cooperative were approached in general, thus being with perceptions similar to the data found in the reports of each project, as can be seen in II1 "[…] With Open Innovation, many processes could be automated in a simple and efficient way, reducing costs and recovering lost revenues, with award-winning and non-award-winning projects or projects created later that served the cooperative's interests, financial and non-financial [...]".

For organizational gains to be measured more effectively, metrics and objectives should be implemented for these gains in certain periods (Scaliza, 2015). It is noted that the cooperative obtained organizational gains and that these are recognized by its stakeholders, whether qualitative or quantitative, through Open Innovation projects, but they do not have consolidated metrics or objectives to be achieved for predetermined periods, thus demonstrating a weakness regarding the metrics for periodic monitoring and treatment of the results obtained.

To synthesize the data and evidence found in this analysis group and present the main results of these analyzed elements, a synthesis was elaborated that can be visualized in Frame 15.

Analyzed Element	**Evidence found: interviews**	**Evidence found: documentary**	**Degree of attendance of the factor**
Quantity of products and processes developed	II1; II2; II3: Process improvement through Open Innovation, however without any implementation, related to products.	- Several process improvements identified in management reports during the period analyzed.	partially assisted
Use of developed products and processes	IG4: Success factors related to the engagement and rapid dynamics of *start-ups* and negative factors related to the lack of time and focus for project developments. EG3: Success factors related to the partnership of internal teams and daily communication and negative factors related to little specific focus on Open Innovation by the cooperative to leverage and develop even more projects	- Results reports of Open Innovation projects with a real utilization rate on average of 25% of the proposed challenges.	not assisted
Organizational	EI1; EI2; EG3: Several qualitative	Results reports of Open	assisted

earnings	and quantitative gains obtained with Open Innovation projects	Innovation projects with qualitative gains related mostly to automation and process improvement and quantitative cost reduction and recovery of financial revenues	

Frame 15. Summary of results: Analysis group Innovative Performance
Source: The author (2020).

This third analysis group presented results that also demonstrate a partial service of the cooperative in relation to the elements analyzed. The number of products developed with Open Innovation and the use or effectiveness, between the proposed challenges and the implemented solutions, presented results below expectations. As a highlight, we observe the organizational gains obtained with the implemented projects, which generated qualitative and quantitative results for the company, even though it is still only projects related to process improvement and low scale (there were 22 projects proposed and effectively only six used and put into practice).

5.4 ANALYSIS GROUP: MARKET PERFORMANCE

The fourth and penultimate group analyzed in the study was related to the descriptor of results related to Market Performance. This category has specific attributes for the commercial and customer theme, with elements related to sales growth, market share, customer satisfaction, creation and implementation of new products. These four elements were detailed and analyzed in relation to the practices developed by the cooperative.

The first element analyzed was that of **new products**. The aim was to identify the evolution of this practice on the part of the cooperative, using the Open Innovation projects developed. This element is a kind of unfolding of another element analyzed in the category of Innovative Performance, where the number of products and processes developed was also analyzed, but here the focus was to observe not only the quantity but, rather, whether the products created and launched by the company, in the period analyzed, had some direct relationship with Open Innovation.

For this, verifications were carried out in internal management reports of the cooperative, with the intention of identifying the new products created and launched in the period analyzed and whether they had any relation to the dynamics of Open Innovation promoted by the company. Only four new products implemented by the organization were identified in this period, being: (1) Complete State Plan for individuals and corporations; (2) Outpatient Regional Plan for individuals; (3) Personal Regional Plan for individuals; and (4) Personal Regional Plan for corporations.

In all four products created in the analysis period, no link was found between their creation and the Open Innovation projects. The main motivations found in these reports were linked to market needs and regulations that the ANS (*Agência Nacional de Saúde*) (National Health Agency) contemplated through specific standards of the area. This information found is adherent to the results in the elements analyzed in the Innovative Performance category, where it was observed that, effectively, no specific product had been created within the dynamics of Open Innovation and, yes, only technological solutions that had an impact on the optimization of cooperative processes.

To validate the information found, research was conducted in the interviews with internal groups of managers and employees participating in the Open Innovation projects. It can be seen that there is no perception of creating new products using Open Innovation projects, being mentioned by respondents that this is a gap that needs to be further explored, even so, that the cooperative's product portfolio has innovative options and can serve the different classes of existing customers or new customers of this health insurance market, as highlighted in II1 "[...] I do not remember products created in recent years being linked to Open Innovation [...]", in II2 "[…] We have not yet reached this level of creating new products based on Open Innovation. I believe that even the biggest reflex is linked to "thinking outside the box", thinking about products that are not part of the daily life of the cooperative, but that can be explored [...]" e II3 "[…] We need to evolve in this area because I do not remember creating new and disruptive products using these aspects of Open Innovation [...]"

Within the perspective of Market Performance, it is crucial that organizations increase their product portfolio, using the dynamics of Open Innovation, with interactions between the external environment and internal agents, in order to diversify their operations and insert these new products in the market, to meet the expectations and needs of customers (Vanhonacker *et al.*, 2013; Barge-Gil, 2013; Scaliza, 2015).

There is a lack in the performance aspect acquired by the cooperative with the Open Innovation projects because the creation and implementation of new products were not found through these projects. In a complementary way, there was no evidence of work on this topic in the *hackathons* or specific challenges for *start-ups*, linked to the generation of new products for the cooperative to test and insert into the market.

The second element analyzed in this category was **customer satisfaction** with the aim of identifying the evolution of this indicator and whether Open Innovation has shown an impact on these results. Within this analysis, verifications were carried out in the satisfaction survey reports of the analysis period (UNIMED, 2018; UNIMED, 2019a; UNIMED, 2020a), since the

cooperative conducts formal satisfaction surveys on an annual basis. To identify these data, the three audiences considered by the cooperative as its main customers were analyzed, namely: employees (internal customers), cooperative members, and (external) customers.

The results found demonstrate levels of satisfaction appropriate to the perspectives desired by the cooperative because, according to (UNIMED, 2018; UNIMED, 2019a; UNIMED, 2020a), the target set for customers and employees is 85%, and for cooperative members of 80% and in all the data calculated in these reports the cooperative has been achieving results above the stipulated goal. Carrying out a more specific observation, none of the three surveys has blocks of questions and specific perceptions about innovation, which demonstrates a gap in stating that the satisfaction results may be related to innovation or not. This perception of satisfaction on specific issues related to innovation is of paramount importance, as it can generate valuable information so that the organization can plan its projects and investments related to innovation in the face of the perception of its customers (Bueno & Balestrin, 2012; Loaiza & Vanegas, 2019).

Since data were not found in the research documents to carry out this analysis, there is a point of improvement to be implemented by the organization, thus making specific studies on the perception of innovation from the perspective of its customers and thus working on these. results, obtained more effectively. Verifications were also carried out in the interviews on these aspects, especially if, in the view of the internal groups of the cooperative, Open Innovation projects are impacting customer satisfaction. It can be seen, through the answers obtained, that, in the interviewees' view, these projects end up impacting customer satisfaction, but indirectly because, in general, the Open Innovation projects, carried out so far, highlight internal improvements that end up superficially affecting end customers, as highlighted in II1 "[...] It can be considered that these projects end up impacting satisfaction but not yet directly, to the point that the customers or parties involved consider our cooperative totally innovative [...]", II3 "[…] The impact of the developed projects is still indirect, since most of the results obtained were in internal solutions that end up still superficially impacting the final experience of the customers, be cooperative members, actual customers or employees [...]".

The interviewees also agree that these levels of satisfaction can have direct repercussion when projects evolve to a broader focus on innovation in products and technologies applied broadly to customers, a scenario not yet reached by the cooperative, as can be seen in II1 "[…] Perhaps when we are able to evolve into wider projects, we will reach this level of direct relationship […]" and II2 "[…] I believe that we cannot consider that Open Innovation already directly impacts the final satisfaction of customers. For this to happen there is a lot of ground

to be covered, taking as an example the "amazonization" of things, that is, to deliver, quickly, what was promised and being fair in the collection. The challenge is to find these solutions, such as Telemedicine and Artificial Intelligence, but this has not yet been discovered. We're in the discovery phase. Beneficiaries of the cooperative use real-time services from Netflix, Uber, Amazon, among others, and have expectations that the cooperative will also act in this way. I think if we produce innovations like these, then we will have a direct impact on the satisfaction of those involved [...]".

A company recognized as an innovator has a clear perception on the part of its customers that these attributes are competitive advantages, that the organization is indeed different and that innovation produces an increase in the satisfaction of these audiences (Gomes & Kruglianskas, 2009; Santos, Zilber & Toledo, 2012). It is perceived that in these aspects the cooperative does not yet present direct results, because, as it was presented, it still has projects mainly related to internal processes that end up not directly affecting its customers. In this aspect it is noted that the cooperative can still evolve in projects related to the experience of its customers (internal and external), thus making the creation and implementation of initiatives have a direct effect on satisfaction.

The third element studied in this category was related to the **company's market share**, propelled by the Open Innovation projects that the cooperative develops. To perform this analysis, inquiries were made in management reports of the cooperative (UNIMED, 2018c; UNIMED, 2019c; UNIMED, 2020d) that had information on the evolution of market share in its field of activity, and if, in any way, the Open Innovation projects had a direct consequence in these developments.

There was a slight growth in the market share of the cooperative within the analyzed period, with a certain dominance in relation to the main competitors. The results show an average market share of 64% which, when compared to the national standard indices of the branch of activity, which are 45% according to the management report (ANS, 2020), presents an expressive result for this performance indicator of the studied cooperative.

However, no evidence was found in the observed reports that these results are related to any of the Open Innovation projects developed by the cooperative. To Vanhonacker *et al*. (2013) and Barge-Gil (2013) market share can be leveraged through innovation when new products and services are offered to a market or niche not yet explored by the organization. Taking this into account, it is noted that, as already presented in the factors studied previously, the cooperative has not launched any new product or service through Open Innovation or, still, a new market or niche different from those in which it already operates traditionally.

This evidences a weakness within the market performance of the cooperative. This aspect can be further explored and worked on so that new products and services can be developed for audiences and niche markets not yet explored, using the dynamics of Open Innovation.

The results found in the interviews were in line with those already evidenced in the documentary analyzes, and the perception of both managers and employees is that the Open Innovation projects developed do not have a direct impact on the market share already obtained by the cooperative, as highlighted by II3 “[…] I don't see Open Innovation projects directly impacting the cooperative's market share indicator [...]”.

In addition, it was mentioned that creating new products and services through Open Innovation is an opportunity for improvement, because different audiences will be reached by the company (classes C and D, for example, with health plans that use technology and are cheaper), thus leveraging the results of market share of the cooperative, as can be observed in II1 "[...] However, we need to be aware of market movements and think outside the box with regard to new products and services, to meet different classes with different products than we currently have. In this respect I believe that Open Innovation can help and a lot [...]" and II2 “[...]: Open Innovation can certainly help the cooperative's evolution in entering new segments and markets that are still little explored. We have classes C and D that are not our target audience yet because we do not have products adhering to these audiences. If we combine technology with plans with a cheaper ticket and mass strategy, we can increase our market share, which is already very good nowadays [...] ”.

It is observed that, for Open Innovation to have a direct effect on the growth of the company's market share numbers, new products and services must be devised and put into practice. For this, it is necessary to conduct research with customers and direct stakeholders, shape needs and create products with prototyping, testing and implementation (Gebauer, Fuller & Pezzei, 2013; Scaliza, 2015). It was verified that the cooperative does not yet have work and results in these aspects, thus providing another opportunity for improvement so that the results of market share can have repercussions in the medium and long term.

Finally, the last element analyzed, which is related to the Market Performance analysis group, was **sales growth**, obtained through Open Innovation projects. To perform this analysis, management reports were observed (UNIMED, 2018c; UNIMED, 2019c; UNIMED, 2020d), to identify sales evolution and customer balance that the cooperative obtained in this period.

It was observed in (UNIMED, 2018c; UNIMED, 2019c; UNIMED, 2020d) that sales maintained a stable and uniform level in this period, as well as the balance of customers. No

significant growth was identified in these indicators and, according to these same reports, the goals were not achieved. As already presented in previous factors, no new products or services developed through Open Innovation were found that could drive sales growth. This scenario is similar to the scenario found at the national level, as exposed by the management report of health plans (ANS, 2020), which demonstrates a negative result in what corresponds to the sales growth for the sector in the last three years.

This scenario of stability in sales was also observed in the interviews with the internal agents of the cooperative. Both managers and employees cited this indicator as a factor to be worked, since the goals stipulated for the period were not achieved, thus reinforcing the scenario identified in the analyzed documents, as can be observed in II3 "[…] we are going through difficult times in recent years with regard to this sales factor, where we are not able to meet the established goals, due to several market factors [...]" and II1 "[...] This is one of the strategic indicators that we are suffering the most in recent years, due to the economy and other market factors [...]".

Another relevant factor of convergence was again the affirmation that new products and new markets can be explored and this can be done, in the interviewees' view, with the development of new products, using Open Innovation mechanisms, with emphasis on II2 "[...] in recent years we are just keeping the portfolio, with no significant growth. I see that this only highlights the need to think about new products, enter different markets and niches, so that we think about expanding sales [...]".

The element related to sales growth, obtained through Open Innovation projects, must be measured by the evolution of the amount of sales of a product or service or even in the revenue stemming from these sales (Kim & Schim, 2018). This growth is due to the creation of new products and services that end up generating new sales and new revenues (Vanhonacker *et al.*, 2013; Scaliza, 2015).

It is observed that the cooperative did not obtain sales growth results in the analyzed period, neither through Open Innovation projects, since no new product or service was developed and placed on the market through these initiatives. Again this scenario highlights the need to work on new product and service projects with the use of Open Innovation, thus producing alternatives that help the cooperative in the growth of its sales and commercial revenues.

Synthesizing the data and evidence found in this analysis group, a summary was elaborated that can be visualized in Frame 16.

Analyzed Element	Evidence found: interviews	Evidence found: documentary	Degree of attendance of the factor
New products	EI1; EI2; EG3: Consensus that there are no products created using the dynamics of Open Innovation and that this process needs to evolve	Management reports containing four new products developed in the last three years, but not linked to Open Innovation.	not assisted
Customer Satisfaction	EI1; EI2; EG3: There are no product or service developments with a direct impact on customer satisfaction	Reports of customer satisfaction surveys, cooperative members and employees without evidence of the impact of Open Innovation projects in improving these indicators	partially assisted
Market share	EI1; EI2; EG3: There are no Open Innovation projects that directly impacted market share indicators	Management reports without evidence of direct impact of Open Innovation projects in increasing market share	not assisted
Sales Growth	EI1; EI2; EG3: There are no Open Innovation projects that impacted sales growth	Management reports without evidence of direct impact of Open Innovation projects in increasing sales growth	not assisted

Frame 16. Summary of results: Analysis group Market Performance
Source: The author (2020).

In a general context, this analysis group was the one that presented the worst results found in the research, when compared to the other groups, since none of the analyzed elements presented satisfactory results. This scenario found confirms some points identified in other groups, mainly related to the development of new products through Open Innovation, where the cooperative has no results so far, thus affecting customer satisfaction, market share, and sales growth. In this way, it can be inferred that these points are shaking the achievement of the results for this group of analysis.

5.5 ANALYSIS GROUP: OPERATIONAL PERFORMANCE

The last group of analysis worked on in the study was related to the descriptor of results called Operational Performance. This group has specific attributes to indicators that impact the operation of the organization, the main ones being: cost reduction, increase in revenues, quality of products and services offered through process improvement, and process time optimization.

The first element analyzed was **Operational Costs**, in which it was intended to identify whether the Open Innovation projects, developed by the cooperative, caused somehow the reduction of costs of the organization. For this, management reports were analyzed (UNIMED, 2018c; UNIMED, 2019c; UNIMED, 2020d) with the objective of verifying the evolution of operating costs in the period analyzed, as well as the reports of Open Innovation projects (UNIMED, 2018d; UNIMED, 2019d; UNIMED, 2020e) aiming for potential cost reductions.

It was observed in (UNIMED, 2018c; UNIMED, 2019c; UNIMED, 2020d) that the indicator of cost evolution of the organization has presented results considered positive by the cooperative in recent years, because, even showing increases, when compared to what was projected and revenue increases, these results were good and met the stipulated targets, according to management reports analyzed.

Analyzing these management reports (UNIMED, 2018c; UNIMED, 2019c; UNIMED, 2020d), it cannot be said that the results obtained have any direct relationship with the cooperative's Open Innovation projects. To achieve this possible relationship, the project results reports (UNIMED, 2019d; UNIMED, 2020e) of the six projects, produced by the cooperative in its Open Innovation dynamics, were analyzed in order to identify cost reductions that they produced.

According to (UNIMED, 2019d; UNIMED, 2020e) of the six solutions analyzed, only one of them presented a result of direct reduction of costs for the cooperative, which was the solution called “Debtor renegotiation - Black Friday Campaign”, in which the company reduced the cost of commission payment to a third party company, using this platform, in the final amount of R$ 9,700.00. The additional solutions showed other gains such as revenue recovery or process time optimization, which cannot be considered as direct cost reduction (Cassiman & Valentini, 2016; Li *et al*., 2018) and fit into other elements that were analyzed later.

In a complementary way, it was observed in the interviews that the Open Innovation projects had an indirect impact on the reduction of costs, observed in the documentary analyzes because, according to the interviewees, after the *hackathons*, a movement was created to carry out analyzes, whenever possible, about processes, mainly related to cost reduction, as highlighted in II1 “[…] reducing costs is in our DNA, where austerity is part of our daily life. I'm sure that Open Innovation projects ended up clearing ways for everyone in the cooperative to think differently and indirectly and ended up reducing costs [...]”.

However, it is also a consensus of the interviewees that the organization's operation has not yet had Open Innovation projects that directly optimize costs, thus leaving another gap, in the opinion of the interviewees, to be developed within these projects, as can be seen with an emphasis on II2 “[…] with time we can evolve in these Open Innovation projects to reduce costs for the thickest operation of an operator, which is in assistance. We have not yet reached this level. Today we have a culture being created and this is important, but the cost reduction achieved in recent years comes much more from the alignments and realignments of processes. Open Innovation projects still do not have a direct impact on these results [...] "and II1" [...] I

still think we can create products and services focused on reducing operational costs, thus directly impacting these results even more [...] ”.

In order to be truly considered a result in operating costs, Open Innovation projects must produce products and services that have a direct impact on reducing the costs of the organization's operation (Knudsen & Sondergaard, 2017), such as, for example, reducing costs for manufacturing of its products, logistics, and commercialization (Scaliza, 2015). It is noted at this point, according to the interviewees' reports, yet another opportunity for the evolution of Open Innovation projects, which can develop solutions connected with the operation of the cooperative and thus produce results in reducing costs.

The second element analyzed in this Operational Performance group was **operational revenues**, whose focus is directed to identify solutions that have increased the operational revenues achieved by the organization through Open Innovation projects. These revenues can be obtained by increasing sales or by recovering financial revenues from defaulting customers, for example (Moretti & Biancardi, 2018).

As in the previous element, management reports were analyzed (UNIMED, 2018c; UNIMED, 2019c; UNIMED, 2020d), to identify the evolution of this indicator in the analyzed period, and also the reports of Open Innovation projects developed, looking at quantitative results of revenue increase, obtained by these initiatives. The result found of operating revenues showed positive variations between the years analyzed. No clear evidence was found that these variations had a direct consequence on the Open Innovation projects developed, especially if the commercial issues are analyzed (increase in sales revenue) since no solution with this objective was produced by the company.

The specific reports (UNIMED, 2019d; UNIMED, 2020e) of the six projects developed so far by the cooperative were also analyzed, aiming at results related to the increase or recovery of revenue. It was observed in this aspect, in (UNIMED, 2020e), that two solutions presented results related to the recovery of financial revenues directly, being: "Debtor Renegotiation – Black Friday Campaign", recovering an amount of approximately R$ 81,000.00, and the solution "Debt negotiation of active contracts", with a significant result of R$ 468,703.21 of revenue recovered by the cooperative. Both solutions were developed by the financial area of the cooperative, thus demonstrating an interesting focus that this sector has been attributing to projects, using the dynamics of Open Innovation and, consequently, reaping results.

The analysis that the projects still do not have a direct relationship with the increase in commercial revenue, but that they already have results with recoveries of financial revenues, was confirmed in the interviews. Both managers and employees cited financial solutions and

reaffirmed points identified in other analysis groups, where projects with a focus on new products or markets have not yet been produced, to leverage this part of commercial revenue, as highlighted in II1 "[...] of the commercial part in fact we did not have evolutions using the dynamics of Open Innovation. What we have and that presented an interesting result were the solutions of the financial area, a pioneer in this aspect in the national UNIMED system, and which returned to the cooperative an amount of more than R$ 500,000.00 [...]", II2 "[...] with the projects with the *start-ups* we were able to produce solutions in the financial area, which were great and returned to us a result of very good recovered revenue [...]" and II3"[...] in the aspect of revenue I remember the projects of the financial area, where negotiations were carried out through the developed platform returning accounts considered lost by the cooperative [...]".

For an organization to have solid results in terms of operating revenues, actions are needed to increase commercial revenues and recover financial revenues, the so-called defaulters (Scaliza, 2015). In view of this, it can be observed that there are interesting results, especially if related to the recovery of financial revenues, thus partially meeting what could be worked on, since commercial revenues have not yet had Open Innovation projects producing results.

The third and final element of this group was related to the **quality and improvement of processes** obtained through Open Innovation projects. In this element are attributes such as agility, reduction of redundant work, time gain in processes, and automation, where innovations must be thought and applied so that the company evolves in these things and consequently acquires positive results (Jabbour *et al*., 2012). For the composition of the analysis, searches were made for these types of gain in the reports (UNIMED, 2019d; UNIMED, 2020e), referring to the six Open Innovation projects developed by the cooperative in the period analyzed.

Conforme (UNIMED, 2019d; UNIMED, 2020e) it was observed in this analysis that in all six solutions at least one of these attributes was worked on and optimized with the solutions developed. This characteristic can be explained by the model of the projects developed, since all were related to technological solutions and had, as a basic premise, the improvement of processes in its essence. To understand these attributes, Frame 17 was assembled, which has the synthesis of the presentation of the main gains found in (UNIMED, 2019d; UNIMED, 2020e) and which had an impact on the quality and process improvement of the organization.

Results: Quality and process improvement	
Solution developed	**Evidence found**
SGC – Sistema de Gerenciamento de Cobranças (Collection Management System)	1. Unification of collection actions, optimizing the global process; 2. Expansion of automated actions; 3. Reduction of man-hour of approximately R$ 10,200.00 a year, due to the automation of the process.

Sadu – Sistema de Avaliação de Atividades (Activity Evaluation System)	1. Automation of the evaluation process with registration and monitoring in a systemic way
Automation of query confirmation and Satisfaction survey	1. Automation of flow and control of shipments and use of WhatsApp tool facilitating interaction with the customer; 2. Reduction of man-hours around R $ 4,200.00 a year, with the automation of the process
Debtor Renegotiation – Black Friday Campaign	1. Automation of the process, made by a robot that optimized the entire flow
Glotic – Gestão do Recurso de GlosasGlotic – Gestão do Recurso de Glosas (Disallowance Resources Management)	1. Facility of access for all agents involved; 2. Transparency and more effective communication with providers and cooperative members; 3. Automation of stages in the operational flow of this process.
Debt negotiation of active contracts – Payment on credit card	1. Automation of the process; 2. Facility of regularization by customers

Frame 17. Summary of Results: Quality and Process Improvement
Source: The author (2020).

In order to complement the analysis, perceptions were extracted from the interviews to prove this evidence already found in the reports. Both for the group of managers and for the employees there was a uniformity in the perceptions about this element, where really the process automation, decreases of repetitive work, and time optimizations in activities were cited as critical success factors in the implemented solutions, as can be seen in II1 "[…] among the gains we had with Open Innovation projects, I see that the gains with processes are the greatest. We automated activities that were manual in the past, improved workflows, saved efforts and had even quantitative results with these improvements [...]", II2 "[…] We had several gains in processes, mainly with a reduction in rework, a factor that is characteristic of manual processes. With these solutions, we also make the involved processes safer and more efficient, demonstrating in practice that automation in routine activities can generate a lot of results [...] "and II3" […] when we talk about rework, we had situations that involved several areas and caused this rework, often due to a lack of system or excessive bureaucracy. This saves time and, consequently, money [...] ".

An interesting point, observed in the interviews, concerns the expansion of these solutions to other processes not yet contemplated and that, according to the interviewees, can still be improved and optimized by the cooperative, as highlighted in II1 "[...] I also point out that there are several other manual processes in my vision that can be optimized using these projects in partnership with *start-ups* [...]", II2 "[...] I think the next step is to identify other flawed processes and seek through these partnerships and *start-ups* solutions that can serve us and further evolve our management [...]" and II3 "[...] I think that the cooperative, because it is very large and has several key processes, can evolve in the expansion of these technologies and solutions, going into processes that are still somewhat archaic and that need improvement [...]".

It is noted that in this analyzed element the results were satisfactory since the developed solutions generated results in automation, reduction of repetitive work, and improvement of processes in general, factors considered important for the gains in Operational Performance (Jabbour *et al*. 2012). It can still be seen, according to the interviewees' reports, that the challenge for the cooperative is related to the expansion of these improvements to processes that have not yet been worked on.

In order to synthesize the evidence found in this analysis group and present the main results of these analyzed elements, a summary was elaborated that can be viewed in Frame 18.

Analyzed Element	**Evidence found: interviews**	**Evidence found: documentary**	**Degree of attendance of the factor**
Operational costs	EI1; EI2; EG3: There are no Open Innovation projects that directly impacted the cooperative's operation, but only projects that ended up indirectly impacting the process improvement culture	Management reports without evidence of direct impact of innovation projects in reducing cooperative costs	partially assisted
Operating Revenues	EI1; EI2; EG3: There are no Open Innovation projects that directly impacted the cooperative's commercial revenue, but there are projects that have brought positive results for the recovery of revenues for the organization.	Management reports without evidence of direct impact of innovation projects on the growth of commercial revenue. Reports of Open Innovation projects demonstrating results related to the recovery of financial revenues for the cooperative	partially assisted
Quality and process improvement	EI1; EI2; EG3: Existence of projects that resulted in process improvement with automations, reductions in rework and time optimization	Reports of Open Innovation projects showing positive results related to automations, reductions in rework and time optimizations in cooperative processes	assisted

Frame 18. Summary of Results: Analysis group Operating Performance
Source: The author (2020).

Finishing the analyzes planned for the study, this group also presented results that demonstrate a partial service of the cooperative in the face of the elements analyzed, thus indicating a scenario with opportunities for improvements to be implemented in the face of these elements. With regard specifically to operating costs, there was no evidence of results and direct impact, but only a creation of a culture to develop projects that can indirectly benefit this element.

With regard to operating revenues, it can be observed that there are still no projects with the direct benefit of increasing commercial revenues, contributing to perceptions already found in other elements and groups previously analyzed (lack of development of new products and

services), but, as a positive point, results were found pertinent to the financial revenues recovered, thus demonstrating a partial service by the cooperative in this attribute. Finally, another highlight was the observation of results obtained by the company in relation to quality and process improvement, with emphasis on automation, rework decreases, and time optimizations through Open Innovation projects.

5.6 CONCLUSION OF THE ANALYSIS

From the analysis of the five groups listed in the study, it was possible to verify the main influencing factors and the results achieved by the cooperative in the Open Innovation projects that it has been developing and, mainly, in which components the organization needs to implement improvements to enhance these results.

Throughout the research, several factors were observed in the document analysis, mainly in the result reports of the Open Innovation projects (UNIMED, 2018d; UNIMED, 2019d; UNIMED, 2020e), and were proven in the analysis of the interviews, where, in a complementary way to the questions asked, the interviewees cited these factors. For the presentation of these main factors, obtained in a complementary way in the interviews, a matrix was elaborated that contemplates, in a synthesized way, the view of the internal and external groups on the positive or negative factors that most influenced the results obtained so far by the cooperative. Frame 19 presents the synthesis of these factors.

Influencing factors of the results of Open Innovation projects (Internal group)	
Positive factors	Negative factors
Engagement and competence of the *start-up* that selected the challenges	Lack of time to closely monitor start-ups
Support from internal direct management so that the challenge was indeed implemented	Lack of focus for project development
	Poorly formalized and disseminated internal processes
Daily interaction so that the project was indeed put into practice	Lack of commitment and lack of understanding of the scope (what needed to be done) by some *start-ups*
	Lack of incentives for the participation of internal groups in the projects
Influencing factors of the results of Open Innovation projects (External group)	
Positive factors	Negative factors
Well mapped processes and clear and transparent interaction flows	Better communication about the results of the developed projects
Partnership of the cooperative's internal team to understand the problem and clearly design the scope	Greater focus and time for internal teams to "accelerate" projects even more
Routine communication and support of the cooperative in the development of the project	

Frame 19. Summary of the results of the factors that influenced the results of Open Innovation
Source: The author (2020).

Analyzing the matrix with the main influencing factors found in the research, it is noted a relationship of these with other evidences, already observed during the study, mainly in relation to the weaknesses of the **analysis groups of operational structure**, with emphasis on lack of time and focus, cited by the teams and which were confirmed in the analyses of this group, and also in relation to factors of the **group of relationship networks, culture, and strategy**, with emphasis on the lack of formalization of internal processes and incentives to internal teams in the development of the Open Innovation projects.

These results, found and confirmed in the research, demonstrate that the partial attendance or not attendance of the influencing factors of these groups influenced the results obtained in the three analyzed performance groups. It was observed that the lack of sectors, teams and leaders, focused on the development of these projects, causes the lack of time and focus, cited in the interviews. Another highlight is related to the lack of integration between multidisciplinary teams and the partial formalization of processes, which also impacted, for example, the number of projects carried out and, mainly, the use of these in the routines of the cooperative that still show unsatisfactory results. Finally, the factors related to communication and to the incentive mechanisms, which also had partial service, ended up influencing the low production of projects related to new products and, consequently, in general results, mainly from the Market Performance group, in which no projects of new products were identified and, consequently, results achieved through Open Innovation, linked to customer satisfaction, market share and sales growth.

With these highlights, it can be inferred that all factors, which have partial or even non-service, influenced the results achieved in the three performance groups analyzed. It is noted that a potential structuring of sectors, teams, and leaders, dedicated full time to Open Innovation projects, can have a positive impact on the evolution of these projects. In addition, improvements in the formalization of processes, incentives, and communication mechanisms can also strengthen work dynamics, enhance the production of Open Innovation and, consequently, generate positive results to innovation, market, and operational performances, evidenced in the study with results that can be improved.

In addition to the influencing factors analyzed, to facilitate the visualization and understanding of the overall results obtained in the research, a summary frame containing all the groups was elaborated, with their respective elements analyzed, based on the criteria defined and presented in the chapter of analysis procedures. Frame 20 presents this synthesis of the research results.

Analysis Group 1: Organizational structure focused on Open Innovation	
Elements/Components	Result identified
Sectors or areas for the management of Open Innovation	partially assisted
Teams for the development of Open Innovation.	partially assisted
Formalized leadership for the development of Open Innovation	partially assisted
Integration of multidisciplinary teams for the development of Open Innovation	partially assisted
Analysis Group 2: Relationship networks, culture, and strategy aimed at Open Innovation	
Elements/Components	Result identified
Structured processes	partially assisted
Communication	partially assisted
Incentive mechanisms	partially assisted
Relationship networks	assisted
Analysis Group 3: Innovative Performance	
Elements/Components	Result identified
Quantity of products and processes developed	partially assisted
Use of developed products and processes	not assisted
Organizational gains	assisted
Analysis Group 4: Market Performance	
Elements/Components	Result identified
New products	not assisted
Clients satisfaction	partially assisted
Sales Growth	not assisted
Market share	not assisted
Analysis Group 5: Operational Performance	
Elements/Components	Result identified
Operational costs	partially assisted
Operating Revenues	partially assisted
Quality and process improvement	assisted

Frame 20. Summary of the results of the projects of Open Innovation
Source: The author (2020).

Based on the summary frame of the results, it can be concluded that the group of organizational structures has a median result since all its elements had partial results identified, where it was found some evidence on the fulfillment of these requirements, but that still need to be optimized. It is worth noting that this group does not have critical points related to the non-integral service, but in all components, there are potential evolutions to be implemented, mainly because the Open Innovation activities are not carried out exclusively, but in a partial way, dividing efforts and resources with other routine activities of the cooperative. For the results to be optimized, in the components related to this category, the cooperative can promote improvements to direct efforts in specific sectors, leaders, and teams to conduct the work of the Open Innovation projects because, according to Hitchen, Nylund, and Viardot (2017), this dynamic results in fluidity and efficiency in the development of the works.

The group “relationship networks, culture, and strategy” presents a similar panorama to the first group, with median results, but with a positive highlight for the element of relationship networks, in which the cooperative presents consistent results. It is noteworthy that the

components related to processes, communication, and incentive mechanisms are already worked by the cooperative, but still incipiently.

It is noted that the focus of work on these components is done effectively in events related to Open Innovation (*hackathons*), but routine continuity is not yet performed. In order to build a strengthened culture and strategy, we need fully structured processes, with flows and documentation on all activities (Hoogan & Cote, 2014), broad and periodic communications (Uzkurt, Kumar & Kimzan, 2013), and clear incentive mechanisms, applied to all participants of Open Innovation projects (Lindergaard & Callari, 2011), factors in which the organization needs to evolve. As a positive highlight, the component of relationship networks is mentioned, which is formalized and with relations between the cooperative and partners, proving what Chesbrough (2012) affirms, that well-formalized partnerships, with clear functions of each partner, help Open Innovation interactions and projects.

In the Innovative Performance group, there is a dispersed result among the components, with a positive highlight for the elements of organizational gains and a negative highlight for the use of the products and processes developed, which is still at low levels. As a positive point, the component of organizational gains stands out, which can be considered as attended by presenting results of qualitative and quantitative gains, collaborating with the vision of Sotello *et al*. (2018) that projects with an innovative bias need to present some attribute of numerical result or quality and must be recognized by the audiences involved, a factor that is perceived in the projects developed by the cooperative. As a negative highlight of this group is the component of the use of the products and processes developed, the results obtained being considered low because, according to Scaliza (2015), at least 50% of the proposed solutions, within the dynamics of Open Innovation, must be used in a practical way and the result achieved is on average 25%, well below the proposed metrics.

The Market Performance group is a negative highlight when compared to all the others analyzed, since none of the components presented a result of complete compliance with the requirements, having only one component with the partial result and three with performance identified as not met. Analyzing these elements together, it is verified that, according to Barge-Gil (2013) and Scaliza (2015), it is necessary that there be the development of new products in the dynamics of Open Innovation, thus making the commercial portfolio of the organization diversified. With this improvement implemented, the cooperative will be able to obtain direct results in other elements of this category, because, according to Kim and Schim (2018); Loaiza and Vanegas (2019), the organizations that intensify the creation of new products produce direct resonance in the satisfaction of their customers, increased sales and consequent growth in their

market share, elements identified in the research with unsatisfactory results in the studied organization.

Finally, the Operational Performance group had a median result with a positive highlight for the "quality and process improvement" component, which is a critical success factor in Open Innovation projects, developed by the cooperative. The "quality and process improvement" component stands out, with clear and predominant results within the developed projects, since there are process optimizations, agility, reduction of rework, factors that are essential, according to Jabbour *et al*. (2012), for Operational Performance arising from Open Innovation. However, in the components of operating costs and revenues, the results obtained still need attention, as they are still incipient and have an indirect relationship, which can be optimized through Open Innovation projects that reduce costs (Li *et al*., 2018) and increase revenues (Moretti & Biancardi, 2018) of the organization directly.

Based on the results of the research, it is verified that in all groups there are improvement points to be worked on by the cooperative, with emphasis on the Market Performance group, which presented the least effective results. The other groups have positive points and mainly aspects that can be optimized, such as the elements of structure, networks, and culture aimed at Open Innovation, which require adjustments and resources being allocated more efficiently.

6 THEORETICAL AND PRACTICAL CONTRIBUTIONS

The practical contribution of this study is directly linked to the presentation of information and data for the researched organization as well as for other companies that have similar initiatives, with the aim of demonstrating the key points of success that these projects are generating for the cooperative, but mainly the opportunities for improvement in several aspects that can be implemented so that the results of these actions are optimized and converted into an improvement in the organization's performance. Tied to this broad context, the creation of the analysis groups, used for the study, can help in the implementation of more effective control of these projects by the organization, thus assisting in decision making and effective investments, a process that does not exist in the cooperative, as well as serve as a basis for future expansion plans and added value on these projects for the cooperative.

From the theoretical point of view, the study mainly contributes to the compiled use of influencing factors and result descriptors in a single case, thus providing a systemic analysis on the evaluation of the results that Open Innovation can generate in its applications. Another theoretical contribution of the study concerns the evidence of influence between structural and organizational factors (2 groups of influencing factors) with the result groups (3 groups of descriptors of the results), demonstrating the impact and direct connection between these analyzed components, thus confirming the hypotheses raised at the beginning of research on the topic. Furthermore, this study contributed theoretically to the formation of an evaluation model with analysis groups that include influencing factors and result descriptors, which can be used in future research on the subject in other cases.

It is expected that the result obtained will contribute to the elaboration of future cooperative strategies aimed at the development of Open Innovation, so that all agents involved in these projects are more involved and this dynamic produces more effective results not only for the organization but also for participating external audiences, such as innovation promotion agencies, *start-ups*, and universities in the region, thus contemplating several important players and promoting the evolution of innovation in the regional context in which the company is inserted.

The research also contributes by demonstrating that all groups, with their analyzed elements, have space for evolution to be implemented by the organization. As much as the cooperative has obtained interesting results, through these projects, there are still several gaps to be filled. In this regard, it also contributes with some suggestions for possible implementations and improvement of the results obtained so far.

In the **organizational structure** group, the study contributes in a practical way mainly with the presentation of the need to direct sectors, teams, leadership, and the integration of participating teams with full dedication to the work involved with Open Innovation.

In the group **relationship networks, culture, and strategy**, improvements are also suggested in aspects: linked to the structuring of Open Innovation processes, which need to be formalized and disseminated; linked to communication, both of the workflows and the results, communication that can be expanded and optimized; and linked to incentive mechanisms, which need to be worked on continuously with the external agents involved, but mainly with the elaboration and dissemination of mechanisms for internal agents, which are nonexistent today.

In the **Innovative Performance** group, the study indicates improvements for the use of products and processes, which still have results below the reference parameters found in the literature, and for the development of new products, which can help the cooperative to remain in the market reaching customers and stakeholders, not yet conquered.

In the **Market Performance** group, several improvements are suggested to be implemented by the cooperative, in all components analyzed, from the development of new products (as mentioned above), to the focus on Open Innovation projects, which have a direct relationship with the organization's customers, thus propelling the indicators of satisfaction, market share, and sales growth.

Finally, in the **Operational Performance** group, it was observed with the study that some projects developed with Open Innovation have already yielded results in terms of costs and revenues, for example, but still indirectly. In view of this, the practical contribution is that there are initiatives aimed at reducing operating costs and leveraging revenues from products and processes directly, further intensifying these results.

It can be said that the study contributed to the organization regarding the availability of information, which the cooperative did not have before, about its Open Innovation projects. This information, generated by the study, contributes to the analysis and decision-making of managers to leverage the results achieved with these projects. Through the study, the company is recommended to improve actions in factors linked to the elements that make up the organizational structure and networks of relationship, culture, and strategy of the company, such as, for example, in the strengthening of sectors, teams, communication and processes, linked to Open Innovation, which need to be worked on with greater emphasis and applied resources.

It is suggested the implementation of sectors, teams, and leaders with exclusive dedication to Open Innovation projects, thus giving an adequate work dynamics that can enhance the development of projects, and it is recommended, in a complementary way, the implementation of improvements in formalization of processes, incentive and communication mechanisms, thus optimizing aspects related to culture and strategy, aimed at Open Innovation.

As evidenced in the research, these improvements can generate for the company a positive effect in the three performance groups: innovative, market, and operational, which presented the worst results concerning the analyses performed and that can be better explored mainly in actions related to the development of products and services focused on the cooperative's customers and that can directly affect satisfaction, institutional image, cost reduction and increased revenues of the organization.

The research contributes to the sector and the region of the cooperative studied, mainly in factors related to the production of Open Innovation, generating evolution in the competitiveness and sustainability of these organizations. It also contributes to the region's innovation ecosystem, because with the implementation of the improvements pointed out, these projects can be expanded, generating value to external agents of the organization and who are inserted in this context, such as *start-ups*, students from universities in the region and even other companies, which can use these projects as an example to implement Open Innovation initiatives in their strategies, thus managing to strengthen these types of initiatives in the region and also stimulate the creation of new *start-ups*.

Still, as a complementary contribution, the study demonstrates data and information that can be used and replicated by other cooperatives in the state and country, also in the health branch, (there are more than 300 Unimed´s throughout the Brazilian territory and that can be mirrored in the model studied), as well as by cooperatives and companies from other branches that develop Open Innovation, aiming to improve their organizational performance.

7 FINAL CONSIDERATIONS

It is considered that this research has achieved the proposed objectives. In accordance with the first specific objective, related to the description of the projects, all Open Innovation projects developed by the cooperative were mapped and described, identifying four major initiatives: **two *hackathons*** (carried out in 2018 and 2019) whose objective was to promote innovation in an open way, in order to solve administrative problems of the cooperative, **partnerships with *start-ups***, with the objective of direct negotiation and development of technological projects , with two *start-ups*, cooperative partners, after the marathons (*hackathons*), and, finally, a **partnership called HUB of innovation**, with the participation of a public educational institution, in the region (Universidade Estadual do Oeste do Paraná - Unioeste), and Sebrae Cascavel, which aimed to structure a space within the partner university for the development of innovative projects, proposed by the cooperative, a space in which students and researchers from the university are invited to work on challenges, whose solutions can be acquired by the cooperative.

The second and third specific objectives were achieved with the identification of influencing factors and results, generated by these Open Innovation projects. In the **organizational structure** group, the partial service to all items was highlighted, evidencing that the cooperative can still implement sectors, teams, and leaders, focused on the projects for the evolution of results. In the group "**relationship networks, culture, and strategy"**, it was also noticed a partial service in items such as processes, communication, and incentives, which still have a structure and implementation with limitations. Also in this group, we highlight the item of relationship networks that had a result with total service by the cooperative, thus being a strong point identified within the dynamics of Open Innovation.

Regarding the **innovative performance** group, the items of product quantity and use of these stood out, with a result identified as not being served by the cooperative, thus demonstrating a gap to be explored within Open Innovation projects. On the other hand, a positive highlight found is related to organizational gains, where the cooperative presented solid results, both in qualitative gains as process improvement, and quantitative gains, where indicators of revenue recovery of approximately R$ 500,000.00 were observed, with tools developed through Open Innovation projects.

The group linked to **market performance** presented the worst results, with a lack of service in several items, thus demonstrating another gap to be explored by the cooperative, especially with regard to the development of projects that propel new products. Finally, the

operational performance group demonstrated a positive highlight in the item of quality and process improvement, mainly tied to the solutions developed with a focus on the optimization of cooperative routines.

The achievement of the general objective occurred through the discovery of the research that the influencing factors have mostly a partial result in relation to what the literature predicts, especially the following: sectors, teams, leaders (belonging to the **organizational structure** group) and communication, processes and incentive mechanisms (belonging to the group of relationship networks, culture, and strategy), thus causing the lack of achievement of the expected performance within the groups of analysis of the innovation results, market and operational, thus proving the dynamics of the research design, where the influencing factors have a direct impact on the results of the performance groups.

The problem situation focused on the analysis of the influencing factors and the results generated by the Open Innovation projects of the cooperative under study. It was observed that the influencing factors linked to the groups of organizational structure and relationship networks, culture, and strategy, demonstrated results of partial service in most of the items in relation to what was found in the literature. These partial results affected the performance groups because the cooperative has results linked to process improvement, but still does not have consistent results regarding Innovative Performance, Operational Performance and, mainly, Market Performance, which was the group with the worst results found. Given this context, it can be inferred that the Open Innovation projects, developed by the cooperative, have several opportunities for improvements to be implemented in practically all the groups analyzed, but considering that they are still new projects and with a short time of implementation, they already demonstrate returns and positive results. This scenario points out that these initiatives are promising and that if the improvement opportunities identified in this study are worked on, they can bring even more expressive results in the medium and long term to the management of the cooperative.

With regard to the limitations of this study, the main aspects are related to the production of specific results from an organization only, thus configuring a scenario centered on the results generated only in this organization. In addition, another limitation is conditioned to the agents who participated in the data collection process, and samples were listed for the interviews, thus not participating all agents involved in the Open Innovation projects, developed by the cooperative.

Future studies are recommended that can contribute, with the evaluation of results generated by Open Innovation, in other organizations, being health cooperatives (as is the case

of the organization analyzed), cooperatives from other branches and even different organizations, making it possible to perform comparisons. Furthermore, considering the highlights found in this research, studies are suggested, related to the interpretation of potential connections between the influencing factors and the results that Open Innovation can generate, through quantitative analyzes, that collaborate with the qualitative findings of this study, giving greater consistency to the results found. It is also indicated studies directed to performance groups (market, innovation, and operational), aiming to evidence the repercussion that investments in Open Innovation projects can produce in the performance of cooperatives or other organizations.

REFERÊNCIAS

Abualrub, R. F., & Alghamdi, M. G. (2012). The impact of leadership styles on nurses' satisfaction and intention to stay among Saudi nurses. *Journal of nursing management*, 20(5), 668-678.

Ale Ebrahim, N., & Bong, Y. (2017). Open innovation: A bibliometric study. *International Journal of Innovation* (IJI), 5(3).

Álvarez-Santos, J., Miguel-Dávila, J. Á., Herrera, L., & Nieto, M. (2018). Safety management system in TQM environments. *Safety science*, 101, 135-143.

Amponsah, C. T., & Adams, S. (2017). Open Innovation: Systematisation of Knowledge Exploration and Exploitation for Commercialisation. *International Journal of Innovation Management*, 21(03), 1750027.

ANS – AGÊNCIA NACIONAL DE SAÚDE. (2020). *Dados e indicadores do setor*. Recuperado de < http://www.ans.gov.br/perfil-do-setor/dados-e-indicadores-do-setor>. Acesso em 15. Dez.2020

Arbussã, A., & Llach, J. (2018). Contextual Effects In Open Innovation: A Multi-Country Comparison. *International Journal of Innovation Management*, 22(02), 1850016.

Atuahene-Gima, K., & Wei, Y. (2011). The vital role of problem-solving competence in new product success. *Journal of Product Innovation Management*, 28(1), 81-98.

Bacon, E., Williams, M. D., & Davies, G. H. (2019). Recipes for success: conditions for knowledge transfer across open innovation ecosystems. *International Journal of Information Management*, *49*, 377-387.

Badir, Y. F., Frank, B., & Bogers, M. (2019). Employee-level open innovation in emerging markets: linking internal, external, and managerial resources. *Journal of the Academy of Marketing Science*, 1-23.

Barge-Gil, A. (2013). Open strategies and innovation performance. *Industry and Innovation*, 20(7), 585-610.

Barrena-Martínez, J., Livio, C., Ferrándiz, E., Greco, M., & Grimaldi, M. (2019). Joint forces: Towards an integration of intellectual capital theory and the open innovation paradigm. *Journal of Business Research.*

Bekkers, V., & Tummers, L. (2018). Innovation in the public sector: Towards an open and collaborative approach. *International Review of Administrative Sciences*, 84(2), 209-213.

Bellot, J. (2011, January). Defining and assessing organizational culture. *In Nursing forum*, Malden, USA: Blackwell Publishing Inc. 46(1), 29-37.

Bierly, P., & Chakrabarti, A. (1996). Generic knowledge strategies in the US pharmaceutical industry. *Strategic management journal*, 17(S2), 123-135.

Bogers, M., Chesbrough, H., & Moedas, C. (2018). Open innovation: research, practices, and policies. *California management review*, 60(2), 5-16.

Bogers, M., Chesbrough, H., & Strand, R. (2020). Sustainable open innovation to address a grand challenge. *British Food Journal*.

Borges, M., Hoppen, N., & Luce, F. B. (2009). Information technology impact on market orientation in e-business. *Journal of business research*, 62(9), 883-890.

Brocco, M., & Groh, G. (2009, October). Team recommendation in open innovation networks. *In Proceedings of the third ACM conference on Recommender systems*, 365-368.

Brunswicker, S., & Chesbrough, H. (2018). The Adoption of Open Innovation in Large Firms: Practices, Measures, and Risks A survey of large firms examines how firms approach open innovation strategically and manage knowledge flows at the project level. *Research-Technology Management*, 61(1), 35-45.

Bueno, B., & Balestrin, A. (2012). Inovação colaborativa: uma abordagem aberta no desenvolvimento de novos produtos. *Revista de Administração de Empresas*, 52(5), 517-530.

Burcharth, A., Knudsen, M. P., & Søndergaard, H. A. (2017). The role of employee autonomy for open innovation performance. *Business Process Management Journal*.

Büschgens, T., Bausch, A., & Balkin, D. B. (2013). Organizational culture and innovation: A meta-analytic review. *Journal of product innovation management*, 30(4), 763-781.

Cândido, A. C., & SOUSA, C. M. P. D. (2017). Redes de colaboração no setor de software: aplicação da análise de redes sociais.

Cândido, A. C., & Vale, M. A. D. (2018). Information management and open innovation practices in a brazilian technological center. *Perspectivas em Ciência da Informação*, 23(4), 184-204.

Caputo, A., Marzi, G., & Pellegrini, M. (2016). The internet of things in manufacturing innovation processes: development and application of a conceptual framework. *Business Process Management Journal*, 22(2), 383-402.

Cassiman, B., & Valentini, G. (2016). Open innovation: Are inbound and outbound knowledge flows really complementary?. *Strategic Management Journal*, 37(6), 1034-1046.

Chen, K., & Guan, J. (2012). Measuring the efficiency of China's regional innovation systems: application of network data envelopment analysis (DEA). *Regional Studies*, 46(3), 355-377.

Cheah, S. L. Y., & Ho, Y. P. (2020). Effective industrial policy implementation for open innovation: The role of government resources and capabilities. *Technological Forecasting and Social Change*, 151, 119845.

Chesbrough, H., & Vanhaverbeke, W. (2003). *Open Innovation: Researching a New Paradigm*.

Chesbrough, H. (2012). Open innovation: Where we've been and where we're going. *Research-Technology Management*, 55(4), 20-27.

Chesbrough, H., & Bogers, M. (2014). Explicating open innovation: Clarifying an emerging paradigm for understanding innovation. New Frontiers in Open Innovation. Oxford*: Oxford University Press*, Forthcoming, 3-28.

Chiaroni, D., Chiesa, V., & Frattini, F. (2010). Unravelling the process from Closed to Open Innovation: evidence from mature, asset-intensive industries. *R&d Management*, 40(3), 222-245.

Chiaroni, D., Chiesa, V., & Frattini, F. (2011). The Open Innovation Journey: How firms dynamically implement the emerging innovation management paradigm. *Technovation*, 31(1), 34-43.

Cordeiro, A. M., Oliveira, G. M. D., Rentería, J. M., & Guimarães, C. A. (2007). Systematic review: a narrative review. *Revista do Colégio Brasileiro de Cirurgiões*, 34(6), 428-431.

Cortonesi, P. P. (2016). *IA como fator relevante para fluxos reversos de conhecimento*: uma investigação no setor de OeG no Brasil.

Creswell, J. W. (2007). *Procedimentos qualitativos*. Projeto de pesquisa: métodos qualitativo, quantitativo e misto, 2, 32-33.

Czarnitzki, D., & Thorwarth, S. (2012). Productivity effects of basic research in low-tech and high-tech industries. *Research Policy*, 41(9), 1555-1564.

Dahlander, L., & Gann, D. M. (2010). How open is innovation?. *Research policy*, 39(6), 699-709.

Da Silva, A. B., Godoy, A. S., Godoi, C. K., Balsini, C. P. V., De Freitas, H. M. R., Macke, J., ... & Bandeira-De-Mello, R. O. D. R. I. G. O. (2017). *Pesquisa Qualitativa Em Estudos Organizacionais*. Editora Saraiva.

De Fátima Bruno-Faria, M., & de Araujo Fonseca, M. V. (2014). Culture of Innovation: Concepts and Theoretical Models. RAC-Revista de Administração Contemporânea. *Journal of Contemporary Administration*, 18(4), 372-396.

De Oliveira Morais, M., Júnior, I. G., Neto, P. L. O. C., & Gonçalves, R. F. (2017). Análise de um projeto de inovação tecnológica e o uso abordagem canvas. *Iberoamerican Journal of Project Management*, 8(1), 14-26.

De Oliveira Lima, S. H., & Leocádio, Á. L. (2017). Mapeando a produção científica internacional sobre IA| mapping the international scientific production about open innovation. Revista Brasileira de Gestão e Inovação. *Brazilian Journal of Management e Innovation*, 5(2), 181-208.

De Paulo, A. F., & Porto, G. S. (2017). Solar energy technologies and open innovation:

A study based on bibliometric and social network analysis. *Energy Policy*, 108, 228-238.

de Vries, H., Tummers, L., & Bekkers, V. (2018). The diffusion and adoption of public sector innovations: A meta-synthesis of the literature. *Perspectives on Public Management and Governance*, 1(3), 159-176.

Desidério, P. H. M., & Popadiuk, S. (2015). Redes de IA e compartilhamento do conhecimento: aplicações em pequenas empresas. *RAI Revista de Administração e Inovação*, 12(2), 110-129.

Di Pietro, F., Prencipe, A., & Majchrzak, A. (2018). Crowd equity investors: An underutilized asset for open innovation in startups. *California Management Review*, 60(2), 43-70.

Dias, C. A. (2000). Grupo focal: técnica de coleta de dados em pesquisas qualitativas. *Informação & Sociedade*, 10(2).

Dumont, M., & Meeusen, W. (2000). The Network of Joint Research Projects and Alliances. *In The National Innovation System of Belgium*, 137-172.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of management review*, 14(4), 532-550.

Etzkowitz, H., & Zhou, C. (2017). The triple helix: University–industry–government innovation and entrepreneurship. *Routledge*.

European Commission. 2012. *Strengthening Social Innovation in Europe. Journey to Effective Assessment and Metrics [Electronic Version]*. http://ec.europa.eu/enterprise/policies/innovation/files/social-innovation/strengthening-social-innovation_en.pdf. [Google Scholar]

Europeia, C. (2016). Open innovation, Open Science, open to the world. A vision for Europe. Brussels: European Commission, *Directorate-General for Research and Innovation.* Disponível na WWW: http://bookshop. europa. eu/en/open-innovation-open-science-open-tothe-world-pbKI0416263.

Faccin, K., & Brand, F. C. (2015). IA e redes: enfoques, tendências e desafios. *Revista de Administração IMED*, 5(1), 10-35.

Fernandes, C., Ferreira, J., & Peris-Ortiz, M. (2019). Open innovation: past, present and future trends. *Journal of Organizational Change Management.*

Ferrari, A. G., Scaliza, J. A. A., & Jugend, D. (2019). The landscape of open innovation in Brazil: An analysis of the recent literature. *Production*, 29.

Flick, U. (2009). Introdução à pesquisa qualitativa. *Artmed*. 3(3). Porto Alegre: Artmed.

Flor, M. L., Cooper, S. Y., & Oltra, M. J. (2018). External knowledge search, absorptive capacity and radical innovation in high-technology firms. *European Management Journal*, 36(2), 183-194.

Freitas, W. R., & Jabbour, C. J. (2011). Utilizando estudo de caso (s) como estratégia de pesquisa qualitativa: boas práticas e sugestões. *Revista Estudo & Debate*, 18(2).

Frizzo, K. (2018). *Gestão da inovação do modelo de negócios e Desempenho Inovador e sustentável*.

FROEHLICH, C., & KONRATH, K. (2019). A capacidade de inovação em uma empresa do segmento químico Innovation capability in a chemical company. *Revista Capital Científico-Eletrônica*, 17(2), 5-22.

Frank, A. G., Mendes, G. H., Ayala, N. F., & Ghezzi, A. (2019). Servitization and Industry 4.0 convergence in the digital transformation of product firms: A business model innovation perspective. *Technological Forecasting and Social Change*, 141, 341-351.

Gassmann, O., Enkel, E., & Chesbrough, H. (2010). The future of open innovation. *R&d Management*, 40(3), 213-221.

Gebauer, J., Füller, J., & Pezzei, R. (2013). The dark and the bright side of co-creation: Triggers of member behavior in online innovation communities. *Journal of Business Research*, 66(9), 1516-1527.

Geri, N., Gafni, R., & Bengov, P. (2017). Crowdsourcing as a business model. *Journal of Global Operations and Strategic Sourcing*.

Ghalayini, A. M., Noble, J. S., & Crowe, T. J. (1997). An integrated dynamic performance measurement system for improving manufacturing competitiveness. *International Journal of production economics*, 48(3), 207-225.

Giannopoulou, E., Yström, A., Ollila, S., Fredberg, T., & Elmquist, M. (2010). Implications of openness: A study into (all) the growing literature on open innovation. *Journal of technology management & innovation*, 5(3), 162-180.

Gil, A. C. (2008). *Métodos e técnicas de pesquisa social*. 6. ed. Ediitora Atlas SA.

Gomes, C. M., & Kruglianskas, I. (2009). Indicadores e características da gestão de fontes externas de informação tecnológica e do Desempenho Inovador de empresas brasileiras. *Revista de Administração Contemporânea*, 13(2), 172-188.

Harel, R., Schwartz, D., & Kaufmann, D. (2019). Open Innovation In Small Businesses In The Industry And Craft Sectors. *International Journal of Innovation Management*, 23(04), 1950038.

Hatak, I., Kautonen, T., Fink, M., & Kansikas, J. (2016). Innovativeness and family-firm performance: The moderating effect of family commitment. *Technological forecasting and social change*, 102, 120-131.

Hecker, A. (2016). Cultural contingencies of open innovation strategies. *International Journal of Innovation Management*, 20(07), 1650067

Hero, L. M., & Lindfors, E. (2019). Students' learning experience in a multidisciplinary innovation project. *Education+ Training*.

Hitchen, E. L., Nylund, P. A., & Viardot, E. (2017). The effectiveness of open innovation: Do size and performance of open innovation groups matter?. *International Journal of Innovation Management*, 21(03), 1750025.

Hogan, S. J., & Coote, L. V. (2014). Organizational culture, innovation, and performance: A test of Schein's model. *Journal of Business Research*, 67(8), 1609-1621.

Hung, K. P., & Chou, C. (2013). The impact of open innovation on firm performance: The moderating effects of internal ReD and environmental turbulence. *Technovation*, 33(10-11), 368-380.

Huston, L., & Sakkab, N. (2006). Connect and develop. *Harvard business review*, 84(3), 58-66.

Ivascu, L., Cirjaliu, B., & Draghici, A. (2016). Business model for the university-industry collaboration in open innovation. *Procedia Economics and Finance*, 39, 674-678.

Ismail, W. W., & Monsef, S. (2012, May). New Product Development through Open Innovation: Role of organization structure and contextual factors. *In 2012 International Conference on Innovation Management and Technology Research*, 446-449.

Jabbour, C. J. C., Freitas, W. R. D. S., Teixeira, A. A., & Jabbour, A. B. L. D. S. (2012). Gestão de recursos humanos e Desempenho Operacional: evidências empíricas. *Gestão & Produção*, 19(2), 347-360.

Jong, S., & Slavova, K. (2014). When publications lead to products: The open science conundrum in new product development. *Research Policy*, 43(4), 645-654.

Johnston, A. (2020). Open innovation and the formation of university–industry links in the food manufacturing and technology sector. *European Journal of Innovation Management.*

Jugend, D., Fiorini, P. D. C., Armellini, F., & Ferrari, A. G. (2020). Public support for innovation: A systematic review of the literature and implications for open innovation. *Technological Forecasting and Social Change*, 156.

Kim, H. E., & Pennings, J. M. (2009). Innovation and strategic renewal in mature markets: A study of the tennis racket industry. *Organization Science*, 20(2), 368-383.

Kim, N., & Shim, C. (2018). Social capital, knowledge sharing and innovation of small- and medium-sized enterprises in a tourism cluster. *International journal of contemporary hospitality management.*

Knudsen, M. P. (2007). The relative importance of interfirm relationships and knowledge transfer for new product development success. *Journal of Product innovation Management*, 24(2), 117-138.

Knudsen, M. P., & Mortensen, T. B. (2011). Some immediate–but negative–effects of openness on product development performance. *Technovation*, 31(1), 54-64.

Krause, D. R., Pagell, M., & Curkovic, S. (2001). Toward a measure of competitive priorities for purchasing. *Journal of operations management*, 19(4), 497-512.

Lacerda, J. S., & van den Bergh, J. C. (2020). Effectiveness of an 'open innovation'approach in renewable energy: Empirical evidence from a survey on solar and wind power. *Renewable and Sustainable Energy Reviews*, 118, 109505.

Lain, G. C., Dorion, E. C. H., & Prodanov, C. C. (2017). Ambientes de inovação: discutindo o ecossistema do Quartier de l'innovation. *Revista Prâksis*, 1.

Lassen, A. J. (2017). Shaping old age: Innovation partnerships, senior centres and billiards tables as active ageing technologies. In Framing Age: *Contested Knowledge in Science and Politics*, Routledge, 222-236.

Lassen, A. H., & Laugen, B. T. (2017). Open innovation: on the influence of internal and external collaboration on degree of newness. *Business Process Management Journal*.

Laursen, K., & Salter, A. (2006). Open for innovation: the role of openness in explaining innovation performance among UK manufacturing firms. *Strategic management journal*, 27(2), 131-150.

Lazarenko, Y. (2019). Open innovation practice: exploring opportunities and potential risks. *Baltic Journal of Economic Studies*, 5(2), 90-95.

Law, C. C., & Ngai, E. W. (2008). An empirical study of the effects of knowledge sharing and learning behaviors on firm performance. *Expert systems with applications*, 34(4), 2342-2349.

Le, H. T. T., Dao, Q. T. M., Pham, V. C., & Tran, D. T. (2019). Global trend of open innovation research: A bibliometric analysis. *Cogent Business & Management*, 6(1), 1633808.

Lee, S., Lee, H., & Lee, C. (2020). Open innovation at the national level: Towards a global innovation system. *Technological Forecasting and Social Change*, 151, 119842.

Lee, E., Yoo, J., & Kim, C. (2019). Entrepreneurial Orientation of Owner Managers and Innovation Performance of Firms: Focusing on mediation effect of user innovation. *Journal of the Korea Convergence Society*, 10(5), 213-219.

Li, D., Zhao, Y., Zhang, L., Chen, X., & Cao, C. (2018). Impact of quality management on green innovation. *Journal of Cleaner Production*, 170, 462-470.

Lichtenthaler, U. (2009). Outbound open innovation and its effect on firm performance: examining environmental influences. *Red Management*, 39(4), 317-330.

Lindegaard, S. (2010). The open innovation revolution: essentials, roadblocks, and leadership skills. *John Wiley & Sons*.

Lindegaard, S., & Callari, A. (2011). A revolução da inovação aberta. Editora Évora.

Liu, Q., Du, Q., Hong, Y., Fan, W., & Wu, S. (2020). User idea implementation in open innovation communities: Evidence from a new product development crowdsourcing community. *Information Systems Journal*.

Lopes, A. P. V. B. V., & de Carvalho, M. M. (2018). Evolution of the open innovation paradigm: Towards a contingent conceptual model. *Technological Forecasting and Social Change*, 132, 284-298.

Love, J. H., & Roper, S. (2009). Organizing innovation: complementarities between cross-functional teams. *Technovation*, 29(3), 192-203.

Mačiulienė, M., & Skaržauskienė, A. (2016). Evaluation of co-creation perspective in networked collaboration platforms. *Journal of Business research*, 69(11), 4826-4830.

Machado, R. R. (2004). *Vivenciando o processo de pesquisa com grupo focal*. Erdtmann BK, Koerich MS, organizadores. Cuidar e pesquisar na enfermagem: relatos e experiências. Florianópolis (SC): Papa-Livro, 180-90.

Machado, D. D. P. N., & da Costa Barzotto, L. (2012). Ambiente de inovação em instituição hospitalar. *RAI Revista de Administração e Inovação*, 9(1), 51-80.

Martins, E. C., & Terblanche, F. (2003). Building organisational culture that stimulates creativity and innovation. *European journal of innovation management.*

Martins, G. A. (2008). Estudo de caso: uma reflexão sobre a aplicabilidade em pesquisas no Brasil. *Revista de Contabilidade e Organizações*, 2(2), 8-18.

Mazzola, E., Bruccoleri, M., & Perrone, G. (2012). The effect of inbound, outbound and coupled innovation on performance. *International Journal of Innovation Management*, 16(06), 1240008.

Michelino, F., Caputo, M., Cammarano, A., & Lamberti, E. (2014). Inbound and outbound open innovation: organization and performances. *Journal of technology management e innovation*, 9(3), 65-82.

Miguel, P. A. C. (2007). Estudo de caso na engenharia de produção: estruturação e recomendações para sua condução. *Production*, 17(1), 216-229.

Moretti, F., & Biancardi, D. (2018). Inbound open innovation and firm performance. *Journal of Innovation e Knowledge.*

Mortara, L., & Minshall, T. (2011). How do large multinational companies implement open innovation?. *Technovation*, 31(10-11), 586-597.

Nahm, A. Y., Vonderembse, M. A., & Koufteros, X. A. (2003). The impact of organizational structure on time-based manufacturing and plant performance. *Journal of operations management*, 21(3), 281-306.

Naqshbandi, M. M., Tabche, I., & Choudhary, N. (2019). *Managing open innovation. Management Decision.*

OECD (2008), *OECD Reviews of Innovation Policy*: China. OECD, Paris. See: http://www.oecd.org/sti/innovation/reviews/china.

Oliveira, C. G. (2012). *Análise da eficácia de melhorias implantadas na gestão de projetos de inovação em uma empresa química*.

Oliveira, S. M., & Alves, J. L. (2014). Influência das práticas de IA na prospecção de conhecimentos para a criação de valor em ambientes de alta complexidade sob condições de incerteza e imprevisibilidade. *RAI Revista de Administração e Inovação*, 11(1), 295-318.

Parida, V., Westerberg, M., & Frishammar, J. (2012). Inbound open innovation activities in high-tech SMEs: the impact on innovation performance. *Journal of small business management*, 50(2), 283-309.

Parveen, S., Senin, A. A., & Umar, A. (2015). Organization culture and open innovation: A quadruple helix open innovation model approach. *International Journal of Economics and Financial Issues*, 5(1S), 335-342.

Patton, M. Q. (2002). Qualitative research and evaluation methods. *Thousand Oaks*. Cal.: Sage Publications.

Pitassi, C. (2014). IA nas estratégias competitivas das empresas brasileiras. *REBRAE*, 7(1), 18-36.

Pollok, P., Lüttgens, D., & Piller, F. T. (2019). How firms develop capabilities for crowdsourcing to increase open innovation performance: The interplay between organizational roles and knowledge processes. *Journal of Product Innovation Management*, 36(4), 412-441.

Popa, S., Soto-Acosta, P., & Martinez-Conesa, I. (2017). Antecedents, moderators, and outcomes of innovation climate and open innovation: An empirical study in SMEs. *Technological Forecasting and Social Change*, 118, 134-142.

Prodanov, C. C., & Freitas, E. C. de. (2013). *Metodologia do Trabalho Científico*: Métodos e Técnicas da Pesquisa e do Trabalho Acadêmico (2a). Novo Hamburgo - RS: Feevale. Recuperado de www.feevale.br/editora

Rangus, K., Drnovšek, M., Di Minin, A., & Spithoven, A. (2017). The role of open innovation and absorptive capacity in innovation performance: Empirical evidence from Slovenia. *JEEMS Journal of East European Management Studies*, 22(1), 39-62.

Rasera, M., & Balbinot, Z. (2010). Redes de inovação, inovação em redes e inovação aberta: um estudo bibliográfico e bibliométrico da procução científica no ENANPAD 2005-2009 sobre inovação associada a redes. *Análise–Revista de Administração da PUCRS*, 21(2).

Rauter, R., Globocnik, D., Perl-Vorbach, E., & Baumgartner, R. J. (2019). Open innovation and its effects on economic and sustainability innovation performance. *Journal of Innovation & Knowledge*, 4(4), 226-233.

Restrepo-Morales, J. A., Loaiza, O. L., & Vanegas, J. G. (2019). Determinants of innovation: A multivariate analysis in Colombian micro, small and medium-sized enterprises. *Journal of Economics, Finance and Administrative Science*, 24(47), 97-112.

Ressel, L. B., Beck, C. L. C., Gualda, D. M. R., Hoffmann, I. C., Silva, R. M. D., & Sehnem, G. D. (2008). O uso do grupo focal em pesquisa qualitativa. *Texto & Contexto-Enfermagem*, 17(4), 779-786.

Ribeiro Serra, F. A., Portugal Ferreira, M., Moraes, M. D., & Fiates, G. (2008). A inovação numa empresa de base tecnológica: o caso da Nexxera. *Journal of technology management & innovation*, 3(3), 129-141.

Richard, E. E., & Davis, J. R. (2014). NASA Human Health and Performance Center: Open innovation successes and collaborative projects. *Acta Astronautica*, 104(1), 383-387.

Richardson, M. (1999). *Fundamentos da metodologia científica*. São Paulo.

Roldan, L. B., Hansen, P. B., & Garcia-Perez-de-Lema, D. (2018). The relationship between favorable conditions for innovation in technology parks, the innovation produced, and companies' performance. *Innovation e Management Review*.

Rosa, A. C. M., Chimendes, V. C. G., & Amorim, G. F. (2020). Measuring open innovation practices in small companies at important Brazilian industrial centers. *Technological Forecasting and Social Change*, 151, 119805.

Rubera, G., Chandrasekaran, D., & Ordanini, A. (2016). Open innovation, product portfolio innovativeness and firm performance: the dual role of new product development capabilities. *Journal of the Academy of Marketing Science*, 44(2), 166-184.

Santos, M. A., Zilber, M. A., & Toledo, L. A. (2012). Um estudo sobre open innovation e sua relação com inovação e orientação para o mercado. *Future Studies Research Journal: Trends and Strategies*, 3(2), 192-219.

Sampieri, R. H., Collado, C. H., Lucio, P. B., Murad, F. C., & Garcia, A. G. Q. (2006). *Metodologia de pesquisa*.

Scaliza, J. A. A. (2015). *Influências de práticas de colaboração da inovação aberta no Desempenho Operacional, de mercado e inovador.*

Schein, E. H. (1984). Culture as an environmental context for careers. *Journal of Organizational Behavior*, 5(1), 71-81.

Scherer, J. O., & Ribeiro, J. L. D. (2011). Open Innovation: um estudo de caso de implantação em instituição financeira brasileira. *In Congresso Brasileiro de Gestão de Desenvolvimento de Produto* (8.: 2011 set. 12-14: Porto Alegre, RS).[Anais][recurso eletrônico].[Porto Alegre, RS: Departamento de Engenharia de Produção e Transportes da UFRGS], 2011.

Secchi, L. (2009). Modelos organizacionais e reformas da administração pública. *Revista*

de Administração Pública, 43(2), 347-369.

Segatto-Mendes, A. P., & Mendes, N. (2006). Cooperação tecnológica universidade-empresa para eficiência energética: um estudo de caso. *Revista de Administração Contemporânea*, 10(SPE), 53-75.

Shalley, C. E., & Gilson, L. L. (2004). What leaders need to know: A review of social and contextual factors that can foster or hinder creativity. *The leadership quarterly*, 15(1), 33-53.

Siedschlag, I., & Zhang, X. (2015). Internationalisation of firms and their innovation and productivity. *Economics of Innovation and New Technology*, 24(3), 183-203.

Silva Castellanos, T. F., & Agredo Díaz, M. L. (2018). Innovation in Companies operating in the Foodstuffs Sector of Colombia. *An analysis from the perspective of open innovation. Cuadernos de Administración* (Universidad del Valle), 34(61), 31-44.

Silva, D. O. D., Bagno, R. B., & Salerno, M. S. (2014). Modelos para a gestão da inovação: revisão e análise da literatura. *Production*, 24(2), 477-490.

Silva, G., & Dacorso, A. L. R. (2013). IA como uma vantagem competitiva para a micro e pequena empresa. *RAI Revista de Administração e Inovação*, 10(3), 251-269.

Silva, M. V., & Zilber, M. A. (2013). Benefícios percebidos pela adoção do processo de IA. *Revista de Administração da UNIMEP*, 11(3), 1-24.

Singh, S. K., Gupta, S., Busso, D., & Kamboj, S. (2019). Top management knowledge value, knowledge sharing practices, open innovation and organizational performance. *Journal of Business Research.*

Sivam, A., Dieguez, T., Ferreira, L. P., & Silva, F. J. G. (2019). Key settings for successful Open Innovation Arena. *Journal of Computational Design and Engineering*, 6(4), 507-515.

Sotello, F., Ribeiro, H. A. S., de Souza Conter, A., & Dechechi, E. C. (2018). Fatores que influenciam a ia: análise do apl iguassu-it de tecnologia da informação do oeste do paraná| factors that influence open innovation: analysis of the lpa iguassu-it information technology in western paraná. *Revista Brasileira de Gestão e Inovação (Brazilian Journal of Management e Innovation)*, 6(1), 95-120.

Steiber, A., & Alänge, S. (2020). Corporate-startup collaboration: effects on large firms' business transformation. *European Journal of Innovation Management.*

Stefan, I., & Bengtsson, L. (2017). Unravelling appropriability mechanisms and openness depth effects on firm performance across stages in the innovation process. *Technological Forecasting and Social Change*, 120, 252-260.

Subramanian, A., & Nilakanta, S. (1996). Organizational innovativeness: Exploring the relationship between organizational determinants of innovation, types of innovations, and measures of organizational performance. *Omega*, 24(6), 631-647.

Telles, R (2001). A efetividade da matriz de amarração de Mazzon nas pesquisas em Administração. *Revista de Administração da USP* – RAUSP, 34 (4), 64-72.

Temel, S., Mention, A. L., & Torkkeli, M. (2013). The impact of cooperation on firms' innovation propensity in emerging economies. *Journal of technology management e innovation*, 8(1), 54-64.

Teplov, R., Albats, E., & Podmetina, D. (2019). What does open innovation mean? Business versus academic perceptions. *International Journal of Innovation Management*, 23(01), 1950002.

Tidd, J., & Bessant, J. (2015). *Gestão da inovação-5*. Bookman Editora.

Tranekjer, T. L., & Søndergaard, H. A. (2013). Sources of innovation, their combinations and strengths–benefits at the NPD project level. *International Journal of Technology Management* 12, 61(3/4), 205-236.

Triguero, Á., Córcoles, D., & Fernández, S. (2020). Influence of open innovation strategies on employment dynamics: evidence for Spanish manufacturing firms. *Economics of Innovation and New Technology*, 29(3), 242-265.

UNIMED CASCAVEL. (2018). *Pesquisa de satisfação*. Recuperado de < https://www.unimed.coop.br/web/cascavel/relatorio-de-pesquisa >. Acesso em 22. Out. 2021.

_____. (2018b). *Pesquisas de share.* Documento disponibilizado por email em 20 out.2020.

_____. (2018c). *Relatório gerencial*. Documento disponibilizado por email em 20 out.2020.

_____. (2018d). *Relatório projetos de inovação aberta*. Documento disponibilizado por email em 20 out.2020.

_____. (2019a). *Pesquisas de satisfação*. Recuperado de < https://www.unimed.coop.br/web/cascavel/relatorio-de-pesquisa >. Acesso em 22. Out. 2021.

_____. (2019b). *Pesquisas de share*. Documento disponibilizado por email em 20 out.2020.

_____. (2019c). *Relatório gerencial*. Documento disponibilizado por email em 20 out.2020.

_____. (2019d). *Relatório projetos de inovação aberta*. Documento disponibilizado por email em 20 out.2020.

_____. (2020a). *Contrato de parceria - Unihub*. Documento disponibilizado por email em 20 out.2020.

_____. (2020b). *Pesquisas de satisfação*. Recuperado de < https://www.unimed.coop.br/web/cascavel/relatorio-de-pesquisa >. Acesso em 22.

Out. 2021.

_____. (2020c). *Pesquisas de share*. Documento disponibilizado por email em 20 out.2020.

_____. (2020d). *Relatório gerencial*. Documento disponibilizado por email em 20 out.2020.

_____. (2020e). *Relatório projetos de inovação aberta*. Documento disponibilizado por email em 20 out.2020.

_____. (2021a). *Descrições de cargo - Setor núcleo de projetos*. Documento disponibilizado por email em 20 out.2020.

_____. (2021b). *Organograma de gestão*. Recuperado de < https://www.unimed.coop.br/web/cascavel/organograma-gestao >. Acesso em 22. Out. 2021.

_____. (2021c). *Relatório Global Reporting Initiative* – ciclo de gestão 2018-2021. Recuperado de < https://www.unimed.coop.br/web/cascavel/unimed/relatorio-de-gestao-e-sustentabilidade >. Acesso em 22. Jan. 2021.

Uzkurt, C., Kumar, R., Kimzan, H. S., & Eminoğlu, G. (2013). Role of innovation in the relationship between organizational culture and firm performance. *European Journal of innovation management.*

Vanhaverbeke, W. (2006). *The interorganizational context of open innovation*. Open innovation: Researching a new paradigm, 205-219.

Van der Meer, H. (2007). Open innovation–the Dutch treat: challenges in thinking in business models. *Creativity and innovation management*, 16(2), 192-202.

Van de Vrande, V., De Jong, J. P., Vanhaverbeke, W., & De Rochemont, M. (2009). Open innovation in SMEs: Trends, motives and management challenges. *Technovation*, 29(6-7), 423-437.

Vanhonacker, F., Kühne, B., Gellynck, X., Guerrero, L., Hersleth, M., & Verbeke, W. (2013). Innovations in traditional foods: Impact on perceived traditional character and consumer acceptance. *Food research international*, 54(2), 1828-1835.

Varrichio, P. C. (2016). Uma discussão sobre a estratégia de IA em grandes empresas e os programas de relacionamento voltados para startups no Brasil. *Revista de Administração, Contabilidade e Economia da Fundace*, 7(1).

Venkatraman, N., & Ramanujam, V. (1986). Measurement of business performance in strategy research: A comparison of approaches. *Academy of management review*, 11(4), 801-814.

Vergara, S. C. (2004). Projetos e relatórios de pesquisa. São Paulo: Atlas.

Vieira, F. C., VALE, H. V., & May, M. R. (2018). Open innovation and business model: embrapa forestry case study. *RAM. Revista de Administração Mackenzie*, 19(4).

Voss, C., Tsikriktsis, N., & Frohlich, M. (2002). Case research in operations management. *International journal of operations & production management.*

Wang, Z., Chen, J., Zhu, Z., & Anquan, W. (2005). A system model for corporate entrepreneurship. *International Journal of Manpower.*

Wang, Z., & Wang, N. (2012). Knowledge sharing, innovation and firm performance. *Expert systems with applications*, 39(10), 8899-8908.

West, J., Salter, A., Vanhaverbeke, W., & Chesbrough, H. (2014). *Open innovation*: The next decade.

West, J., & Bogers, M. (2017). Open innovation: current status and research opportunities. *Innovation*, 19(1), 43-50.

Wu, W. W., Hao, Q., Kasper, H., & Muehlbacher, J. (2012). How does organizational structure influence performance through learning and innovation in Austria and China. *Chinese Management Studies.*

Xu, G., Liu, X., Zhou, Y., & Su, J. (2012). Effects of relational embeddedness on technological innovation: An empirical study in China. *Chinese Management Studies*, 6(1), 108-123.

Yin, R. K. (2001). *Estudo de caso: planejamento e métodos (2a).* Porto Alegre: Bookman

Yin, R. K. (2005). *Estudo de caso: planejamento e métodos*. 3 Edição. Porto Alegre: Ed Bookman.

Yin, R. K. (2010). *Estudo de caso: planejamento e métodos*. 4. Ed. Porto Alegre: Bookman.

Yun, J. J., & Liu, Z. (2019). *Micro-and macro-dynamics of open innovation with a quadruple-helix model.*

Zanjirchi, S. M., Jalilian, N., & Mehrjardi, M. S. (2019). Open innovation: from technology exploitation to creation of superior performance. *Asia Pacific Journal of Innovation and Entrepreneurship.*

Zhou, H., Yao, Y., & Chen, H. (2018). How does open innovation affect firms' innovative performance. *Chinese Management Studies.*

Zhou, S. S., Zhou, A. J., Feng, J., & Jiang, S. (2019). Dynamic capabilities and organizational performance: The mediating role of innovation. *Journal of Management & Organization*, 25(5), 731-747.

APPENDIX A – INTERVIEW SCRIPT MANAGERS

Block 1 – Organizational structure focused on Open Innovation
Existence and functioning dynamics of **Areas or sectors** for the development of Open Innovation
Existence and working model of specific **Teams** for the development of Open Innovation
Existence and responsibilities **formalized leadership** to drive the development of the Open Innovation projects
Provision of **multidisciplinary teams** from different areas for collaboration and cooperation in the innovation projects
Block 2 – Relationship networks, culture, and strategy aimed at Open Innovation
Existence of **structured processes**, containing operating rules and operating flows clearly, with the necessary responsibilities and actions of each actor (internal and external) in the projects
Types/models of **communications** and tools used to publicize Open Innovation projects
Ways of carrying out and systematic of **incentive mechanisms and recognition** for internal and external actors participating in the projects
Existence of **partnerships** with external agents participating in the projects, in the form of formalization, rules and operating systematics
Block 3 – Innovative Performance
Results pertinent to the **growth of the quantity of products and improvement** in the cooperative's **processes** through Open Innovation
Existence of **effective use** of developed solutions
Organizational gains achieved through the projects developed
Block 4 – Market Performance
Impact of the solutions on **new products** and diversification in the cooperative mix
Alignment of the developed projects and their impact on the **satisfaction and recognition** of the cooperative's **customers**
Impact of the solutions on **sales growth and market share** of the cooperative
Block 5 – Operational Performance
Impact of developing solutions on **reducing costs** of the cooperative
Impact of developing solutions on **increasing revenues** of the cooperative
Impact of developing solutions on **time optimization** for improving processes and launching innovations of the cooperative
Impact of the development of solutions on **agility, automation and reduction of rework** of the cooperative
Potential improvements to be made in the Open Innovation projects of the cooperative
Thank you very much for your contribution.

APPENDIX B – INTERVIEW SCRIPT EMPLOYEES

Block 1 Organizational structure focused on Open Innovation
Existence and functioning dynamics of **Areas or sectors** for the development of Open Innovation
Existence and working model of specific **Teams** for the development of Open Innovation
Existence and responsibilities **formalized leadership** to drive the development of the Open Innovation projects
Provision of **multidisciplinary teams** from different areas for collaboration and cooperation in the innovation projects
Block 2– Relationship networks, culture, and strategy aimed at Open Innovation
Existence of **structured processes**, containing operating rules and operating flows clearly, with the necessary responsibilities and actions of each actor (internal and external) in the projects
Types/models of **communications** and tools used to publicize Open Innovation projects
Ways of carrying out and systematic of **incentive mechanisms and recognition** for internal and external actors participating in the projects
Existence of **partnerships** with external agents participating in the projects, in the form of formalization, rules and operating systematics
Block 3 – Innovative Performance/Market and Operational
Results pertinent to the growth of the **quantity of products and improvement** in the cooperative's **processes** through Open Innovation
Existence of **effective use** of developed solutions
Alignment of the developed projects and their impact on the **satisfaction and recognition** of the cooperative's **customers**
Impact of developing solutions on **time optimization** for improving processes and launching innovations of the cooperative
Impact of the development of solutions on **agility, automation and reduction of rework** of the cooperative
Potential improvements to be made in the Open Innovation projects of the cooperative
Thank you very much for your contribution.

APPENDIX C – INTERVIEW SCRIPT SEBRAE REPRESENTATIVE

Block 1 – Organizational structure focused on Open Innovation
Relationship with Sebrae of **areas or sectors** for the development of Open Innovation
Flow of interactions and openness of **leaderships** who lead Open Innovation projects
Relationship with Sebrae of **multidisciplinary teams** from different areas of the cooperative for collaboration and cooperation in the innovation projects
Block 2 – Relationship networks, culture, and strategy aimed at Open Innovation
Existence of **structured processes**, containing operating rules and operating flows clearly, with the responsibilities and necessary actions of Sebrae in Open Innovation projects
Communication dynamics and tools used by the cooperative with Sebrae to publicize Open Innovation projects
Ways of carrying out and systematic the **incentive mechanisms and recognition** with Sebrae
Formalization and operating dynamics of the **partnership** with Sebrae
Improvement points in the **relationship** with Sebrae
Block 3 – Innovative Performance/Market and Operational This block of questions is related to your perception of the Innovative Performance of Unimed Cascavel
Organizational gains that the partnership has generated for the cooperative in the view of Sebrae
Organizational gains that the partnership has generated for Sebrae
Potential improvements to be made in the Open Innovation projects of the cooperative
Thank you very much for your contribution.

APPENDIX D – INTERVIEW SCRIPT UNIOESTE REPRESENTATIVE

Block 1 – Organizational structure focused on Open Innovation
Relationship with Unioeste of **areas or sectors** for the development of Open Innovation
Flow of interactions and openness of **leaderships** who lead the Open Innovation projects
Relationship with Unioeste of **multidisciplinary teams** from different areas of the cooperative for collaboration and cooperation in the innovation projects
Block 2 – Relationship networks, culture, and strategy aimed at Open Innovation
Existence of **structured processes**, containing operating rules and operating flows clearly, with the responsibilities and necessary actions of Unioeste in Open Innovation projects
Communication dynamics and tools used by the cooperative with Unioeste to publicize Open Innovation projects
Ways of carrying out and systematic the **incentive mechanisms and recognition** with Unioeste
Formalization and operating dynamics of the **partnership** with Unioeste
Improvement points in the **relationship** with Unioeste
Block 3 – Innovative Performance/Market and Operational This block of questions is related to your perception of the Innovative Performance of Unimed Cascavel
Organizational gains that the partnership has generated for the cooperative in the view of Unioeste
Organizational gains that the partnership has generated for Unioeste
Potential improvements to be made in the Open Innovation projects of the cooperative
Thank you very much for your contribution.

APPENDIX E – INTERVIEW SCRIPT START-UPS REPRESENTATIVES

Block 1 – Organizational structure focused on Open Innovation
Relationship with start-ups of **areas or sectors** for the development of Open Innovation
Flow of interactions and openness of **leaderships** who lead the Open Innovation projects
Relationship with start-ups of **multidisciplinary teams** from different areas of the cooperative for collaboration and cooperation in the innovation projects
Block 2 – Relationship networks, culture, and strategy aimed at Open Innovation
Existence of **structured processes**, containing operating rules and operating flows clearly, with the responsibilities and necessary actions of start-ups in Open Innovation projects
Communication dynamics and tools used by the cooperative with start-ups to publicize Open Innovation projects
Ways of carrying out and systematic the **incentive mechanisms and recognition** with start-ups
Formalization and operating dynamics of the **partnership** with start-ups
Improvement points in the **relationship** with start-ups
Block 3 – Innovative Performance/Market and Operational This block of questions is related to your perception of the Innovative Performance of Unimed Cascavel
Organizational gains that the partnership has generated for the cooperative in the view of start-ups
Organizational gains that the partnership has generated for start-ups
Potential improvements to be made in the Open Innovation projects of the cooperative
Thank you very much for your contribution.