# HYBRID MODE OF BIBLIOMETRY AND TECHNIQUE OF PROSPECTIVE SCENARIOS FOR INDUSTRY 4.0 ASSOCIATED WITH INTELLECTUAL CAPITAL

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## Abstract

*The prospective scenarios technique conducts strategic planning as a futuristic signpost for the management goals of Industry 4.0 in its technological advances, directed towards the development of productive digitalization and creation of value connected to Intellectual Capital as an aggregator of economic value in the organizational process. The objective of this research is to propose a hybrid modality of bibliometrics and the prospective scenario technique for Industry 4.0 associated with Intellectual Capital. In the methodological stages of this study, the insertion of the Bibliometric Laws of Lotka,*

*Bradford, and Zipf and its informative potential stand out, aiming to assist in the decision-making process of strategic planners.*

**Keywords***:* industry 4.0, prospective scenarios, intellectual capital, bibliometrics.

# 1. INTRODUCTION

The resources of the company's knowledge have a positive influence on products and their values, stimulating competition and growth. Therefore, the drive towards the strategic development, success and growth of a company in the present and in the future, such as Industry 4.0, potentially depends on the use of the set of elements that constitute Intellectual Capital, increasing over the decades and asserting itself as a significant theme in the economic environment, as well as in the different theories that focus their attention on intangibles in order to provide explanations, useful information for measuring and identifying plausible variables for incorporation and increased performance assisting in the business management process (Hernandez, Moreno, & Arroyo, 2012, Angelini, Gennaro, & Labella, 2019).

In turn, in the business knowledge management process, there was a strong influence due to the incorporation of the Industry 4.0 model, conceptualizing itself as the consolidation of a fourth industrial revolution strengthened and triggered by a series of technological advances aimed at achieving the complete digitalization of production and promotion of the use of connected devices in increasing customization through analytical data from customers and consumers (Abreu, 2018).

This real-time data connectivity of the company marks Industry 4.0, providing successive information through a tablet on the factory floor and offering numerous advantages and facilities in the current production models, its growth in the course of discoveries and evolutions had its beginning at the end of the 18th century with steam engines and the use of hydraulic power, beginning the 1st Industrial Revolution, representing a great advance at the time. The 2nd Industrial Revolution appeared at the end of the 19th century and the beginning of the 20th century with the arrival of electric energy and essentially corrective production due to productive prioritization. The 3rd Industrial Revolution is represented by means of electronics and investigative technologies (information systems), allowing productive automation and spreading extremely quickly, directly influencing the need to reduce time, personnel and unproductivity, giving rise to the term predictive maintenance. Given this evolutionary process, the future is a construction resulting from several changes in the course of history that impacted the industry we know today (Borlido, 2017).

The objective of this research is to propose a hybrid modality of bibliometrics and the prospective scenario technique for Industry 4.0 associated with Intellectual Capital. The methodology is anchored in the modalities of prospective scenarios relevant to strategic organizational planning adapted from de Schwartz (2004), Marcial, Chervenski, Okado, Wosgrau, and Carvalho (2015), Stelzer, Meyerbrötz, Schiebel, and Brecht (2015), Sturari and Korilio (2017), and Araújo, Hoffmann, abd Pizzolato (2018).

# 2. RELEVANCE AND JUSTIFICATION OF THE FUTURISTIC THEME

The importance and justification of the futuristic theme for the prospective scenarios for Industry 4.0 in

association with Intellectual Capital is anchored in the need for organizational survival in face of the challenges imposed by the globalized market. It is worth mentioning that the prospective of scenarios is not a forecast or a projection, scholars of this area do not aim at a proposal to guess the future, "this is the result of the actions, attitudes and decisions" taken since the present and, should it not exist at all, all those who intend to foresee it would be impostors. However, there is the possibility of reducing uncertainties towards the construction of a better future for organizations, through the use of techniques, prospective methods and the adoption of proactive actions jointly by the interested parties, towards the changes with plausibility of occurrence inserted in the temporal perspective. in question. Complying with this vision, the industry that does not commit itself to the perspective of innovation and knowledge through its Intellectual Capital, anticipating the future (Schenatto, Polacinski, & Abreu, 2011, Sturari, 2008, & Angelini *et al*., 2019).

Through the future benefit or all knowledge about the market, functional experience and its importance in the management of the company's intangible resources, Intellectual Capital encompasses all hidden assets that generate value, it can also be understood as the ability to surpass the sum of other assets, creating value through interactivity that benefits companies in operation and adds value in the development of internal activities or when they are in connection with different stakeholders (Rossato, Zancan, Kesseler, & Piccinin, 2015).

The measurement of Intellectual Capital will laterally remain in an adaptable and modeled process for evaluating the added value of other new types, leading the models for measuring Intellectual Capital to a constant evolution, aiming to encompass new theories, new knowledge and new types of capital. The measurement of corporate intangible assets plays a central, continuous and intermittent role in any organization, aiming at competitive advantage and sustainability. (Oliveira, Nascimento, & Dalkir, 2016)

In this sense, the importance of managing intangibles with an intense focus on Intellectual Capital (CI) is highlighted as the main source of value creation and a plausible way to reconfigure the business models of the productive industries, focused on strategic decision making in the future of Industry 4.0 (Cabrita, Cruz-Machado, & Duarte, 2018).

## 2.1 The Strategic Perspective of the Prospective Scenarios

In 1956 the philosopher Gaton Berger, considered one of the fathers of the "prospective" in France, for being the creator of this word as an intelligence of the present, illuminating the probable future to come, this process originated by virtue of his participation in two world wars, testifying about the human capacity of irreversible acts and their philosophical reflections on the meaning of life in a fast-paced world, where the future needed a meaning (Pinto, 2015).

This panoramic direction towards the uncertainties of the future and the prediction of occurrences aiming at a more adapted response to the rapid changes of the external environment, towards the guarantee of competitiveness and longevity is provided by the process of construction of prospective scenarios, assisting in the high management of the development of the strategic planning. On the other hand, some managers demonstrate a short-sighted and only projective view based on statistics from the past without considering the future variables that potentially will affect the company's results in a positive or negative way (Netto, 2018).

Thus, the scenarios are the beginning of a long process of strategic achievements to be adopted by the company and do not guarantee the exemption of the negative results of the organization; although these representations were elaborated as close to the future reality, the understanding and application of a forecast adjusted to the market and its uncertainties depends on the potential of the actions on the formulated strategies and the flexibility and speed of the necessary changes (Faller & Almeida, 2014).

Complementing this view, the strategic perspective assumes that prospective scenarios are fundamental tools for managing auxiliary risks in the conduct of organizational objectives, expanding the potential towards defenses and threats using the opportunities arising from the external environment, ensuring the success of business in the present, past and future (Netto, 2018).

The futuristic representation by the modality of widely used prospective scenarios, should not be confused as a forecast, since its purpose is to guide strategic decision making (Schenatto *et al*., 2011).

Inserted in the route of definitions and strategic options that prioritize qualitative aspects, centralization of efforts and conjugation of actions aiming to make the desire for a plausible future in the business environment, these "prospecting" studies involve exploratory or normative methods and consider collective reflection for the challenges of future decision-making, based on economic, social, scientific and technological aspects (Stelzer *et al*., 2015).

In this way, Bibliometrics can be understood as a trail of knowledge and complementary research in the development of studies that seek to systematize the academic literature on a specific subject, expanding the notion that this complement will occur as the quantification of bibliographic data in certain content, plausible answers such as: Who researches in partnership?; What are the most common key terms?; What are the most influential works?; Where is it most researched?; Who is in the forefront of research?; What group of authors is systematically cited by others? The analysis of the answers to these questions from the perspective of laws and bibliometric indicators, presents potentiality of criteria for predilection of readings that should constitute the theoretical framework, state of the art, argumentation, production of insights for new areas of study and in accordance with the quantity of bibliographic data, the use of bibliometric software/tools certify their potential aid to the researcher in the analysis of bibliometric studies, their combination with the scenario technique leads to a more accurate projection of future states (Stelzer *et al*, 2015, Leite, Silva, Aragão & Camargo, 2019).

## 2.2 The Benefits of Combining Bibliometry with the Scenario Technique

The general benefit of combining bibliometric methods with the scenario technique is the integration of scientifically based information that exceeds the knowledge bases of the scenario team and other experts. Most notably, the examination of large amounts of specific information that facilitate the identification of emerging technologies (Stelzer *et al*., 2015).

Table 1 shows articles that combine Bibliometry with the Scenario Technique and other modalities.

Table 1. Articles that combine Bibliometrics and other modalities

| AUTHOR | TITLE | MODALITY ASSOCIATION |
|---|---|---|
| Piirainen, K. A., Kortelainen, S. and Lindqvist, A. (2010) | Translating scenarios for management: Use of system dynamics modeling to quantify scenarios | Scenarios and Simulation |
| Saritas, O. and Aylen, J. (2010) | Using scenarios for roadscript: The case of clean production | Scenario Technique with Roadmapping Technology |
| Hirsch, S., Burggraf, P. and Daheim, P. (2013) | Scenario planning with integration quantification: Managing uncertainty in building corporate strategy | Scenario Technique with System Dynamic Simulation |
| Li, X., Zhou, Y., Huang, L., Wang, K. and Huang, Z., (2013) | Research on the development path of China's solar photovoltaic industry based on technology and bibliometrics roadmap | Bibliometrics with Roadmapping Technology |
| Zhang, Y., Guo, Y., Wang, X., Zhu, D. and Porter, A. L, (2013) | A hybrid visualization model for technology roadmap: bibliometrics, qualitative methodology and empirical study | Bibliometrics with Roadmapping Technology |
| Gerdsri, N., Kongthon, A., Vatananan, R.S. (2013) | Mapping the evolution of knowledge and the professional network in the field of technology roadmapping: a bibliometric analysis | Bibliometrics with Roadmapping Technology |
| Watatani, K., Xie, Z., Nakatsuji, N. and Sengoku S. (2013) | Global competences of regional stem cell research: bibliometrics to investigate and predict research trends | Scenario Technique with Bibliometrics |
| Letaba, P. T., Pretorius, M. W. and Pretorius, L. (2014) | The Use of Bibliometrics in the Development of Technological Roadmaps: Planning the Industrial Impact of Emerging Technologies | Bibliometrics with Roadmapping Technology |
| Huang, L., Zhang, Y., Guo, Y., Zhu, D, and Porter, A. L. (2014) | Science and technology planning in four dimensions: a new approach based on bibliometrics and technology roadmap | Bibliometrics with Roadmapping Technology |
| Stelzer, B., Meyerbrötz, F., | Combining scenario technique with bibliometrics for technology prediction: The | Scenario Technique with Bibliometrics |

| | | |
|---|---|---|
| **Schiebel, E. and Brecht, L. (2015)** | case of personalized medicine | |
| **Cho, Y, Daim, T. U. and Sklar, P. (2015)** | Prediction of OLED TV technology using bibliometrics and Fisher-Pry diffusion model | Scenario Technique with Bibliometrics |
| **Sheikh, Nasir J.; Sheikh, Omar (2016)** | Prediction of biosensor technologies for emerging point of care applications and medical IoT using bibliometrics and patent analysis | Bibliometrics, Technical Scenarios with Technology and Patent Analysis |
| **Lokuhitige, S. and Brown, S. (2017)** | Forecasting the maturity of IoT technologies in the top 5 countries using bibliometrics and patent analysis | Bibliometrics, Technical Scenarios with Technology and Patent Analysis |
| **Wang, B. Liu, Y., Zhou, Y. and Wen, Z. (2018)** | Emerging nanogenerator technology in China: a review and forecast using the integration of bibliometrics, patent analysis and technology mapping methods. | Technology Roadmapping, Bibliometrics, Scenario Technique, with Technology and Patent Analysis |
| **Yuchen, H., Yajuan, Y., Kai, H. and Lei, W. (2019)** | Development trend and future response on methods of recycling spent lithium-ion batteries based on bibliometric analysis | Scenario Technique with Bibliometrics |

Source:   Adapted from Stelzer et al. (2015)

Stelzer *et al*. (2015) listed the advantages and benefits of combining bibliometric methods with the scenario technique, which are: a) Corrects deficiencies in mutual combinations, resulting in a holistic tool for conducting predictions; b) Integrates and allows projections of precise analysis of long-term scenarios and considers socioeconomic factors, thus overcoming the short term associated with bibliometrics; c) Avoids fictitious forecasts inserted in the scenario technique and demonstrates usefulness in the short-term evaluation of bibliometric approaches ; d) It leads to a more accurate projection of future states by narrowing the scenario's funnel; e) Facilitates the identification of emerging technologies; f) It aggregates ample and current information from the scientific literature that exceeds the knowledge base of the scenario team and other specialists. Bibliometric studies can contribute to the task of systematizing research in a field of knowledge, seeking solutions so that the researcher is not influenced in their literature reviews and proposing problems for the investigation of future research (Chueke & Amatucci, 2015, & Gianardolli, 2016).

### 2.3 The Visual Notability of Bibliometric Networks

The establishment and prominence of research in several scientific areas of bibliometric studies is mainly due to the emergence of these different software tools. The most notable advantage of these tools stands

out, the visualization of bibliometric networks, which aim to identify knowledge bases and research fronts in a large number of articles. These authors identified sixteen bibliometric tools, four of which were selected for an in-depth comparison of resources, in order to highlight their advantages and deficiencies; its final results show that Biblioshiny and VOSviewer proved to be the most complete of the tools analyze (Moreira, Guimarães & Tsunoda, 2020).

Biblioshiny proved to be the most complete tool; however, it has deficiencies in relation to the visualization of the maps and its launch in 2017, it certainly shows limitations concomitantly with its evolutionary potentialities. On the other hand, although VOSviewer does not provide specific analyzes for the laws of Lotka and Bradford, its strong point is concentrated on the visualization of the networks, allowing the visualization of the processed data in table format, being able to be exported to other programs, enabling new types of analysis (Moreira *et al*., 2020),

Although there is an absence of specific Vosviewer analyzes for Lotka's bibliometric laws (relationship between authors and their scientific productivity), Bradford (relationship between number of journals and published articles) and Zipf (correlation between the number of words and the frequency of their use) in documents with a specific subject), the identification of these triple laws, can be inserted through the analysis of co-authoring networks (Lotka's Law), word co-occurrence networks (Zipf's Law) and periodical citations networks (Bradford's Law) (Leite *et al*., 2019).

Regarding bibliometric laws, it is understood that Lotka's Law examines the authors' scientific productivity; in short, it analyzes the contribution of each one to scientific dissemination in their respective area of knowledge, aiming at the identification of the most productive authors. Bradford's Law admits the calculation of the degree of relevance of journals in a defined area of knowledge, their historical evolutionary process in number of publications, as well as the journals that most published on the subject. The frequency of occurrence of words and the main thematic approaches are estimated by the Zipf Law in a given scientific / technological text (Rodrigues & Vieira, 2016).

## *2.4 Vosviewer and its Application in the Viewing, Construction and Analysis of Bibliometric Networks*

The VOSviewer software focuses on visualization of bibliometric networks, meets the main requirements of the area and presents a clean and simple graphical interface with reliable results, using an equally reliable data source, its processing has several data reduction options through presentation of your resources to the user. Its techniques are based on similar principles that avoid results that are inconsistent with the unified principle for the production of maps and clusters. Its approach holds a differential when it takes into account the theoretical foundations through which clusters (clusters that represent elements that have interconnection) are formed and maps constructed (Gianordoli, 2016, Moreira *et al*., 2020);

Schaller and Thesenvitz (2019) point out that in the process of building the network maps of links, the Vosviewer software is used in its essence in: Analysis of citations, which allows the researcher to detect popular sources and publications, as well as authors; cocitation analysis, which allows to understand the extended effects of the citations in a given body of knowledge; bibliographic coupling, which allows the researcher to see documents, authors and even journals connected based on the number of common references; coauthor analysis, which allows the researcher to find articles that are co-authors. On the other

hand, they highlight the multiplicity of VOSviewer options in different variants, such as, for example, in the process of cocitation analysis, which can be carried out in journals, authors and documents.

## 3. Methodology Procedures

The methodology procedures of this research were adapted from Araújo *et al*, (2018); two central phases were inserted by these authors: a) analysis of the chosen prospective scenarios and b) proposal for the construction of the stages, as can be seen in the following topics.

### 3.1 Analysis of the Chosen Prospective Scenarios

In this phase, the analysis of the modalities of prospective scenarios chosen for this proposal occurs, containing the "Strategic Prospective" as an intersection point and the "Strategic Planning", as a connective point in its general structure, synthesized in stages of Schwartz's modalities (2004 ), Marcial (2015), Araújo *et al*. (2018), Sturari & Korilio (2017), and Stelzer (2015) summarized in Table 2.

Table 2. Modalities used for the construction of prospective scenarios

| | Schwarz (2004) | Marcial *et al* (2015) | Sturari e Korilio (2017) | Araújo *et al* (2018) | Stelzer (2015) |
|---|---|---|---|---|---|
| 1 | Identify the central issue or decision | Document identification | Context Analysis (classify uncertainties) | Identification of Problem | Define the analysis object |
| 2 | Key Forces in the Local Environment | Identification of the seeds of the future | Selection of Critical Uncertainties | Analyze the Environment | Identify the main driving forces |
| 3 | Identification of the driving forces of the macroenvironment | Evaluation and Integration | Identification of Predetermined Elements | Analyze the historical and current moment of the company | Derive projections and decide on the number of scenarios to be built |
| 4 | Hierarchization of key factors by importance and uncertainty | Identification of Global Megatrends | Morphological Analysis | Identify the main variables | Cluster projections in consistent packages of alternatives |
| 5 | Selection of scenario logic | Justification of Global Megatrends | Augur Consultations | Create Alternative Scenarios | Describe scenarios |

| | | | | | |
|---|---|---|---|---|---|
| | | and their seeds of futuro | | | |
| 6 | Scenario writing | | Augur Consultation Processing | Describe the scenario in detail | Identify disturbing events and their effects on scenarios |
| 7 | Analysis of implications | | Identification of Reference and Optimistic Scenarios | Develop strategies | Identify emerging technologies for each scenario |
| 8 | Selection of initial indicators and warning signs for Monitoring the future | | Identification of Focal Scenario | Monitor scenarios and strategies | Explore the implications for technology strategy and develop action plans |
| 9 | | | Determining Structuring Policies | | |
| 10 | | | Description of Focal Scenario | | |

Source:   Elaborated by the authors, 2021

The Strategic Prospective allows for a "visit to the future", essential for the success of management; it is not a forecasting exercise. It consists in adopting a preemptive approach in the face of uncertainty in the planning and management process, ceasing to be an eventual one and becoming a continuous learning process at all levels of administration. Thus, the adjective "strategic" indicates that the Prospective falls within a contextual range of Strategic Management, differentiating itself from merely prospective studies limited to futurology exercises and although they present a certain importance, they do not constitute value aggregator (Sturari & Korilio, 2017).

Thus, Foresight and Planning, pointing out that, although they seem to overlap at times, when in reality they are opposed, while Foresight outlines a path to a desired future, planning guides the way along this path in an efficient and effective manner. This vision of strategic planning can be established through the construction of an ambitious scenario with fundamental assumptions chosen such as: vision, mission, objectives, actions, goals, indicators, etc. In turn, the prospective scenario emerges as a compass that enables a strategic drive of success that will make it possible in the future to achieve the ambitioned goals (Pinto, 2015).

### 3.2 proposal to Build the Steps

In the constructive proposal of the ten stages of this research, the insertion of the Bibliometric Laws of Lotka, Bradford and Zipf is highlighted in the proposal of the hybrid modality of the Prospective Scenarios of Industry 4.0 in association with Intellectual Capital, with informational potential to assist in the decision-making process of planners strategists and researchers interested in a futuristic industrial vision, consisting of 10 stages adapted from the modalities of Schwartz (2004), Marcial *et al*. (2015), Araújo *et al*. (2018), Sturari and Korilio (2017), and Stelzer *et al*. (2015), as described in Figure 1.
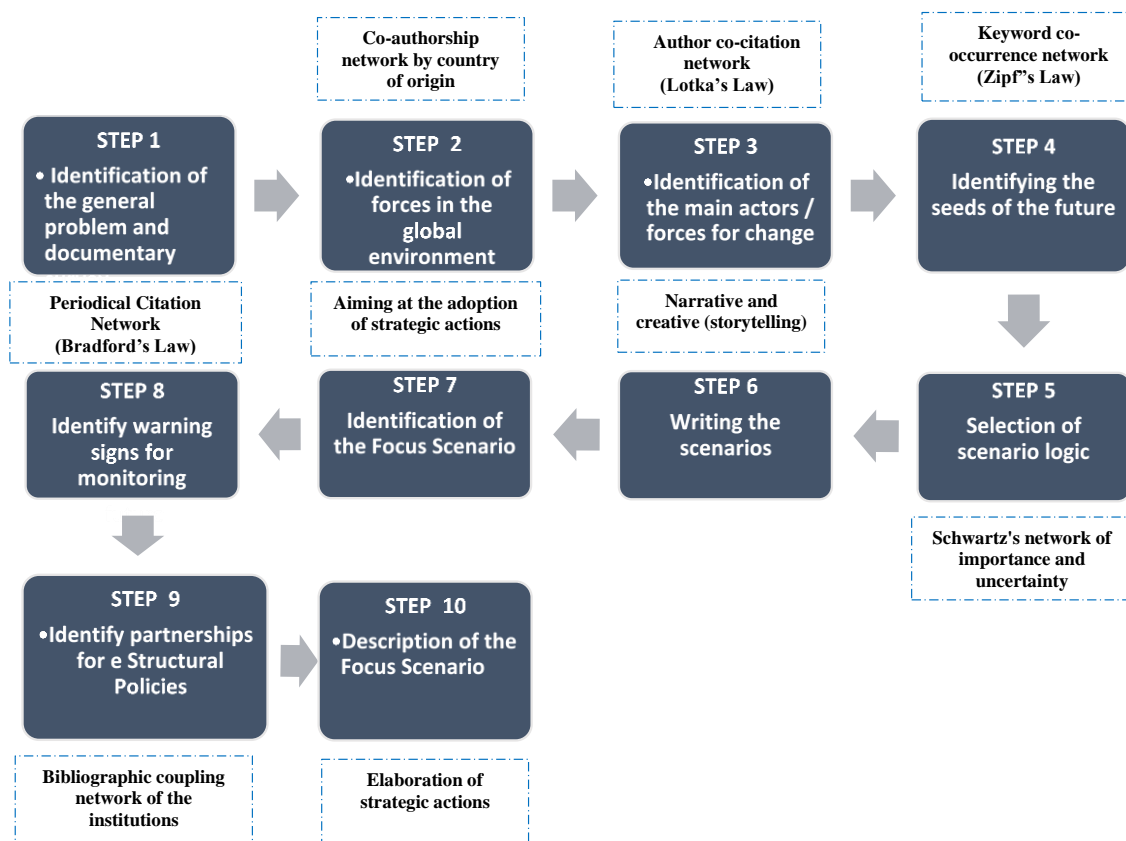


Figure 3. Hybrid modality of bibliometrics and prospective scenario techniques
for Industry 4.0 associated with Intellectual Capital.
Source:   Elaborated by the authors

The desire for knowledge of the future has impacted human generations with intriguing nods of impossibility; however, through the methods and techniques of Strategic Prospective and Strategic Planning, Prospective Scenarios, the flexibility of these models aims to assist in decisions, to anticipate certain trends and ruptures offering significant competitive advantages in the most challenging business environments (Sturari & Korilio, 2017). In this challenging environment, the modality created in this research, preliminarily intends a better comprehensibility and decision-making aid of strategic planners

and researchers interested in a futuristic industrial vision. In the following topics, there is a description of the construction process of the ten (10) stages with their objectives and aspects.

**Step 1 - Identification of the general problem and documentary survey**

In the context of prospecting for Industry 4.0 associated with Intellectual Capital, according to the assessment environment, in the analysis process, the provision of alternative paths to new challenges should be a keynote for the scenario team. Ex: What are the prospective scenarios for Industry 4.0, associated with Intellectual Capital?

Using the main academic databases available for analysis of bibliometric networks, make a documentary survey on studies with long-term world scenarios in the dimensions adapted from PESTELE analysis (political, economic, social, scientific and technological, environment, legal, etc.).

**Step 2 - Identification of forces in the global environment**

In this stage, we seek to identify forces in the global environment surrounding the main question, using the analysis of the co-authorship network by country of origin of the authors.

**Step 3 - Identification of the main actors / forces for change, in their historical and current moment**

It seeks to identify and understand the behaviors, evolutionary mechanisms of the actors of the past and the present moment of the research object of study through the analysis of the co-citation network of authors.

**Step 4 - Identifying the seeds of the future**

The identification and projection of the seeds of the future is a key factor in the construction process of prospective scenarios as existing landmarks or signs that point to plausible alternatives for the future through the co-occurrence network of keywords and how they are related to the object of study.

**Step 5 - Selection of scenario logic**

In this step, the logic of the scenarios is selected, the seeds are classified according to the ranking of importance and uncertainty through which, the logical description of the scenarios will be given in the form of a narrative.

**Step 6 - Writing the scenarios**

In this stage, the writing of scenarios in the form of narrative and creative, (eg Storytelling) showing the scenarios as photographs of the future, explaining the global evolutionary insertion in the pre-established time horizon, turning to the main question;

**Step 7 - Identification of the Focus Scenario**

Right after the narrative description of the scenarios, the "Focus Scenario" must be identified at a level of significance for the organization to adopt attitudes and measures.

**Step 8 - Identify warning signs for monitoring**

Identify warning signs, aiming at monitoring through the main networks of journals and how they are related to the dissemination of their strategic information according to the object of the study by checking the citation network.

**Step 9 - Identify partnerships for establishing Structural Policies**

Identify external institutions / organizations considering the Focus Scenario for the development of actions and activities by the organization for promising consolidation of the future through the network of bibliographic coupling of the authors' home institutions.

**Step 10 - Description of the Focus Scenario**

In this stage, the Focus Scenario is described with the evolutionary narrative of the actions taken by the main actors and how strategies were developed to face threats and opportunities.

In the process of creating the scenarios, the basic steps are the same, whether for an individual, small business or large company; essentially, this creative path is improved in the decisions, in the search for other key elements, in the attempt of new plots and in the insistence of the essays. The ordering of the stages can be mixed, its beginning can be based on a new discovery, justifying that the development of the scenarios is an art and not a science (Schwartz, 2004).

## 4. CONSIDERATIONS

The proposition of the ten (steps) of the bibliometric hybrid modality and the prospective scenarios technique for Industry 4.0 associated with Intellectual Capital was preliminarily anchored, due to the relevance of the prospective scenarios technique to allow the strategic planning direction as a guiding arrow of the management goals of Industry 4.0, its connective and technological advances in association with Intellectual Capital in the view of Rossato *et al*. (2015) emerges as a role that aggregates economic and future benefits and creates value in the internal activities of industrial operations in its connectivity with the different stakeholders.

The proposed modality was analyzed, compared and adapted from five existing prospective modalities Schwartz (2004), Marcial *et al.* (2015), Araújo *et al*. (2018), Sturari and Korilio (2017), and Stelzer *et al*. (2015).

Among the advantages of the combined methods, the correction of mutual deficiencies stands out, avoiding the insertion of fictitious forecasts of the scenario technique and aggregation of an amplified long-term perspective for bibliometrics, highlighting also the potential of the knowledge inserted in the texts academics compared to the stage crew and other futuristic experts.

Thus, mentioning preliminarily that the creation of the modality evidenced in the course of the text, inserts the Focus Scenario as a differential hybrid inducer for the organizational elaboration of strategies to face threats and opportunities. In turn, its other objectives signal for informational potential, aiming to assist in the decision process of strategic planners and researchers interested in a futuristic industrial vision.

For future work, we suggest the practical application of the hybrid modality of bibliometrics and the technique of prospective scenarios for Industry 4.0 associated with Intellectual Capital, as well as its adaptation to other themes connected in several interdisciplinary areas of organizational management.

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