

PROSPECTIVE SCENARIOS: SYSTEMATIC REVIEW AT LISA, EMERALD, SCOPUS AND WEB OF SCIENCE

CENÁRIOS PROSPECTIVOS: REVISÃO SISTEMÁTICA NA LISA, EMERALD, SCOPUS E WEB OF SCIENCE

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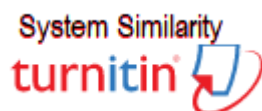
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ABSTRACT

The aims of this study was to identify in the Emerald, Lisa, Scopus and Web of Science databases the documents that discuss the theme "prospective scenarios" and characterize them in terms of keywords, journals and authorship. The importance of the application of techniques for prospecting scenarios to identify strategic information and for the definition of priorities of organizations is a constant in recent years, because decision making is a complex activity, these depend on the survival of organizations in a competitive environment. This research is by nature applied, uses bibliographic sources and bibliometry as an aid in the meta-analysis of the results. The approach is quali-quantitative and has exploratory and descriptive objectives. For data collection and organization, a systematic review based on PRISMA was used, with temporality defined between 2009-2019. The result was 64 relevant texts, gathered in eight sub-themes, indexed by 208 keywords, with 229 authors from 26 different countries. The sub-themes converge to the concept of prospective scenarios and add multidisciplinary to the method. The results indicate that the identified texts can be used as reference by companies and/or state organizations, provided that they are adapted to the realities found.

KEYWORDS

Information management. Knowledge management. Scenarios. Lisa. Scopus. Web of Science.

RESUMO

O objetivo deste estudo foi identificar nas bases Emerald, Lisa, Scopus e Web of Science os documentos que discorrem sobre o tema "cenários prospectivos" e caracterizá-los quanto às palavras-chave, periódicos e autorias. A importância da aplicação de técnicas de prospecção de cenários para identificação de informações estratégicas e para a definição de prioridades das organizações é uma constante nos últimos anos, pois a tomada de decisão é uma atividade complexa, destas dependem a sobrevivência das organizações em um ambiente competitivo. Esta pesquisa é por natureza aplicada, utiliza fontes bibliográficas e bibliometria como auxílio na meta-análise dos resultados. Quanto a abordagem é quali-quantitativa e tem objetivos exploratórios e descritivos. Para coleta e organização de dados foi utilizada a revisão sistemática com base na PRISMA, com temporalidade definida entre 2009-2019. Teve por resultado 64 textos pertinentes, reunidos em oito subtemáticas, indexadas por 208 palavras-chaves, com 229 autores provenientes de 26 países distintos. As subtemáticas convergem para o conceito de cenários prospectivos e agregam pluridisciplinaridade para o método. Os resultados indicam que os textos identificados podem ser utilizados como referência por empresas e/ou organizações de Estado, desde que com as devidas adaptações às realidades encontradas.

PALAVRAS-CHAVE

Gestão da informação. Gestão do conhecimento. Cenário. Lisa. Scopus. Web of Science.

1 Initial Considerations

The application of prospecting techniques as a source of strategic information for the formulation of strategies and prioritization of organizations is a necessity, especially for the creation of efficient services applied to the Information Units. Araujo, Hoffmann and Pizzolato (2018, p.168) show that for the 21st century the scenario method is the “most complete and richest process of exploration and anticipation of futures”, because it understands that the future is multifaceted and not a mere succession of past trends and that, therefore, the scenarios “describe the original situation and the occurrences that lead to each future situation, with coherence and links between the predicted facts”.

The authors Alarcão, Tavares and Mealha et al. (2018); Cañas (2017) indicates that there is a difference between prospective and predictive scenarios, the first is a set of data collection techniques with the purpose of generating a coherent description of the future and the events necessary for this future to occur, so as to create the necessary foundations for assertive decision making; while the second is a mathematical function that identifies patterns and offers some degree of future prediction when applied to a mass of data.

In both cases, both prospective and predictive methods may use historical, monitoring or market data, for example, as structuring elements in the construction of scenarios. The application of large volumes of data or specific sets depends on the methodological approach used.

For this study, we used the reliable scientific bases: Emerald, Lisa, Scopus and Web of Science. These have in their collection documents with the report of research that used the scenario prospecting methods and these may allow the identification of probable changes, so that decision makers have the means to act assertively and generate new business strategies (CAÑAS, 2017).

In this context, the following question arises: What literature is available on prospective scenarios (PS) from Emerald, Lisa, Scopus, and Web of Science? This study is justified by the judicious use of the Systematic Review method with the Key Items to report Systematic Reviews and Meta-Analyzes (PRISMA), and for addressing a current issue, since the adoption of effective models contributes to the decision in the organizations and, consequently, in their results. The objective of this study was to identify in the above bases the documents on prospective scenarios and to characterize them in terms of keywords, journals and authors.

2 Methodological Procedures

According to the concepts discussed in Sampiere, Collado and Lúcio (2006), this research is by nature applied, which uses bibliographic sources to demonstrate the reality of the scientific literature on the subject, which makes it use bibliometry as an aid in results' meta-analysis. Regarding the approach is qualitative and quantitative and aims to explore and describe each of the relevant documents.

Regarding data collection and organization techniques, systematic review was used,

which is an explicit method of synthesis of facts that critically evaluates and interprets relevant and available research on a problem, area of knowledge or phenomenon. Its objective is to identify, organize and evaluate the quality of these surveys, based on a reliable, rigorous and verifiable statistical methodology, to expand the sample and the accuracy of the evaluated results, evidencing the need to do it with more than one researcher (MINISTRY OF HEALTH, 2012).

The PRISMA recommendation was used throughout the research process because of its effectiveness and reliability in the scientific community. PRISMA is a checklist of 27 items plus a four-step flowchart that, if followed precisely, will bring security and transparency to the reader; and improve the development of research reports by the author (GALVÃO; PANSANI, 2015).

According to Galvão; Pansani (2015) the first indispensable flow to PRISMA is the identification flow that aims to indicate the number of base reports, the second is the selection aimed at eliminating duplicate results and separating the tracked and excluded results, the third is of eligibility that justifies the number of eligible and excluded texts; finally, the fourth is of inclusion that is restricted to the number of studies actually used and analyzed. The values found and used in this article are shown in Table 1.

Table 1. Results in the databases

Database	Search term	Results	Exclusion (relevance)	Exclusion (duplicates)	Eligibility	Exclusion (temporality)	Selection
Emerald	"Prospective scenarios"	20	142	44 duplicates of 18 articles	74	10	64
LISA		3					
SCOPUS		186					
Web of Science		117					
Total		326					

Source: Research data, 2019

The searches effectively took place from May 10 to 24, 2019 and were restricted to the Emerald, LISA, SCOPUS, and Web of Science databases. These were chosen primarily for their relevance to Information Science (IS), as well as covering other related areas of knowledge, having an extensive collection and having an agreement with the CAPES Journal Platform, which facilitated the access and indexing of the metadata of the relevant articles. For the beginning of the systematic search, the term "prospective scenarios" was used, the quotation marks were necessary to restrict the base results to this specific term and thus have a higher probability of obtaining articles relevant to the theme, as indicated by PRISMA in the identification flow.

Initially 326 documents were retrieved, then it was found that 142 had some indicative in the title or indicative keywords that effectively discussed the prospective scenarios theme. These files were imported to the Mendeley tool, with the purpose of continuing the analysis more restricted to the pertinent files, with the help of this tool we found that 18 articles were duplicates and generated 44 repetitions in the application, which were readily merged to be

only one record each, resulting in 74 separate document references that match PRISMA in the selection flow.

According to PRISMA's eligibility flow, and due to the proportion of the data it was necessary to make a 10-year time-cut, with a decrease of 10 articles, so all 64 texts analyzed here were published between 2009 and 2019 and deal with prospective scenarios in their content, a finding that is only possible after reading them in full.

3 Results and Analysis

Among the 64 articles analyzed here, 10 had high citation values and these are shown in Table 2. From May 31 to June 2, 2019, Google Scholar searches were performed to identify the number of citations of the 64 articles searched. Among them, one received over 80 citations, 15 had between 10 and 39 citations, 36 obtained between one and 9 citations, 11 had no citations and 1 was not found in the search engine to be counted.

Table 2. Titles, journals and year of most cited articles

Document title	Journal	Year	Citation
<i>Prospective scenarios for the full solar energy development in Malaysia</i>	Renewable and Sustainable Energy Reviews	2010	85
<i>Prospective scenarios on energy efficiency and CO2 emissions in the European Iron & Steel industry</i>	Energy	2013	36
<i>Prospective scenarios for the biodiesel chain of a Brazilian state</i>	Agricultural Systems	2010	34
<i>Participative assessment of innovative technical scenarios for enhancing sustainability of French mixed crop-livestock farms</i>	Renewable and Sustainable Energy Reviews	2014	34
<i>Demolition waste generation and recycling potentials in a rapidly developing flagship megacity of South China: Prospective scenarios and implications</i>	Construction and Building Materials	2016	28
<i>Subregional and downscaled global scenarios of nutrient transfer in river basins: Seine-Somme-Scheldt case study</i>	Global Biogeochemical Cycles	2010	23
<i>Life cycle assessment of forecasting scenarios for urban water management: A first implementation of the WaLA model on Paris suburban area</i>	Water Research	2016	22
<i>Economic-energy-environment analysis of prospective sugarcane bioethanol production in Brazil</i>	Applied Energy	2016	21
<i>The future of agriculture. Prospective scenarios and modelling approaches for policy analysis</i>	Land Use Policy	2013	21
<i>Examining the ethical and social issues of health technology design through the public appraisal of prospective scenarios: a study protocol describing a multimedia-based deliberative method</i>	Implementation Science	2014	17

Source: Google Scholar, 2019

According to the survey data and the limited timeframe from 2009 to 2019, it is noticeable an expansion of publications on prospective scenarios in 2017, with 12, or 18.75% of articles, followed by 2018 which had 11, or 17.18% of them. The lowest index occurred in 2012 with only one article published. The outlook for 2019 is positive, as up to the first half of that year 3 articles on the topic were retrieved.

Regarding the languages used in the 64 articles studied in this research, 51 were in English, 9 in Portuguese, 3 in Spanish and 1 in French, however, 1 of them was written simultaneously in English and Spanish (in the same file there was the version in both languages), as a result the total was higher than that described in the general quantitative.

3.1 Prospective Scenarios and their Subthemes

While reading the 64 articles and with the aid of NVivo qualitative data organization and analysis software, we realize that all are based on practical research and applied to some area of human experience, they are Administration; Agriculture and Climate; fuel; education; energy; Engineering, Architecture and Geography; health; and technology.

- 1° **Administration:** strategic alliances, community of practice, strategic plans, ergonomics and system dynamics were subthemes addressed by: Araujo, Hoffmann and Pizzolato (2018); Blois, Paris, Carvalho *et al.* (2017); Franco, Canen and Pizzolato (2011); Lira, Araújo and Duarte (2017); Medeiros, Souza, Epelbaum *et al.* (2013); Nelson, Buisine, Aoussat *et al.* (2014); Oliveira, Barros, Pereira *et al.* (2018); Reis, Oliveira, Sakamoto *et al.* (2014); Santafe-Rojas, Ramírez and Albornoz-Arias (2018); Vieira, Braga and Gomes (2017);
- 2° **Agriculture and Climate:** Water, agribusiness and food, food technology, ecosystems, temperatures and greenhouse effect were subthemes addressed by: Arias and Vásquez (2016); Billen, Noë and Garnier (2018); Camargo, Priesnitz Filho, Silva *et al.* (2014); Demanboro, Laurentis, Bettine *et al.* (2013); Fadhil, Maarif, Bantacut *et al.* (2018); Gouveia, Seixas, Labriet *et al.* (2013); Loubet, Roux, Gruérin-Schneider *et al.* (2016); Maestripieri, Houet, Paegelow *et al.* (2017); Mosnier, Duclos, Agabriel *et al.* (2017); Paloma, Ciaian, Cristoiu *et al.* (2013);); Pardo and Moya (2013); Ryschawy, Joannon, Choisis *et al.* (2014); Shi, Yang, Chen *et al.* (2013); Thieu, Mayorga, Billen *et al.* (2010); Willaert, Garcia-alegre, Queiroga *et al.* (2019);
- 3° **Fuel:** ethanol, biodiesel, aviation and transport were subthemes addressed by: Assis, Pereira, Machado *et al.* (2017); Carvalho, Antunes and Freire (2016); Dias, Vianna and Felby (2016); Gonçalves, Mussi and Del Corso (2016); Hirschinger, Spickermann, Hartmann *et al.* (2015); Silva, Franco, Junqueira *et al.* (2014); Vaccaro, Pohlmann, Lima *et al.* (2010);
- 4° **Education:** Brazilian legislation, journalist profession and higher education were subthemes addressed by: Alarcão, Tavares, Mealha *et al.* (2018); Araújo, Guimarães and Sousa (2018); Díaz, Lobo and Geraldino (2013);
- 5° **Energy:** thermoelectric, nuclear power, river basin and sustainability were subthemes addressed by: Feuerstein and Adamek (2009); García-Gusano, Garraín and Dufour (2017); Gomes, Costa and Barros (2017); Kadir, Rafeeu and Adam (2010); Marini and Blanc (2014); Martín-Gamboa, Iribarren, García-Gusano *et al.* (2019); Massara, Tetart, Lecarpentier *et al.* (2009); Pardo and Moya (2013); Peigné (2017); Poullikkas, Zueter and Dirar (2015); Quiroga, Kagan, Amasifen *et al.* (2015); Weilong, Xiang and Wenying (2014);

- 6° **Engineering, Architecture and Geography:** ecology, regional growth, territory, national defense and water management were subthemes addressed by: Camacho-Sanabria, Juan-Pérez and Pineda-Jaimes (2015); Correa and Cagnin (2016); Enault and chatel (2017); Loubet, Roux, Gruérin-Schneider *et al.* (2016); Maestriperieri, Houet, Paegelow *et al.* (2017); Silva (2018); Valença, Sobreal, Ramos *et al.* (2010); Wu, Duan, Zheng *et al.* (2016); Zapata, Puente, García *et al.* (2018);
- 7° **Health:** Psychology, Pharmacy and Chemistry were subthemes addressed by: Gregório and Lapão (2012); Lehoux, Gauthier, Williams-Jones *et al.* (2014); Marinovi, Glaria, Muñoz *et al.* (2016); Martin, Guyot, Laugier *et al.* (2018); Meza, Mercedes and Sauer (2014);
- 8° **Technology:** urban mobility, motorcycles and education were subthemes addressed by: Cañas (2017); Jha, Kumar, Kumar *et al.* (2011); Kaufmann and Ravalet (2016); Lehoux, Gauthier, Williams-Jones *et al.* (2014); Mateu, Cobo and Moravec (2018); Moon, Han and Kwahk (2019); Zhou, Yang, Shi *et al.* (2017).

In each subtheme the concept and use of prospective scenarios is understood subtly differently. In the Administration texts PS's are presented as a tool that would allow companies to evaluate future alternatives of conduct, and the purpose of scenarios in the early stages of the project is not only to provide an accurate view of the user's future activity, but also to crystallize current knowledge and designers' assumptions about future activity, especially in the view of Nelson, Buisine, Aoussat *et al.* (2014). As an example of the applicability of this concept Blois, Paris, Carvalho *et al.* (2017) aimed to analyze, describe and simulate market trends for a five-year period of the Brazilian footwear sector, collecting data from Vale dos Sinos from 1991 to 2001, creating 10 possible scenarios for the period from 2006 to 2010.

For agriculture and climate work, PS's are used to guide land use policies and to assess the international environment. So prospecting highlights environmental and socioeconomic issues at multiple scales. “The future is a political, exploratory or normative“ space ”constructed by and for individuals (or groups of individuals)” (MAESTRIPIERI, HOUET, PAEGELOW *et al.*, 2017, p.67). As a model, we have the research of Mosnier, Duclos, Agabriel *et al.* (2017) that by collecting data from 2005 to 2015 from French agriculture, identified the influence of dairy and beef cattle farms on climate change and created four PS's for 2035.

In the texts whose sub-theme is Fuels, the authors Dias, Vianna and Felby (2016); Gonçalves, Mussi and Del Corso (2016) indicate that approaches are already being used to create renewable fuels that are less environmentally friendly, to provide security and energy equity. However, no prospective method can replace the intelligence, critical sense, and collective insight of the working group, but to assist people in decision making.

Studies in Education, such as Díaz, Lobo and Geraldino (2013), indicate the advantages of PS as presenting multifaceted interactive process flows and providing a holistic and systematic view of different events or processes; and the disadvantages of the method such as the difficulty in considering all scenarios that seem interesting and the subjectivity

of the results. These points are highlighted as a way to promote the creation of services applied to Information Units and other spaces.

In the subthematic Energy, the authors Marini and Blanc (2014) divide the theories about PS methods into three types: the predictive scenarios, which answer the question "What will happen?"; the exploratory scenarios, which answer the question "What can happen?"; and the normative scenarios, which answer the question "How can a specific target be achieved?". Confirmed by Martín-Gamboa, Iribarren, García-Gusano et al. (2019, p.72) where "energy sensitive" planning requires the development and analysis of prospective energy scenarios exploring alternative courses of action and their implications for sustainability". Marini and Blanc (2014) proposes the use of Life Cycle Assessment (LCA) as the main parameter to reduce uncertainties in the future; Based on data from photovoltaic systems in Spain, they assess the environmental performance of the power lines in operation and create six PSs for the branch in 2050.

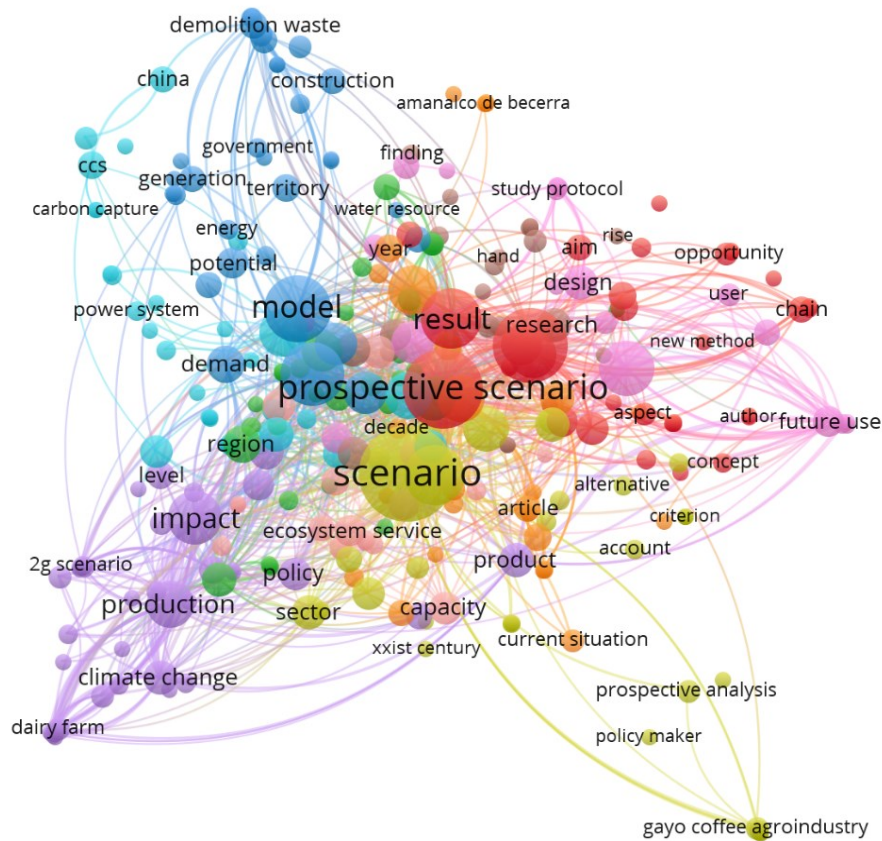
For texts in Engineering, Architecture and Geography, the dialogue between policy makers and different sectors of society includes the exchange of values, the sharing of commitments and the physical and behavioral aspects of all actors involved; that can change the PS's (CORREA and CAGNIN (2016), while in the sub-theme Technology, for Moon, Han and Kwahk (2019) a detailed scenario can be used to reveal new opportunities that provide user value and ultimately lead to User experience innovation.

Finally, the texts in Health, in the words of Gregory and Lapp (2012, p.132) highlight that a strategic plan should serve as a support for an organization dealing with the adversities that come up in a "dynamic environment, such as health care and help establish a position for long-term success." The authors describe in detail the use of the Schoemaker method to collect data for the purpose of prospecting three scenarios for the community pharmacist profession in Portugal from 2010 to 2020.

Unanimously, the authors of the 64 articles point out that the PS method "is not about divinatory or tarot-type approaches, but knowing how to read the present, anchored in past experience and the windows that are most likely to open in the future" (ALARCÃO, TAVARES, MEALHA et al. (2018). As well as Araújo, Guimarães and Sousa (2018), who emphasize that "scenario-making should not be confused as a hypothesis game, it is necessary to adopt the following conditions at the same time: pertinence, coherence, likelihood, importance and transparency", evidencing, by Assis, Pereira, Machado et al. (2017), that the PS is not "the future reality, but a representation to guide present actions, describing possible future situations with the estimated probability of events".

In parallel to the subthemes, in the body of the texts are indicated the keywords or terms that summarize the main subjects covered in the texts, which are chosen by the authors for this purpose and to facilitate the retrieval by the reader. The most frequent keywords of the 64 relevant articles are illustrated in Image 1, created with the aid of the VOSviewer application.

Image 1. Most Frequent Keywords



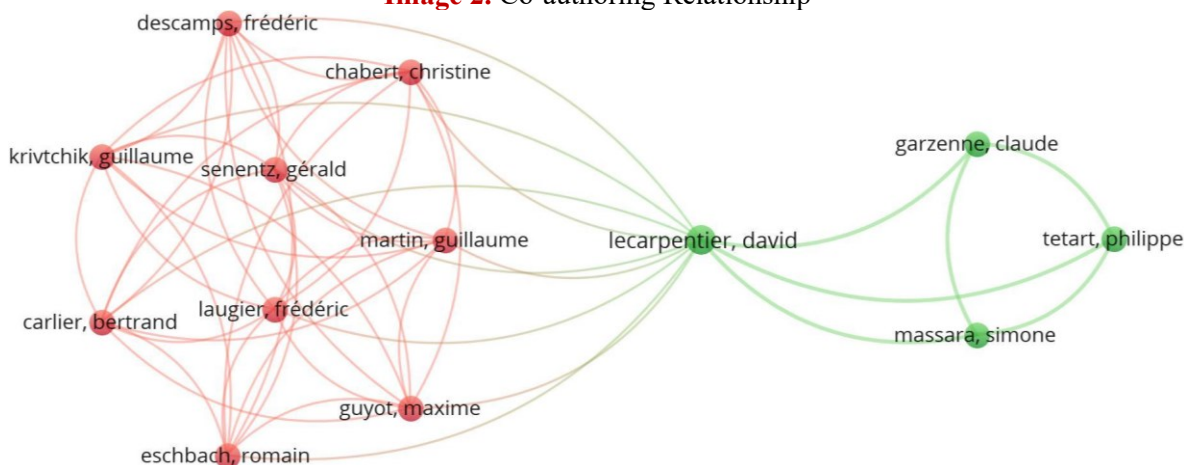
Source: Research Data, 2019

We found 237 keywords indicated in the publications of this search, which taking the duplicate terms resulted in 208 keywords. Of these terms, 190 (80%) appeared only once, 13 (11%) twice and 3 (3.8%) three times, while the term “prospective” was present in 4 (1.8%) texts and "prospective scenarios" have been used in 8 publications. This result points out that the English term “prospective scenarios” is the most common and accepted by researchers, and therefore, the texts published in the future should have it among their keywords to facilitate and standardize the retrieval of those interested in the theme. Given this, we can say that the term used in the searches in the bases was compatible with that used effectively in the scientific literature.

3.2 Researchers in Prospective Scenarios

The 64 articles studied in this work were written by 229 researchers, of which only 13 re-published on the subject representing 6% of these people, the other 216 (94%) published once on the subject. According to the frequency of publication and the partnerships signed in the form of text co-authoring, the VOSviewer application was created with Image 2, which illustrates the relationships between the authors of a text and their relationship with the other authors of the theme.

Image 2. Co-authoring Relationship



Source: Research Data, 2019

Regarding the affiliation of the 229 researchers found, 75 of them are linked to institutions from Brazil, 44 from France, 16 from Portugal, 15 from China, 12 from Spain, 7 from Germany, Canada and Colombia each; 4 from Chile, South Korea, the Netherlands and Indonesia each; 3 from the United Arab Emirates, the United States, India, Malaysia, Mexico and Venezuela each; 2 from Denmark, Ecuador, Switzerland and Uruguay each; and 1 from Australia, Belgium, Italy and Norway each. From the total of authors, it was found that only 13 of them have a co-authoring relationship and are identified in Image 2, where only David Lecarpentier was identified as the researcher linking two groups, the first formed by Claude Garzenne, Philippe Tetart and Simone Massara; and the second formed by Guillaume Martin, Christine Chabert, Gérald Senentz, Romain Eschbach, Bertrand Carlier, Guillaume Krivtchik and Frédéric Descamps.

Regarding the authors' citation indexes, Table 3 presents the values indicated in the Google Scholar and ResearchGate databases for the 10 with the highest scores, according to the algorithms of the databases consulted.

Table 3. Citation indices for most published authors

Author	Citations	Source
Gilles Billen	23471	Google Scholar
Chong-Yu Xu	16831	Google Scholar
Isabel Alarcão	14252	Google Scholar
Philippe Roux	13888	Google Scholar
Javier García Alba	12741	Google Scholar
Josette Garnier	9665	ResearchGate
Zhongbo Yu	8967	Google Scholar
Lauran van Oers	8221	Google Scholar
Xi Chen	7095	ResearchGate
Vincent Kaufmann	6827	Google Scholar

Source: Google Scholar and ResearchGate, 2019

Table 4 presents the RG Score, number of citations and readings of the texts published by the authors, as well as the recommendation index of the author's research to other users of the ResearchGate social network. These altimetric indices are relevant to indicate the relevance of the works published by the author and the acceptance level of this by the other

researchers, since the platform is focused on sharing information and scientific archives and also promotes the contact, for academic purposes, of the authors with those interested in their research.

Table 4. Authors Altimetrics

Author	Score RG	Citation	Readings	Recommendation
Gilles Billen	43.60	17529	50466	58
Chong-Yu Xu	46.38	13471	85324	367
Isabel Alarcão	12.29	258	3886	23
Philippe Roux	32.13	812	8874	32
Javier García Alba	18.73	62	4308	11

Source: ResearchGate, 2019

Table 3 presents the five authors with the highest number of citations, while Table 4 shows the altimetric values of these authors:

Gilles Billen is a professor at the Sorbonne Université de France and co-author of the articles “Subregional and downscaled global scenarios of nutrient transfer in river basins: Seine-Somme – Scheldt case study” and “Two contrasted future scenarios for the French agro-food system”. According to his profile on ResearchGate his main area of study is Biogeochemistry and its rates are over 97.5% of members of the social network.

Chong-Yu Xu is a professor at the University of Oslo of Norway and an honorary professor at Hohai University of China, co-authored by the article “Urban Water Consumption in a Rapidly Developing Flagship Megacity of South China: Prospective Scenarios and Consequences” and ResearchGate reports that its areas of interest are geosciences, hydrology, hydrogeology and climatology; for the network its rates are 97.5% higher than other users.

ResearchGate indicates that the retired professor at the University of Aveiro in Portugal and author of the article “Thinking the University of the next 20 years through a scenario methodology”, Isabel Alarcão, has affinity with the subjects Educational leadership and Didactics in higher education; and that their rates are higher than 52.5% of network members.

Philippe Roux is a member of the Unité Mixte de Recherche Information, Technologies, Environmental Analysis and Agricultural Processes (UMR Itap) of France and author of “Life cycle assessment of forecasting scenarios for urban water management: A first implementation of the WaLA model on Paris suburban area” ResearchGate indicates that its rates are over 90% of the network members and that it operates in the areas of Environmental Engineering, water treatment, climate, bioenergy and pesticide application technology.

Finally, Javier García Alba is a researcher at the Institute of Environmental Hydraulics at the University of Cantabria in Spain and author of the article “Assessment of ecosystem services of an urbanized tropical estuary with a focus on habitats and scenarios”. ResearchGate indicates that its rates are over 67.5% of network affiliates and that its areas of interest are hydrodynamics, undersea outfall design, morphodynamics and dredging, and analysis of undercutting processes in marine and river structures.

Regarding the PS methodologies used by the authors in their work, we have Delphi as the most used and which consists in the creation of a group of specialists who will participate in rounds of targeted collective interviews, so that consensus is generated and they serve as a basis for the creation of scenarios (BLOIS; PARIS; CARVALHO *et al.*, 2017).

The second most widely used method is Grumbach, which is divided into four stages, where the first defines the magnitude of the problem, the second raises the variables, the third analyzes the causes and consequences of the variables, and the fourth defines the strategies to be employed in the future (ARAUJO, HOFFMANN e PIZZOLATO, 2018).

The third method most commonly found was the Godet method, which is divided into three moments: analytical and historical survey of the subject, survey of variables and uncertainties, and elaboration of scenarios (LIRA, ARAUJO and DUARTE (2017); OLIVEIRA, BARROS, PEREIRA *et al.* (2018), and finally, the fourth method is the cross-impact matrix that, according to Assis, Pereira and Machado (2017), Araujo, Hoffmann and Pizzolato (2018), in which the subject matter experts indicate in a stepwise and quantitative manner the influence that the occurrence of event A will bring on the probability of events H, T and C occurring, that is, verify the impact that one event has on another.

In addition to the four methods described above, others were applied to the research, however not with the same hegemony as these, such as the *Analytical Hierarchy Process* (AHP), the *Fuzzy* method, the *paraconsistent*, the SWOT analysis, the *Life Cycle Assessment* (LCA), *Multi-criteria decision analysis* (MCDA), *Systemic Management Model* (MOSIG) and *The Integrated MARKAL-EFOM System* (TIMES).

4 Final Considerations

The development of this work helped in the perception of the multidisciplinary nature that the method of prospective scenarios brings to science, and that even areas as different as Biogeochemistry, Geography, Psychology, Architecture, Information Science, among others, can formulate solid and specific works for its fields using the full PC.

As a result, we perceive an affinity of subjects among the 64 pertinent articles, and we group them into eight subthemes, namely: Administration; Agriculture and Climate; Fuel; Education; Energy; Engineering, Architecture and Geography; Health; and technology.

Subthemes converge to the concept of PC as a systematic and participatory process that gathers knowledge about the future and creates medium and long term visions on a certain subject, aiming to gather sufficient information for the decisions that must be taken in the present. Among the concepts of PC presented in the relevant articles, we highlight those in Chart 1 as the most recurrent in the literature.

Chart 1. Prospective Scenario Concepts

Authorship	Concepts	Our translation
Correa, Cagnin (2016, p.10)	“Scenarios could be used as an aid to the complex simulation process of possible future environments through a participatory process. Such dialogue between policy-makers and different sectors of society includes the exchange of values, the sharing of commitments and both physical and behavioural aspects of all involved actors.”	Os cenários podem ser usados como uma ajuda no complexo processo de simulação de possíveis ambientes futuros através de um processo participativo. Esse diálogo entre os decisores e os diferentes setores da sociedade inclui a troca de valores, a divisão de esforços e os aspectos físicos e comportamentais de todos os atores envolvidos.
Díaz, Lobo, Geraldino (2013, p.5)	“El trabajar con los escenarios permite visualizar las acciones futuras desde diferentes puntos de vista que permiten al planificador adentrarse más en la complejidad de la situación e idear las mejores opciones y sus planes alternos.”	Trabalhar com cenários permite visualizar ações futuras a partir de diferentes pontos-de-vista, permitindo ao gestor, o aprofundamento em situações complexas de modo a escolher as melhores opções e/ou seus projetos alternativos.
Fadhil, Maarif, Bantacut <i>et al.</i> (2018, p.960)	“Prospective analysis is a technique to determine various strategies that may happen in the future by referring to current situation.”	A análise prospectiva é uma técnica para determinar várias estratégias que podem ser aplicadas no futuro, tomando por referência a situação atual.
Gonçalves, Mussi, Del Corso (2016, p.4)	“O planejamento de cenários se utiliza de elementos racionais e de cadeias construídas a partir de relações de causa e efeito na avaliação dos potenciais cenários, tornando a organização mais propícia a se adaptar a situações diferentes, ainda que incomuns/novas.”	-
Lehoux, Gauthier, Williams-Jones <i>et al.</i> (2014, p.3)	“Scenarios usually take a narrative form, providing a plausible, intelligible story about a putative future. Scenarios may pursue different purposes (research or policymaking), are constructed through different processes (relying on informal versus formal knowledge) and possess different characteristics.”	Os cenários geralmente assumem uma forma narrativa, fornecendo uma história plausível e inteligível sobre um suposto futuro. Os cenários podem ter diferentes propósitos (pesquisa ou criação de políticas), são construídos através de diferentes processos (com base no conhecimento informal ou formal) e possuem diferentes características.
Oliveira, Barros, Pereira <i>et al.</i> (2018, p.21)	“The study of scenarios can be defined as a study of events that may come to occur in the future, organized in a limited and structured list with the possible future situations.”	O estudo de cenários pode ser definido como um estudo de eventos que podem vir a ocorrer no futuro, organizado em uma ordem limitada e estruturada com as possíveis consequências futuras.
Silva (2018, p.538)	“Scenarios methodology is a tool for visualization of future options or different alternatives in the long term, integrating complex components in a scope of foresight.”	A metodologia de cenários é uma ferramenta para visualização de alternativas futuras no médio ou longo prazo, integrando componentes complexos em um âmbito de previsão.
Zapata, Puente, García <i>et al.</i> (2018, p.2)	“Scenarios are visualizations of possible future events resulting from a combination of trends and policies.”	Cenários são visualizações de possíveis eventos futuros resultantes de uma combinação de tendências e políticas [praticadas hoje].

Source: Research data, 2019.

Therefore, the results found should, with appropriate adaptations and compatibilities, be used by companies, such as Moon; Han and Kwahk (2019) describe how organizations can use user-provided data on the Internet and create consumer goods that use the Internet of Things to encourage them to continue consuming; and/or by the State, which could use, among others, the research of Alarcão; Tavares; Mealha et al. (2018) to re-elaborate the

guidelines of Higher Education Institutions (HEIs) to improve teaching, research, extension in these spaces; and consequently bring improvements to education at national level. There are reliable works with invaluable data, what is missing is to use this data for effective application in daily life and services applied to Information Units.

We conclude this work, with the certainty that we have achieved the proposed objective, however, without intending to exhaust the theme, but to look at the new questions that emerge, because when a question is answered, the researcher feels impelled to question more from other perspectives.

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