Prospecting the Impact of New Business based on Project Keywords

Edward David Moreno;Maria Elena Leon Olave;Paulo Afonso

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Prospecting the Impact of New Business based on Project Keywords

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Abstract

In this paper we present and use the ITW-Index – this name was given in reference to the term Technology Watch, which is a technique of observation, analysis and identification of possible opportunities and threats, linked to the method of technological forecasting called Monitoring and Intelligence Systems. The purpose of TW-Index is to provide the user the capacity of monitoring and identifying whether certain terms which are used for defining a technology or research are currently been searched and used in the Internet. For this, we used as a basis the Google Trends. So, in this paper we present three contributions: (i) the concept of the TW-index, (ii) options for evaluating and getting a value for the TW-index applied in two different examples, and (iii) we measure and explain the means of TW-index when it is applied in two ideas for creating new business into the IdeaLAB program at University of Minho, Portugal.

Keywords- *Technological forecasting, Technology Watch, Intelligence Systems, Google Trends, Business and Research.*

1. INTRODUCTION

In today's world, where companies and institutions compete daily to stay ahead of their competitors for business success, efforts are being made to gain competitive advantage [7] [8]. In order to deal with uncertainties and seek a more prosperous future, technology prospection techniques have proven to be an effective alternative to achieve satisfactory results. According to Coelho (2003, p. 1) "Although the future is uncertain, there is evidence that systematic attempts to gain perspective on the present and possible future situations have been helpful."

So, technological prospecting studies seek to add value to present information, helping in decision making. The purpose of prospecting studies is not to unravel the future, but to delineate and test possible and desirable visions, allowing choices that will contribute positively to building the future. Such visions can help to generate long-term policies, strategies and plans that provide likely and desired future circumstances in close alignment (MAYERHOFF, 2008, p. 7).

For Coelho (2003, p. 84) "technological prospection cannot and should not be made focused solely on technology, but also to try to anticipate and understand the social, environmental, economic and political factors that interact with it". With this in mind, the potential of technological prospection, which emerges as a strategic planning tool, is capable of monitoring and making decisions that impact positively in the face

of the globalized world and the increasingly competitive market.

With the increased competitiveness, organizations have sought to anticipate innovations and changes in the market. To succeed, they have invested in technology prospection methods that underlie the choices and decision-making for structuring a desirable future.

In this sense, knowledge and use of indices that measure the impact of an idea or technology or research is relevant, thus helping organizations that want to conduct a prospective study focused on trend analysis, identifying terms that are prominent in order to subsidize their actions. looking for a possible successful investment [1][3].

Thus, this paper presents three contributions: (i) presents the creation of a new index, call for us as, ITW Index, which allows quantifying how much a subject of a technology or scientific research or idea for a new business is being sought by people on the Internet, or in the world or in a particular region or country, and (ii) mechanisms to obtain the value of this index either manually or by using a web application that assists in the exploration of technologies using the TW-Index index for identification and monitoring of research and technology subject trends; and (iii) analysis of two ideas to create two new businesses within the IdeaLAB program of the University of Minho, in Braga and Guimaraes, Portugal, using the TW-Index.

To achieve the objectives of this work it was necessary to carry out a theoretical study on technological prospection, knowing existing works and tools that could support the development of the application. In addition, for the software development stage, it was necessary to use several technologies and the implementation of new features, aiming to make the application more interactive and complete. This enabled us to test and validate the WEB application and the index concept, applying it to two new business ideas, one dedicated to environmental management consulting, and the other to adding virtual reality technology in museums.

The remainder of this article is organized into five sections, part 2 devoted to presenting the concept of the TW-Index index, section 3 presents options for obtaining the value of the TW-Index index, section 4 presents the use of the TW-Index. in two new business ideas, and finally section 5 presents the conclusions and ideas for future work.

2. CONCEPTS OF ITW-INDEX

In this article we present the TWI or TW-Index (Technology Wathing Index) index. This index gives a score from 0 to 100, and allows you to measure how a particular technology, described by your keywords, is being sought by people on the world wide web (Internet). The main idea is for anyone to evaluate a subject using keywords. To get a quantifiable number, we designed a robot that searches these subjects on the Internet, and for each keyword you enter, you see how that word is being used and searched by people in a particular region, country, or continent. Similar to Google Trends, we look at how this subject appears over a period of time, and we continue it over time. Google Trends [4] is a free tool that allows you to track the evolution of a keyword's number of searches over time through a graph.

The creation of ITW-Index was mainly inspired by this tool, as it allows the discovery of current trends, showing if a particular term is highlighted and its evolution over time.

Figure 1 shows the search for a particular term using the Google Trends tool. In this example we observe the trend of the term "Business Intelligence and Technology" in the last year period (counted before the

date of the search for this term, made on 12/12/2019). This way, besides observing the search behavior, it creates a value from 0 to 100, for each research day, and its evolution over time. The maximum value (100) is obtained when a maximum number of people in this specified period searches the term on the Internet. The other values are relative to this maximum. Thus, the index will be 50% which represents half of the (maximum) value found. Thus, the index offers that demand on that day was 50%. This is done for each day within a certain period of time.
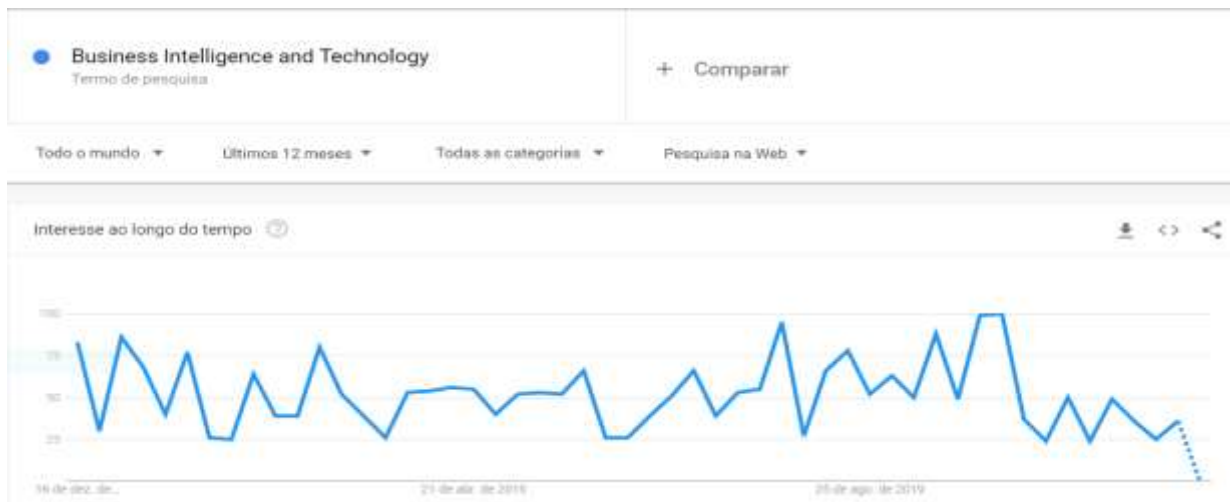

Figure 1 – Behavior of term "Business Intelligence and Technology" using Google Trends

Our ITW-Index index gives a value from 0 to 100, being the arithmetic average of the demand of each searched day. In this article, we think it might be of interest to look at this demand in the last week, last month, or last year. That way we can set an index by week, by month, or by year. We call them, respectively, ITW-I week, ITW-I month, and ITW-I year.

The main contribution of this article is to create a number that quantifies the demand for a given subject using this ITW-index. We calculate the subject's TW-Index as the geometric average of all TW-Index indices for all keywords describing a particular technology or research or new business idea.

In our view, this index can be used to measure the impact of a given survey. The ITW-Index can be used to assess the impact of works derived from scientific research (PhD Theses, Master's Dissertations, Course Completion Papers, Scientific Reports, Technical Reports, etc.), or in the business and business world (for evaluate patents, software registrations, products, services, etc.), or Technological Prospecting on the valuation of ideas and their impact on the market (measured as the amount of people looking for information in the terms that define the new product or service).

In this paper we present the ITW-Indexes for two proposals, two new ideas presented in the IdeaLAB project of the University of Minho (Portugal) [9], here called Green Startup, and the other as Blue Startup. Green wants to offer specific Environmental Management Consulting, and Blue wants to add virtual reality technology to museum´s products and services.

3. CALCULATING THE ITW INDEX

The index proposed here can be obtained in two ways. The first one is by hand, where each interested person should follow these steps:

(1) Login to google trends website (https://trends.google.com.br/trends);

(2) Configure with the desired information, for example, enter which country or region you want to analyze, what period you want (1 year, 1 month, 1 week), what kind of information to look for on the Internet (all options, images, etc.);

(3) Enter the keyword, and wait for the results. Here you can visualize a graph similar to the one in figure 1;

(4) Analyze the data from this graph. It can be done manually. To calculate the ITW index proposed in this article, an interested user must export the results to a file;

(5) Analyze the file data. This must be done for each keyword. Then generate the index and make the graphs.

This process is time consuming and must be done manually. For better data search and analysis, we propose a WEB-based software that makes the entire previous process more automated.

The tool can be viewed in four (4) parts: presentation pages (contains basic tool information); authentication pages (to assist users in registering and recovering their password); administration pages (to assist administrators, the application has pages where you can view data entered by users, as well as add, modify or remove other types of data that are stored in the application), and finally system pages (which request the information and provide the results of the analysis based on the keywords.

To use this software on a local machine, can make a download and install it into local machine, using the code available in Moreno (2019). After correct installation seems one page similar to Figure 2.

Figure 2 – First page after correct setup of WEB-based software

4. CASE STUDY – BLUE AND GREEN STARTUPS

In this article we present the example of applying the ITW index on two business creation options. BLUE wants to open a field by consulting in environmental management, and GREEN wants to add virtual reality technology to museum presentations.

For BLUE, she outlined her new product / service with 11 keywords, in Portuguese, (1) arqueologia virtual, (2) reconstituição arquitetônica, (3) realidade aumentada, (4) realidade virtual, (5) visualização 360, (6) Digital Tourism, (7) Virtual heritage, (8) Gamefication, (9) Turismo cultural, (10) Imersivo, and (11) Interativo.

They intend to open the market only in Portugal, for this reason analysis was made only for that country and in the world, and using Keywords in Portuguese, see behavior in Figure 3.

Our assessment detects that the keywords "gamefication", "architectural reconstitution", "virtual archeology", "360 visualization", and "virtual heritage" returned ITW = 0 (see Figure 3 and 4).

Again, this indicates that in this country, people are not looking for information with these words, and therefore there is possibly no interest in these products / services. This is a good indication for the entrepreneur, as he should think better about the market strategy for his product in this country, or invest less in the technical qualities of his product that have or use these words. It also indicates that you should consider inserting better marketing strategies of your products in this country.

In the case of BLUE, the ITW index for worldwide searches was 38, and for Portugal it was 22. In the case of the words "architectural reconstitution" and "360 visualization", an ITW = 0 value was also obtained for searching the world. This causes the overall ITW index to be lower than the ITW. Thus, when the ITW-0 index is lower than the general ITW index, an alert is generated for the entrepreneur, as it indicates that there are no interests in the world or region searching for these terms, and this may indicate that there is no market for your products / service with these descriptions.
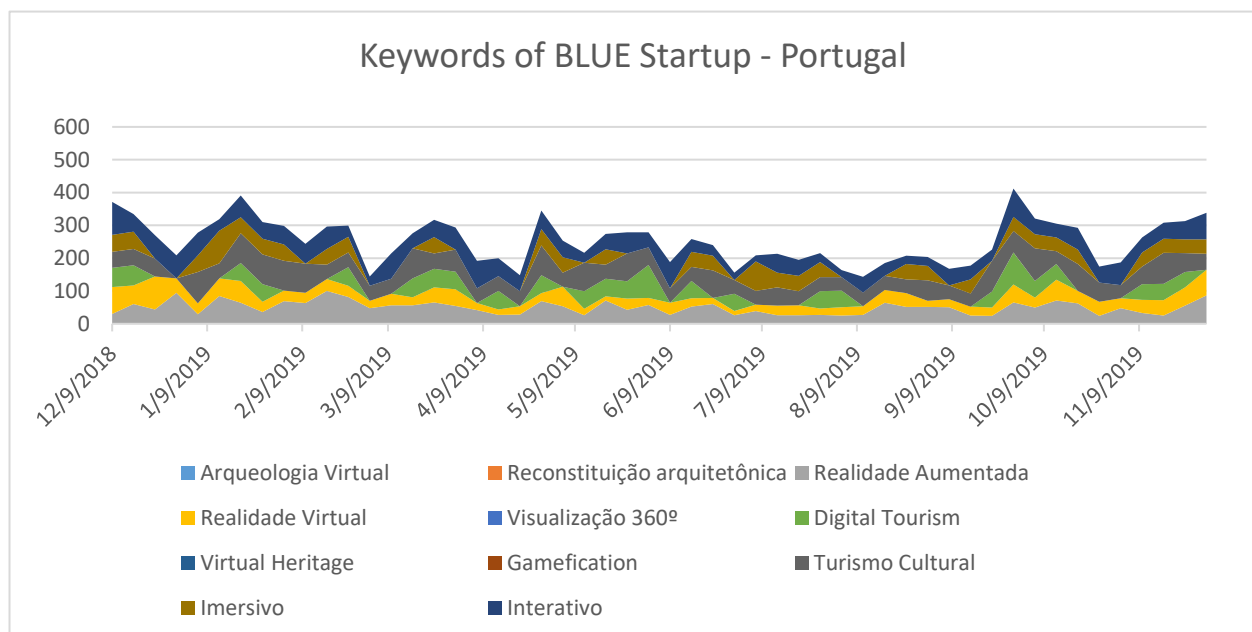

Figure 3 – Behavior of ITW index for 11 keywords of BLUE Startup

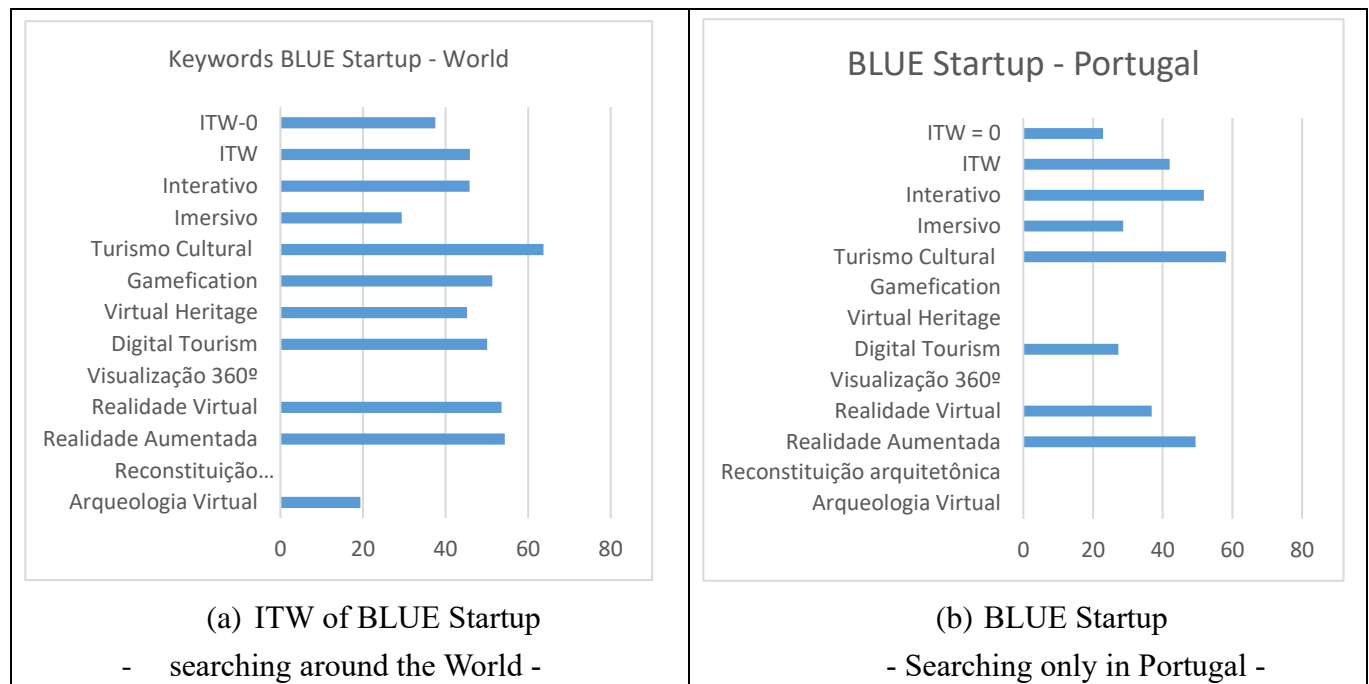| (a) ITW of BLUE Startup	(b) BLUE Startup
- searching around the World -	- Searching only in Portugal -

Figure 4 – ITW Index for BLUE Startup using keywords in Portuguese

On the other side, GREEN has characterized its new product / service with 9 keywords. The keywords used are: (1) gestão participativa, (2) responsabilidade socioambiental, (3) Analise de dados, (4) Tomada de Decisões, (5) Gestão Pública, (6) Mediação de Conflitos, (7) Participação Cidadã, (8) Estudos Sociológicos, and (9) Consultoria.

They intend to open markets in the countries of Portugal and Brazil, Spain and Colombia, for this reason the index analysis was made using the keywords in Portuguese (see Figure 5) and Spanish (see Figure 6). The assessment was made for these four countries, as well as searching the world (with Portuguese words), as shown in figures5 and 6. In these figures you can see that some words gave a return of 0 (zero), this indicates that there are no people interested in these issues, which could indicate that there is no market, or that entrepreneurs should be careful with their product in these countries, or that you should think of some different marketing strategy so that there will be interest in your products.

In the case of GREEN, our index suggests that there would be a better market in Brazil than in Portugal.

In the case of GREEN, our assessment using the ITW index suggests that their market would be equivalent in Spain and Colombia (ITW indices of 34.04. 34, 93). In the world this index gave a value of 58.82, and in Portuguese it was 51.85 (see data in the following table I). Table I shows the values of the ITW indexes evaluated for the Startup GREEN, for different periods (1 year, 1 month, 1 week). These indices change, as they track Internet searches for a given subject in a given period.

We think it is best to consider a period of 1 year to get an idea of how the interests of a given subject happen. We also consider it important to follow up over a period of one year, to observe periods when there are high and low values, and to observe and analyze why these behaviors.

Comparing the indices for BLUE and GREEN companies evaluated here, our index suggests that GREEN (environmental management consultant) may have a better market than BLUE's desired product.
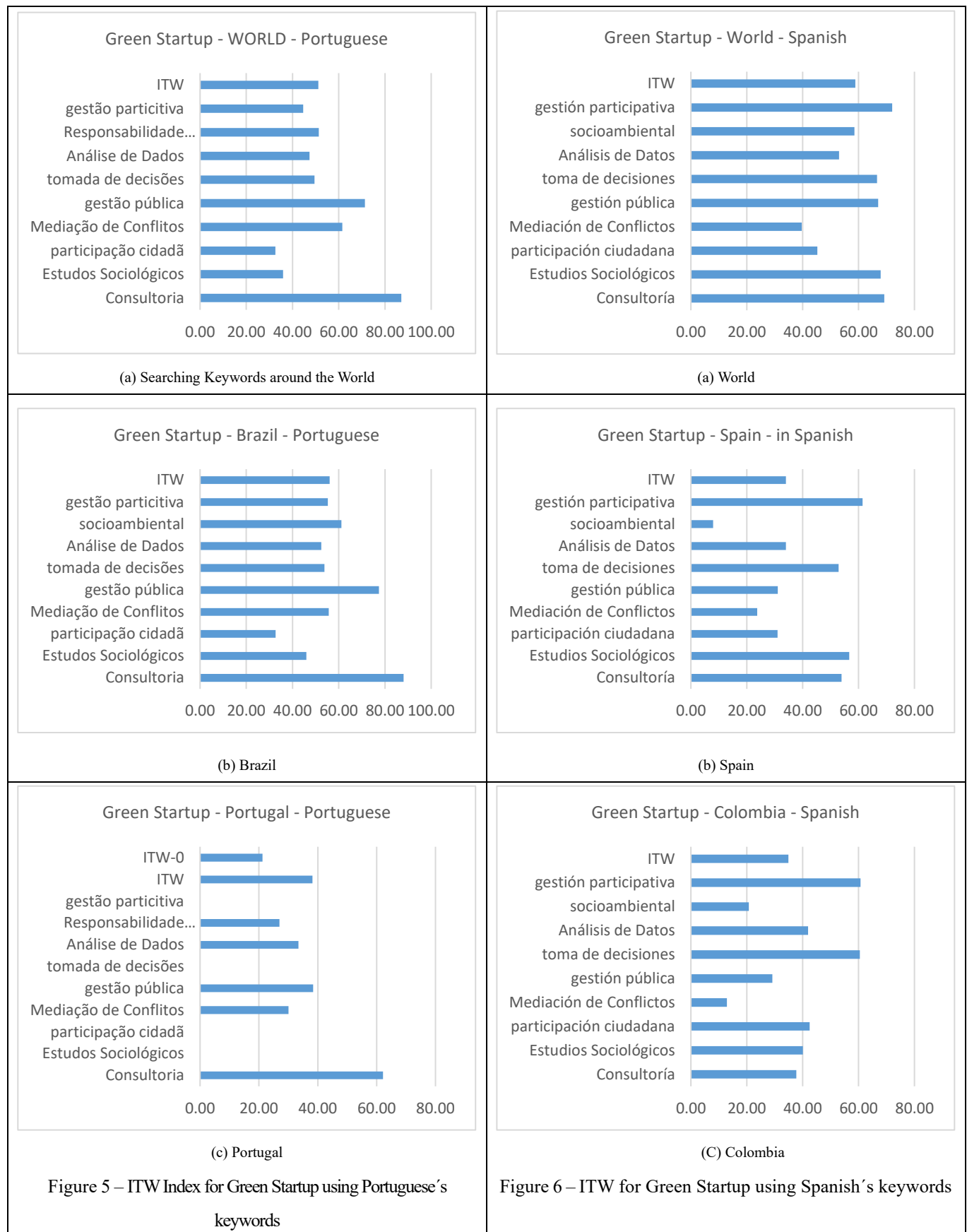
(a) Searching Keywords around the World

(a) World

(b) Brazil

(b) Spain

(c) Portugal

Figure 5 – ITW Index for Green Startup using Portuguese´s keywords

(C) Colombia

Figure 6 – ITW for Green Startup using Spanish´s keywords

Table I - Summary of ITW Values for GREEN Startup

Portuguese	Year	Mont	Week		Spanish	Year	Mont	Week
World	51,85	61,59	82,98		World	58,82	69,75	66,92
Brazil	56,02	65,38	66,01		Spain	34,04	43,79	33,73
Portugal	21,23	18,36	37,33		Colombia	34,93	39,99	34,72

5. CONCLUSIONS

This paper introduces the concept of a new index, called the ITW index, an index that measures the impact of a particular technology or research subject by measuring the amount of Internet searches for the key terms that characterize a particular product / service.

This index is based on information generated by Google Trends. The article also presents a way to calculate this index for any keyword, which can be calculated manually by accessing Google Trends, or automatically using a web tool that facilitates evaluation. Finally, the article presents an example with two new business ideas, and using the data from the new index, it can be concluded that the GREEN business has more market potential than the BLUE business, and the GREEN business has more opportunities in Brazil, Spain and Colombia than in Portugal.

So, the ITW-Index emerges as a technology-driven aid application, and can be used to quantify market possibilities in a particular country for a particular product or service, and also helps to take special care of some terms that will define or will define. the product / service.

As future work, we would like to suggest the following points: improve the Web tool by allowing new functionality and analysis, as well as validating the impact of the proposed index (the TW-index) so that it has greater mastery of what it actually represents in prospecting technologies and researches, and measure the impact of new products and services as new business.

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