TREND ANALYSIS OF TERMINOLOGY IN BUSINESS ANALYTICS WITHIN TIME PERIOD OF 2009 – 2019 IN FIELD OF BUSINESS AND INDUSTRY

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ABSTRACT

In this paper we focus on trend analysis of the search queries in the field of business and industry within dataset of time period of 2009-2019. We process the dataset via trend analysis and highlighting the increasing trends in used terminology grouped by regions. In first chapter we present methods and materials followed by results of the analysis which includes the regional differentiation based on ratio of search queries.

KEYWORDS

terminology, business analytics, trend analysis, industry, regions, period of 2009-2019

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INTRODUCTION

With reference to authors Shmueli, Bruce and Patel (2016), **Business Analytics** is the practice and art of bringing quantitative data to bear on decision-making. However, the term means different things to different organizations (Shmueli, Bruce and Patel, 2016). According to Liebowitz (2018) article presented in Technopedia.com definition of Business Analytics *is: "Business Analytics refers to all the methods and techniques that are used by an organization to measure performance. Business analytics are made up of statistical methods that can be applied to a specific project, process or product. Business analytics can also be used to evaluate an entire company. Business analytics are performed in order to identify weaknesses in existing processes and highlight meaningful data that will help an organization prepare for future growth and challenges (Liebowitz, 2018)."*

To provide more of the experienced opinions on issue, we refer to Lee (2016) that business analytics is used to describe the entire function of applying skills, technologies, standard practices, and algorithms related to data mining and data collation methods to generate valuable information, usually presented in highly readable format so that managers can make business decisions and to control and manage their business operations. Data mining, as a part of business analytics, is usually applied in the back-end of the business analytics function while the front-end of business analytics function consists of executive reporting metrics and collated information. When the business analytics function is efficiently and effectively executed, it may become a core competence for the organization in the form of valuable business intelligence that will **support the strategic actions** undertaken by the organization (Lee, 2016).

All owners of business are interested in the idea of evolving the industry. Even in more niche area of focus in terms of corporate structure is this interest strong enough to lead this

paper to elaborate past trend with the aim of future insight.

According to De Finetti's (1937) idea of exchangeability, that future observations should behave like past observations, came to the attention of the English-speaking world „Prediction“ with the 1974 translation from French of his 1937 paper La Prévision: ses lois logiques, ses sources subjectives *(transl. Foresight: Its Logical Laws, Its Subjective Sources).* As far we know De Finetti is the father of the word *“prediction“* in context of analytics.

Move to present research, Thomas H. Davenport is an American academic and author specializing in analytics, business process innovation and knowledge management. He is currently the President’s Distinguished Professor in Information Technology and Management at Babson College, a Fellow of the MIT Initiative on the Digital Economy, who described predictive analytics in Harward Buiness Review (2014) in three simple sentences: *“No one has the ability to capture and analyse data from the future. However, there is a way to predict the future using data from the past. It’s called predictive analytics, and organizations do it every day (Davenport, 2014).”*

Davenport (2014) in the book titled *“Big Data at Work”* spotlighted the main terminology in the field of Business Analytics. As we can see on the table below, we can elaborate how the understanding of the Business Analytics has changed over the time. In following lines, we will focus on chronological terminology on business analytics in terms of techniques and terminology.

Table 1 *Terminology for Using and Analysing Data (Davenport, 2014)*

Term	Time frame	Specific meaning
Decision support	1970–1985	Use of data analysis to support decision making
Executive support	1980–1990	Focus on data analysis for decisions by senior executives
Online analytical processing (OLAP)	1990–2000	Software for analysing multidimensional data tables
Business intelligence	1989–2005	Tools to support data- driven decisions, with emphasis on reporting
Analytics	2005–2010	Focus on statistical and mathematical analysis for decisions
Big data	2010–present	Focus on very large, unstructured, fast-moving data

1 MATERIALS AND METHODS

In this research we will focus on analysis of the search trends in the field of business analytics in context of business & industry within dataset of time period of 2009-2019. Based on Davenport’s representation of Business Analytics terminology.

Objective of this research is to exclude obsolete terminology in the field, in purpose to focus on most frequent keyword in the field, in our future research. And clarify the focus on leading regions based on terminology. This research shall give clear insight and verify the Davenport’s table of terminology in context of providing still relevant possible directions in the field within the countries.

Moving forward, on the tables below, we provide graphical representation of datasets generated by google search results which provide us the search string with presented ratio in period of time 2009-2019 (from 1/1/2009 to first half of the year 2019). Numbers

represent search interest relative to the highest point on the chart for the given region and time. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means there was not enough data for this term. Ratio is measured via equation:

$$RQD_{BD} + RQD_{DS} + RQD_{O} + RQD_{BI} + RQD_{A} = 100\%$$

RQD	Ratio of Queried Data in Time
BD	Big Data
DS	Decision Support
O	OLAP
BI	Business Intelligence
A	Analytics

2 RESULTS

In following graphical representation of the used terminology from 2009-2019 is leading term the “Analytics” with long-term ascending linear trend line in field of Business and Industry. Second in tandem is decreasing “Business Intelligence” with descending linear trend line. Compare year 2009 to end of measures for year 2019, the term “Business Intelligence” is overcame by term “Big Data” in the end of measured dataset. We can see slight jump between the years 2011 and 2013 for term “Big Data” in the field of Business and Industry, which quite agrees with Davenport’s (2015) presented Table of Terminology. Term “OLAP” has long-term decreasing trend. On the other hand, Decision support – one of the oldest components in the Table, acquires low values in the long-term period. The Table mentions term “Executive support” which did not acquire any valid values in our research. It’s value of the ratio was <1. Therefore, we’ve excluded it from measures.

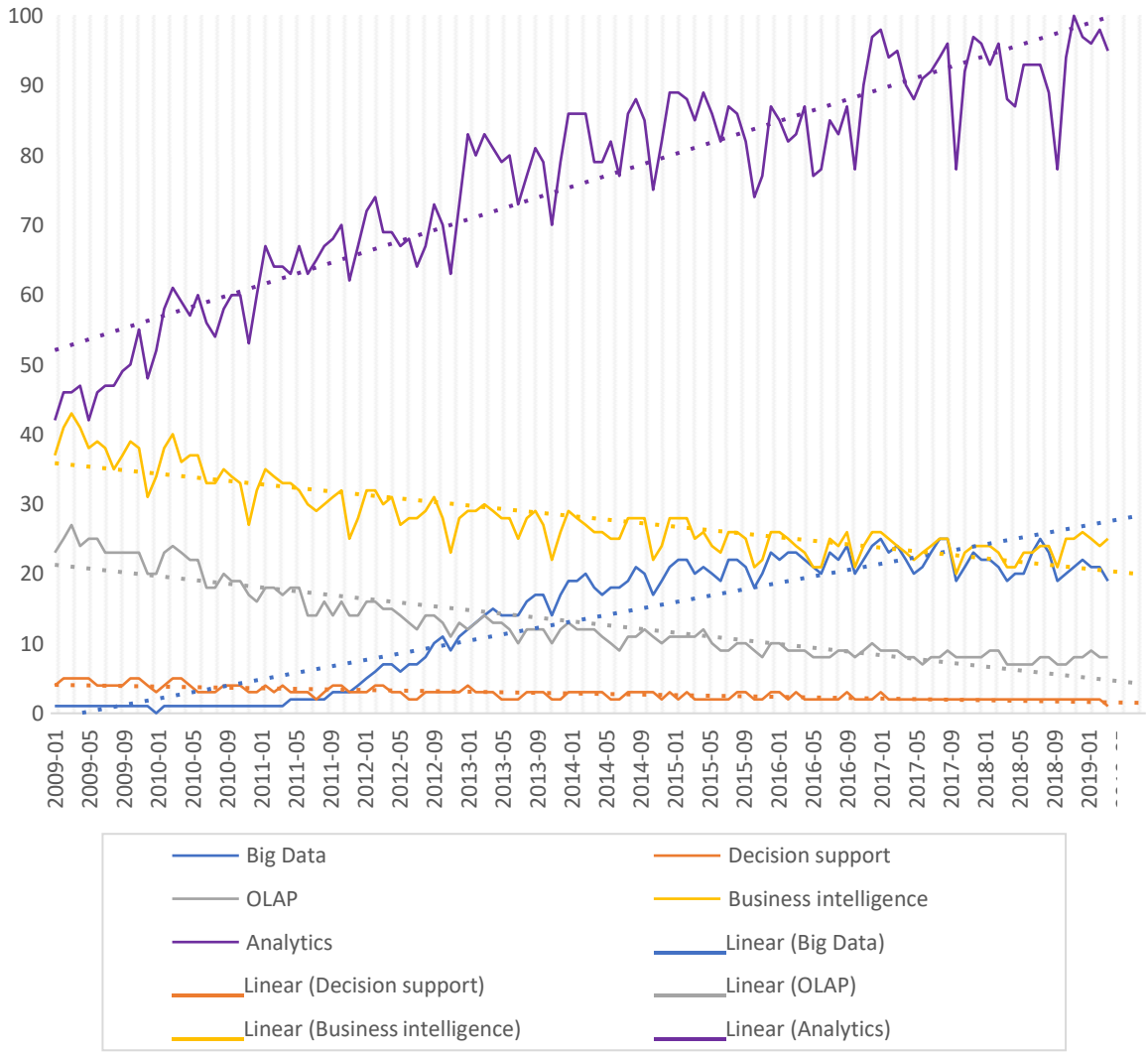

Figure 1 *Trend Analysis of Terminology for Using and Analysing Data (own processing)*

2.1 Results by Region

Following results, we present as regional overall differentiations. We highlighted high local extreme (red), low local extreme (yellow), and as a technological and economical leading country in Europe Union, we highlighted Germany and percentual equivalent region to Germany (green). Grey results are Regions which has unmeasurable results or value <1%.

We can spot the term *"Analytics"* is quite distinctive in Japan and Turkey with the first place (70%) of results, followed by Ukraine (69%) and United Kingdom (65%). On the other hand, lowest results are in Peru (27%), followed by Iran (29%). Overall, results for term "Analytics" in context of the ratio in Business and Industry are quite high.

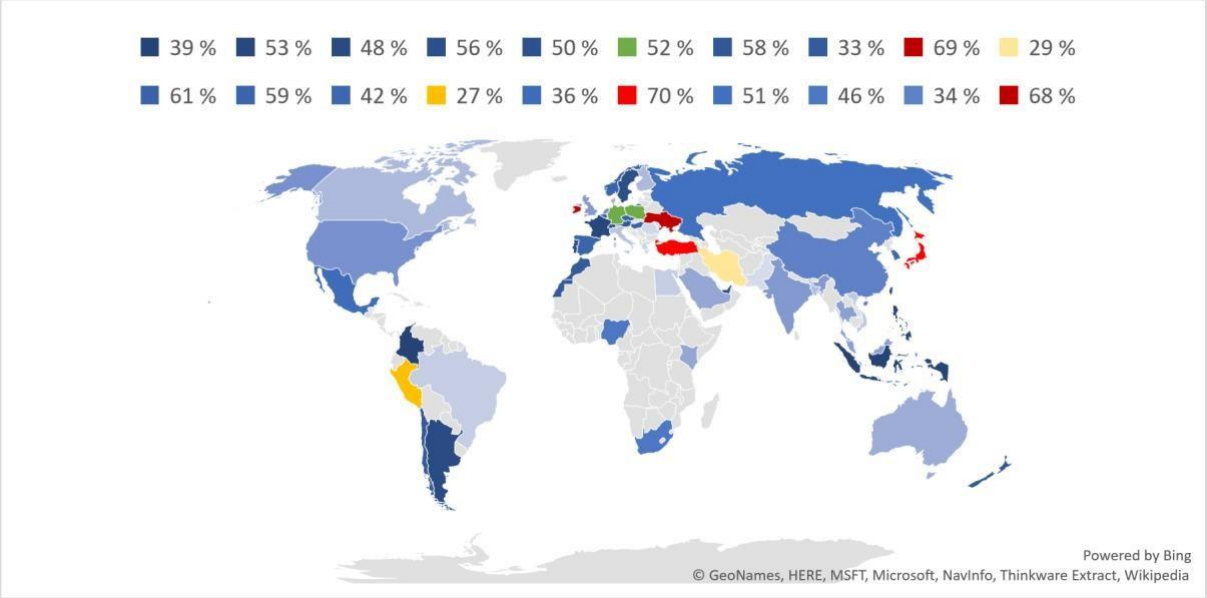

Figure 2 *Term "Analytics" (own processing)*

If we focus our attention on term *"Big Data"* we can see South Korea (31%) and Taiwan (21%) one of the leading regions. On the low extreme is located Cech Republic (5%) and Ukraine (7%). Competitive country to Germany (12%) is Peru (12%) and Mexico (13%).

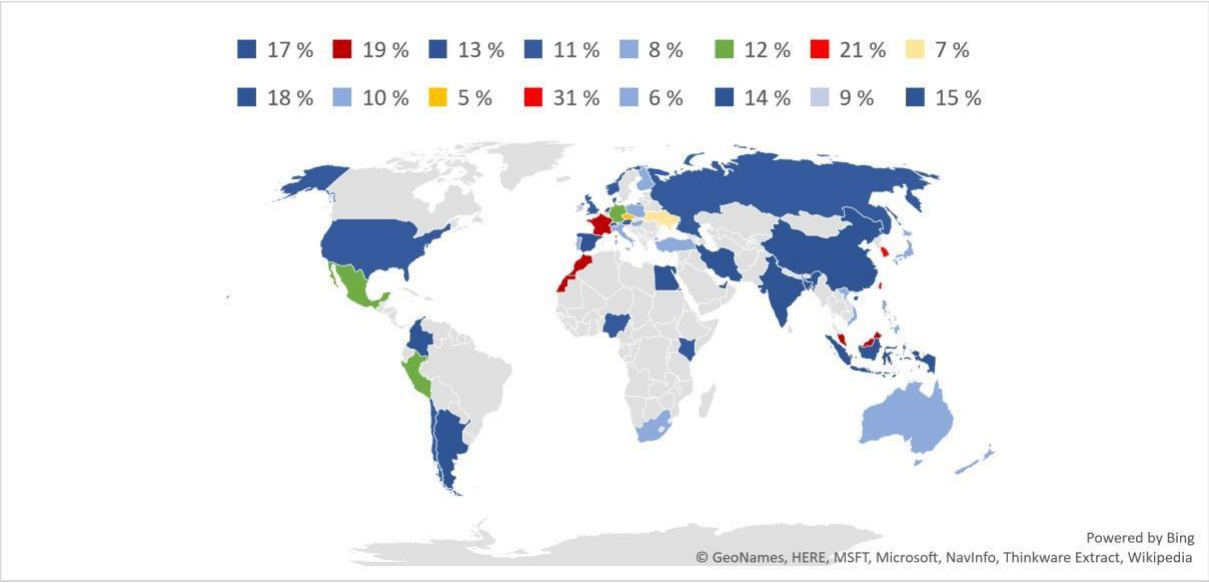

Figure 3 *Term "Big Data" (own processing)*

Lowes values for *"Decision support"* with less or equal to 1%, with still measurable values, are Russia, USA, Canada, Brazil, India, Ukraine and majority of countries in EU. Another, but high, local extreme are Kenya (12%), Nigeria and Indonesia (11%).

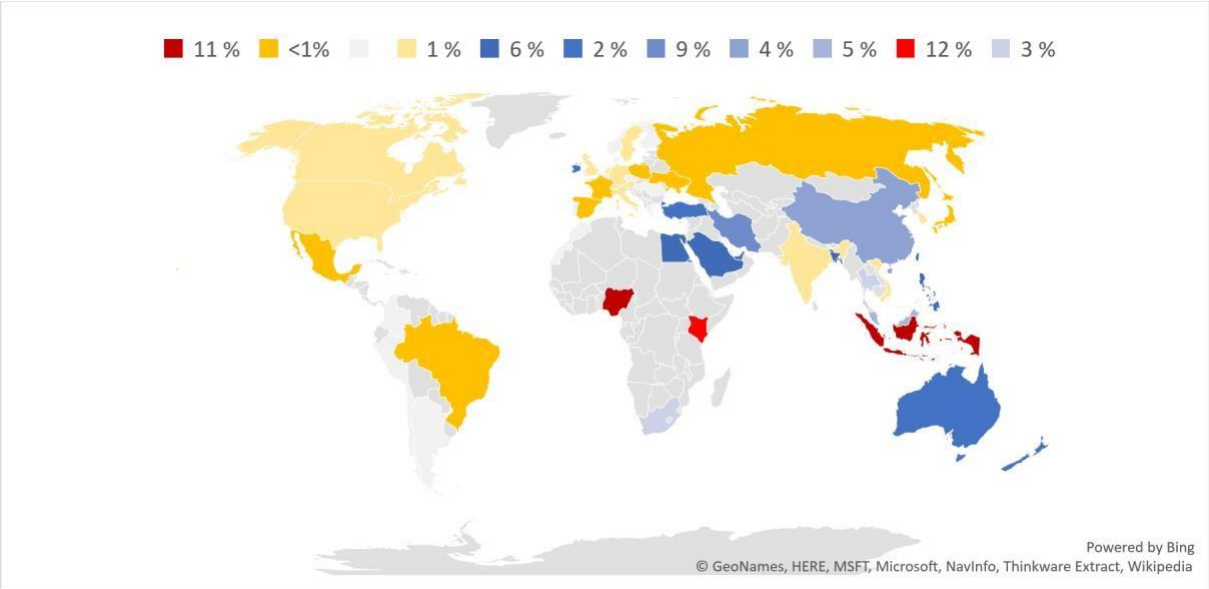

Figure 4 *Term "Decision support" (own processing)*

Term “OLAP” leads in countries China (33%) and Russia (25%). Lowest ratio belongs to Nigeria (3%). Equivalents to Germany (11%) for searching results are Austria, Czechia, and Philippines.

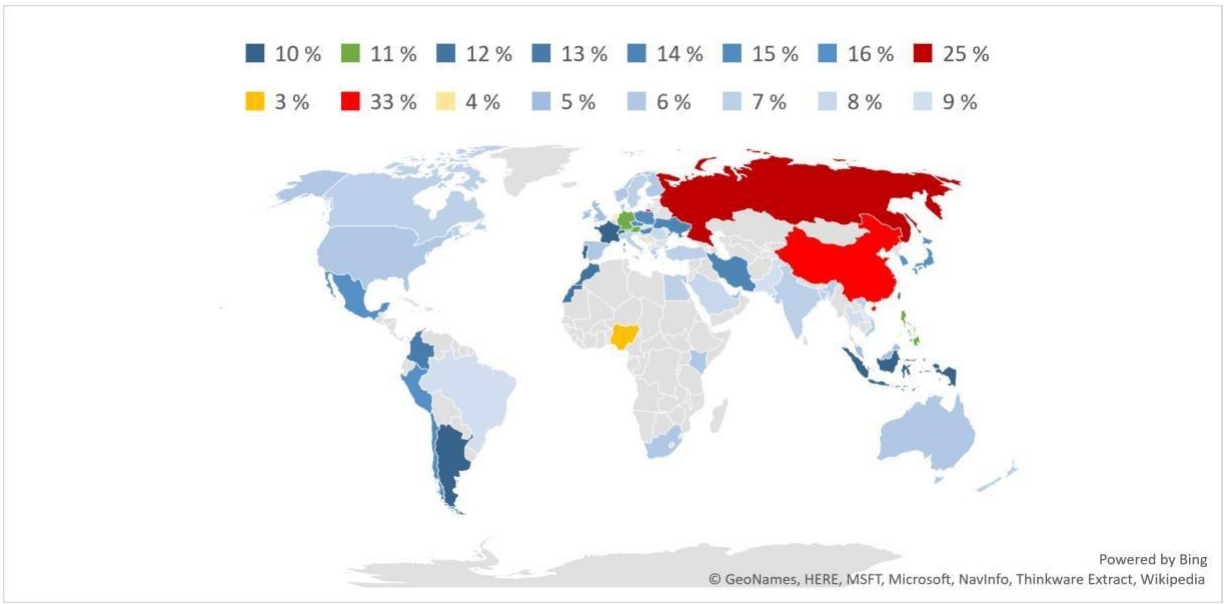

Figure 5 *Term "OLAP" (own processing)*

Finally, term Business Intelligence, is represented with higher ratio in regions as Peru (44%) followed by Chile (41%). In case of lowest local extreme, leading country is Kenia (3%). Equivalent to Germany (21%) are Norway, Thailand and Malaysia.

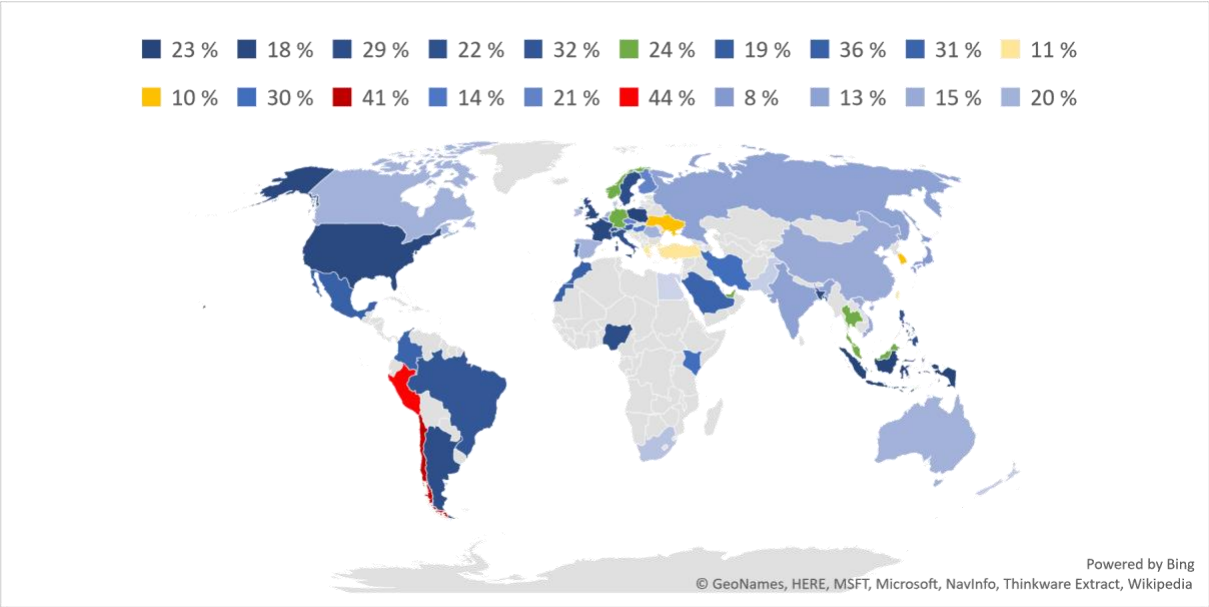

Figure 6 *Term "Business Intelligence" (own processing)*

2.2 Summarised Results

On the following table, we can spot the differences between regions in context of leading analytical technology according to Davenport (2014). We sort and summarise following regions by demand for specified term. For comparation we present Germany as the leading region in productivity in European Union.

Table 2 *Results by region (own processing)*

Term	Leading Region	Germany
Decision support	Kenya (12%), Nigeria (11%)	<1%
Online analytical processing (OLAP)	China (33%), Russia (25%)	11%
Business intelligence	Peru (44%), Chile (41%)	21%
Analytics	Japan (70%), Turkey (69%), Ukraine (68%)	52%
Big data	South Korea (31%), Taiwan (21%), France and Malaysia (19%)	12%

3 DISCUSSION

In this paper we've focused on the trend analysis in the field of business analytics in context of business and industry within time period of 2009-2019 dataset. The research

shown us which term has the increasing trend and which has decreasing trend. Followed by regional differentiation of search results, we created the proper ratio in presented terms divided into courtiers.

This paper delivers handy guide for literature search, orientated on Business Analytics for future research. Therefore, we describe following recommendation:

"In future research in Business Analytics for Industry and Business, we shall focus on terms as 'Analytics' and 'Big Data', which have long-term ascending linear trend line. According to analysis, other terms in context of Business Analytics have decreasing trendline, which leads to slow disappearing of terminology in relevant literature in context of Business Analytics.

Each of mentioned country is focused on different terms, which leads us to more specified author's regions and literature *search. For instance, if we deal with OLAP oriented technology we may focus on literature and authors originated in country such as are Russia or China. On the other hand, if we deal with Business Intelligence there is high probability to access the right paper from authors located in Peru or Chile. We also have to consider that these regions represent high demand for presented analytic tools."*

In this analogy we can distinguish countries which are on peak of trending queries in context of Business Analytics. We can see that more technologically evolved countries have leading positions in term "Big Data" in comparation of "Decision support" which have leading position more of economically challenged countries (in contrast of presented countries). These regions are focused more on older terms (see the Davenport's table). We can say there may be correlation between focusing on "right" technology and economical advantage. For this reason, we will deliver possible answers on the issue in future research.

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