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The Rise of Green Competitiveness: A Global Study from Scopus Database

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Abstract: *In this study, we explore the significance of environmental factors for companies and large businesses in the rapidly growing modern world. The focus is on green competitiveness, which plays a crucial role in sustainable development. A bibliometric analysis was conducted on 30,000 scientific papers indexed in the Scopus database from 1996 to 2019. The analysis revealed that 2004 marked a turning point when research articles from around the world began highlighting the value of green competitiveness, a trend that has continued to dominate since then. Major nations like the United States, China, India, Great Britain, and Taiwan have addressed this phenomenon. The study identified clusters of scientific papers that connect green competitiveness with concepts such as green marketing, green innovation, and sustainable development. The findings suggest that implementing effective marketing strategies based on green competitiveness can contribute to building a productive and sustainable society.*

Key Words: Green Competitiveness, Sustainable Society, Clusters, Scopus Database

Introduction

When judged at the measuring threshold of the scale of development, today's definition of a successful business will be illustrated as the ones promoting efficient strategies to prove to be environmentally friendly at its full potential, implementing successful long-term goals thereby providing the best solution to curb out environmental problems, along with a reduction in the level of anthropogenic pressure in the environment, saving resources, and finally building up a gigantic building block of ever-increasing competitive strategies and competitive advantage.

It becomes inevitably more prominent when taken into account in terms of green marketing context to gain mega share in the ever-competitive world today, that the phenomenon of efficient resource utilization is the one that would thoroughly lead towards a strong formation of research and terminological basis.

The unending war of market leadership guides and navigates companies to accelerate maximum usage of green products and services, and it all pays tribute to the company's efforts to

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choose and implement careful, timely and effective promotion of distribution channels (Hrytsenko 2014, Aliyas, Ismail et al. 2018, Cebula, Chygryn et al. 2018, Dkhili 2018). If companies want surety regarding successful marketing and possessing lion's share in market long-term domination, they have to immediately devise a careful insight into how some factors have been running along the planned vision as prompted by company, being economic stability, highly socially supportive, friendly environmental policies, great technological advancement, top class managerial productivity, designing profitable marketing strategy, ensuring innovative development etc(Rosokhata 2014, Boiko, Samusevych et al. 2017, Bilan, Lyeonov et al. 2018, Masharsky, Azarenkova et al. 2018, Bilan, Vasilyeva et al. 2019, Chygryn, Pimonenko et al. 2019). The authors in the papers(Chygryn, Krasnyak et al. 2015, Kendiukhov and Tvaronaviciene 2017, Lyulyov, Chygryn et al. 2018, Mentel, Vasilyeva et al. 2018, Uçkan 2018, Chygryn, Pimonenko et al. 2019, Lyeonov, Pimonenko et al. 2019, Pimonenko, Lieonov et al. 2019) finally came to put the endeavours of their relentless research in a nutshell that how different economic instruments prove to drive the fate of today's mega dominating dynasty of environmental sustainability.

The research findings of some papers(Vasylieva, Lieonov et al. 2017, Uçkan 2018, Am Marcel 2019, Bilan, Raišienė et al. 2019, Bilan, Vasilyeva et al. 2019, Bilan, Vasylieva et al. 2019, Shvindina 2019) are right here today to prove how well an interconnected relationship exists between macroeconomic and environmental indicators. Along with a magnificent congruency of research badged on the topic (Eva, Marcel et al. 2017, Khan 2018, Ibragimov, Vasylieva et al. 2019, Myroshnychenko, Makarenko et al. 2019) came to a conclusion to justify how the Stamp of success would have been engraved over the marketing strategy of different levels when enriched with the rightful implementation of marketing factors of the competitive strengths' formation. Many other valuable types of research appeared to unveil the phenomenon that the linkage between environmental and economic indicators would run along the same line of action. The valuable findings of the paper(Letunovska and Rybina 2020) have paved the way for researchers to conclude that these are actually social and ecological determinants that would determine competitive indicators. The core heart of the philosophy in their research discovers the fact that a healthy population proves to be enough to perform work effectively, along with a possession of good cultural and social security provided thereby making a strong and prosperous living in an environmentally friendly environment. Beyond the slightest shadow of a doubt, core services by the company including its relation to environmental problems, efficient resource utilization, and production and promotion of green goods and services would drive, decide and stamp a strong market positioning(Shevchenko, Koblianska et al. 2016, Yevdokymov, Chyhryn et al. 2018, Chen, Huang et al. 2020, Pimonenko, Bilan et al. 2020).

Thus, whole the pandora box, including the theoretical background of market strengthening would be unveiled when a considerable quantity of research would be invested in the plethora of ever-shining green paradigms of ultimate competitiveness and capability.

Methodology

The following keywords including "competitiveness, greening and policy" stand as the prominent basis of our research methodology. Two steps were taken down to initiate and run down the research process. A proper analysis of clusters and their respective scale development, with a central cluster having scientific publications embedded in it, as well as affiliation and contribution of individual scientists and countries.

Implementing and utilizing the programs of VOS viewer helped accomplish the analysis process by using the dates from Scopus, resulting in the visualization of a wide array of series composed of proper major definitions, along with providing exact co-citation while investigating the policies that would make green competitive philosophy ever strong and developed.

Research Outcomes

A full-fledged sense including the establishment of a research study based on a vital cross-sector paradigm, along with the use of appropriate terms has resulted in interpreting the research under bibliometric analysis. Mega information

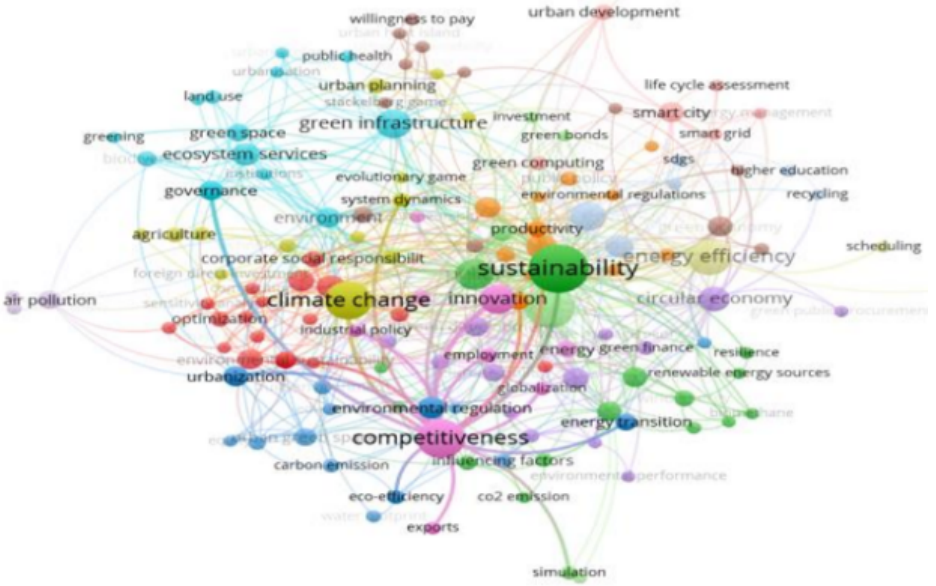
embedded in the scient metric division of Scopus Database stood out to be the main target of this study to enrich its strong base information.

The daylight reality became evident that without carefully analyzing whether a strong connection does exist and is maintained between the sole main categories including “competitiveness, greening, policy”, this research might never have been accomplished at a marvel level of grasping the majestic concept of scientific development constructed and holding its roots on gigantic green competitive empire.

Selecting and picking desired scientific publications of the Scopus database, covering a time period ranging from 1996 to 2019, provided the corresponding analysis (Fig. 1). The mega-level study cherished the in-depth analysis of a huge bulky amount of 30,000 scientific papers studied, interpreted and analyzed over targeted and planned time horizon.

Figure 1

Illustration of an analyzed relationship of appeared and published key categories in the scientific publications for enlightening green competitiveness.



Source: Authors have presented and composed this program with the help of VOS viewer

The study is primarily brought up to investigate whether there is found enough ground to prove a link between classes and categories presented below: competitiveness and the philosophies encapsulating the greening process. Thus, findings revealed the presence of three vital situational clusters in relation to categories namely coping with competition, bringing about climate change and ensuring sustainability practices. The philosophy of the top cluster, named ‘competition’ revolves around a backbone concept of keeping up environmental regulation, environmental productivity and efficiency, ensuring sustainability culture, taking measures for balancing climate change, boosting productivity, the stronghold of management, empowering industrial policy".

The arousal of the second cluster, headlined as ‘climate change’ reveals some precious information including its core concept foundation as “upholding economic growth, preserving environment, uplifting ecosystem services, greened and developed infrastructure, managing green finance, issuance of green bonds, maintaining energy policy, green balanced information systems”. A combination of the following categories has led to the formation of a third cluster 'sustainability' namely: balancing

"climate change", keeping "sustainable development", utilizing "alternative energy", thus ultimately reaching out to "competition", proclaiming "efficiency", "environmental policy", "energy efficiency", "green infrastructure" e.t.c.

The treasured findings being analyzed from the literature, pave the way for a piece of confident information to abridge a close correlation among the following categories namely gaining a green competitive edge, sustainable developed society, keeping intact environmental regulation, well-balanced change in climate, etc. Running along the same line of action, similarity in the following trend has been observed as that of above illustrated as encompassing a greened management along with environmentally friendly production process, ensuring sustainable development that could engine the competitive environment and survive in market contingencies while lying within the bounds of an efficient and strong foundation of the global market.

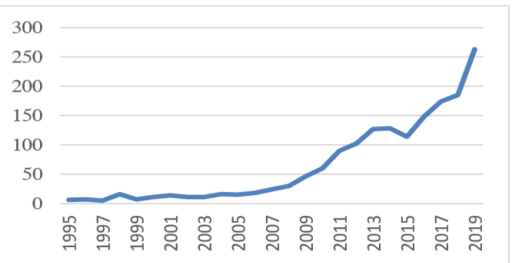
The charisma revolved around the main philosophy of specific concepts and distinct features of the scientific publication category and its analysis relevance, namely "green competitiveness" to prove to be helpful for some future research. The following had been the sequence trend while conducting the study on the trend below: - articles being studied, interpreted, monitored and analyzed in the scientometric database Scopus by keywords "green competitiveness", "green marketing", "green innovations"; - The data is grouped in different categories facilitated researchers in even more enriched and flourished systematization to utilize it in a chronological shaped order and affiliation,

-Areas of use; - a wide range covered, starting from citations given from targeted scientific articles and their analysis, to reference of scientists in corresponding speciality or relevant branch.; - a proper well managed co-citation mechanism of authorship, identification of core vital key categories which could have been mostly used, finding their interconnection with the researches carried on a greened competitive society; - publications arranged in chronological order and thus clustering of terms according to same, visualizing their networks in different areas (the magnitude usage and frequency adoption of relationship); - uplifting and performing an analysis of a network pivotal to utmost guidance and help while exploring whether a relationship does exist between the competitiveness of a green society and relevant other research dimensions, that led to the complete and fully designed hypothesis about the relationship between gaining competitiveness and green growth and sustainable comprehensive development.

This proved that these scientific topics have been prevailing in the recent research trends of the Scopus database (Fig. 2). The papers studied included about 2,000 academic documents, covering a timeline from 1995 to 2019. The long-term need towards sustainability in society has led green marketing and green competitiveness to be the frontline topic of today's research, getting its increased importance earlier back in 1998.

Figure 2

Historical illustration of green competitiveness in specified journals along with different dimensions

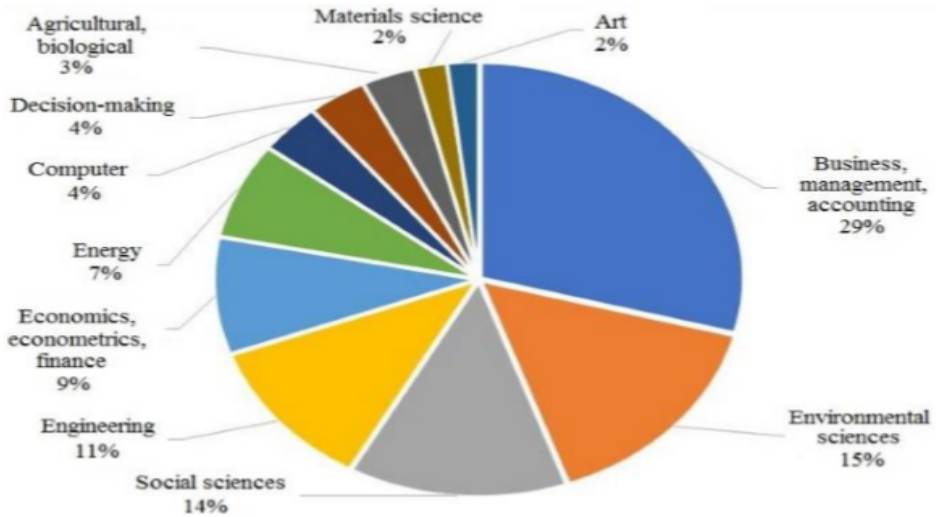


During the same time horizon in 2016, the focus has also been on a vital part of research which is green competitiveness. The worth in the form of validity of the topic speaks out from its rising demand that environmental issues must be implemented in actuality. (Signing in December 2015 of the Paris Agreement "On Climate Change"), the relentless research expanded its analyzing wings and finally reported out the topics of grasping worth and which needs speedy and critical measures to be taken ultimately and immediately, being environmental degradation, speedily depletion caused in natural resources, an ever-increasing level of inequality, unfavourable climate change increased to a disastrous level, and many more. Adding up to that, a fabulous increase in the number of scientists devoting their lives towards the betterment of society through increased measures of green competitiveness has increased to 20 per cent in 2019, compared to 2000. Further and in-depth accomplishments

achieved in analyzing scientific publications on the accelerating issue of green competitive civilization paved the way to point out and cover up many major areas of research regarding attaining many mature research achievements (Fig. 3). The pictorial representation in Figure 3 is a thorough illustration of cross-sector research carried on attaining green competitiveness. Finally, two great horizons of research stand out to be of business and management contributing 29%; environmental sciences make up 15%; social sciences achieves about 14%, engineering sciences make a share of 11%; economics proves vitality up to 9% and others (demand for energy, computer literate society, prompt effective decision making, biological research, materials science) - 22%.

Figure 3

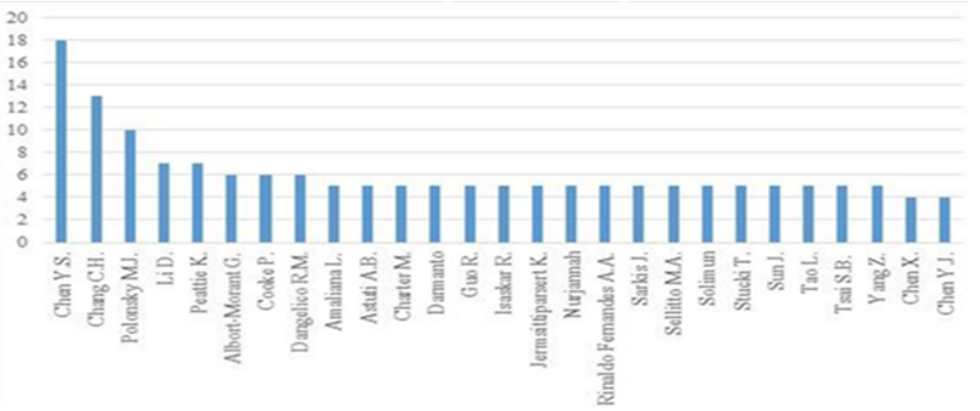
Green competitiveness and different fields embedded in it. Source: authors disclosed the details by research from Scopus database



Green competitiveness and different fields embedded in it. Source: authors disclosed the details by research from the Scopus database Cross-country analysis shows United States, China, India and the United Kingdom have become a research hub in the world regarding research reliability (Fig. 4).

Figure 4

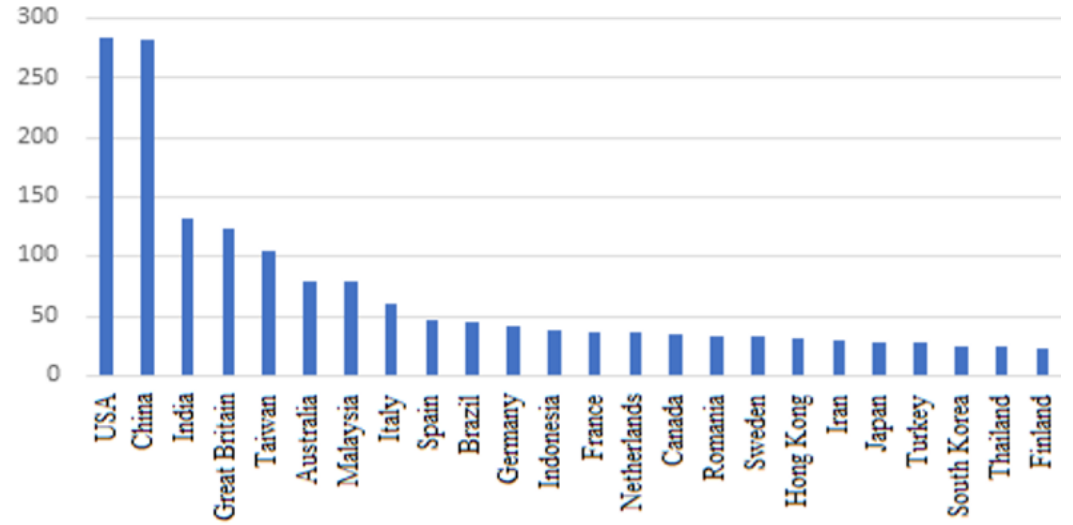
Green competitiveness along with cross border affiliates.



Consequently, being such a magnificent topic of green competitiveness, a considerable amount of research has been credited to that one. Namely, starting from a series of analyzing the names and roles of how green products are perceived, till how they prove to be helpful to assess and curb out environmental risk, ultimately staying at boosted up green confidence. Huge innovative research is being carried out on the topics of green organizational identity of companies, how to develop and utilize proactive and reactive innovations, and methods how to expand and diversify the market for green certificates(Li, Zheng et al. 2017, Zhang, Cao et al. 2019). Worth noting has been a contribution of how scientific publications prove to be backbone supportive in emerging and developing sectoral aspects on a highway to promote green marketing.

Figure 5

A descriptive picture of how great scientists engraved great hallmarks in the enlightened field of green competitiveness have been designed



A descriptive picture of how great scientists engraved great hallmarks in the enlightened field of green competitiveness have been designed in Figure 5 which discloses the ultimate reality that how magnificently a group of scientist at Harbin University (China)(Zhang, Liang et al. 2020, Zhao, Zhang et al. 2020) goes on unveiling new mega horizons on the philosophical shore of promoting and enhancing green innovative concept, within the bounds of mega green competitiveness development. A thorough analysis of unimaginable hard work and research composed and presented by scholars (Fig. 5) revealed the fact that matchless contributions from Taiwanese scientists led to occupying top positions in relevant fields of research (Chen, Huang et al. 2019, Chen, Liao et al. 2019). Australia stables its position in third place. To be a perfect one in forming a strong and firm methodological background base and strengthening the chosen topic by concreting its theoretical foundations, thus studying priceless features from great publications stands out to be inevitable. To boost the potential worth and vitality regarding the importance of research, it becomes even more crucial and necessary to analyze the journals capturing the top 5 ranks, encompassing a brightened universe of scientific articles published on developing environmental marketing and gearing up green competitive efforts (Table 1).

Table 1

An arranged list of top productive scientific journals ranked on the basis of articles published on green competitive concept. articles on the green competitiveness topic

Sr.	Journal Title	Cite Score 2018	SJR 2018	SNIP 2018	No. of Articles
1	Journal of Cleaner Production	732	1620	2308	78
2	Sustainability	301	0549	1169	78
3	Business Strategy and the Environment	793	2166	2488	47
4	Journal of Business Ethics	446	1860	2006	21
5	Journal of Consumer Marketing	217	0653	0967	18
6	Top Conference Series Earth and Environmental Science	044	0170	0536	17
7	Journal of Business Research	532	1684	1920	17
8	Advance Materials Research	008	0121	0179	13
9	Marketing Intelligence and Planning	249	0580	1033	13
10	International Journal of Consumer Studies	211	0595	0973	11

Source: data arranged by authors, from record provided by Scopus database.

Therefore, the widespread scope of study encompassing a list of top-ranked journals with Cleaner Production topping the list, Sustainability arising right next to it, Business Strategy taking next place and the Environment capturing the fourth place in the list, etc. have been analyzed to validate a firm basis for research outcomes. Above illustrated journals dominate the market by possessing high citation rates and thus on the top of demand by the scientific community. If rated on the basis of a mega blend of two characteristics (including a number of articles along with journals being rated), this would be rightly to undergo a statement that the ones possessing the most influence when judged from a dimension of how many published articles are envigored on green competitiveness, this stands out to be Journal of Cleaner Production, Sustainability. While undergoing a deep analysis into top quality productive universities keeping tiger eye on relevant topics, it was revealed that kingship on the list is decorated with the name of Chinese scientific institutions paving and smoothening the most influential supportive highway for proactive and top quality productive record in publishing, and the list is thus enriched in following fashion with China Science Foundation (CSF) crowning the list, Fundamental Science Funds of Central Universities right next to the CSF, Humanities and Social Science Foundation of the Ministry of Education of China marks third place, Doctoral Science Foundation embraces fourth rank, National Aerospace Science Foundation comes next (Table 2).

Table 2

Universities ranked on the basis of validating the number of most concrete articles published on studying green competitiveness

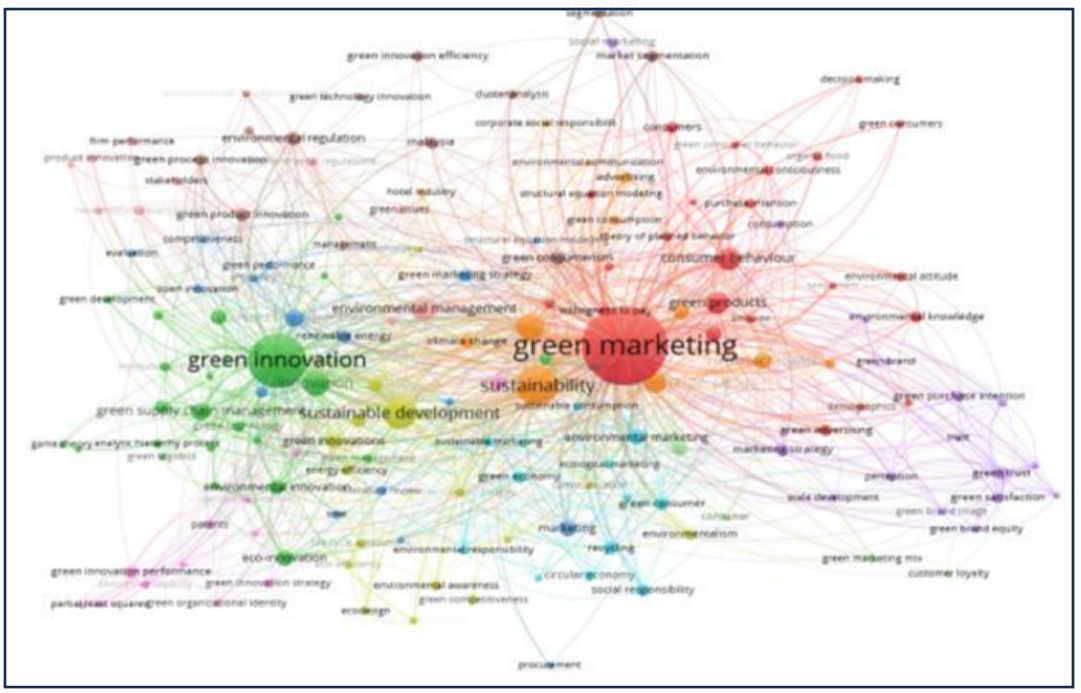
Sr.	Scientific Institution	Country	Number of Publications
1	Natural Sciences Foundations	China	85
2	Fundamental Research funds of Central Universities	China	19
3	Humanitarian and Social Sciences Foundation of the Ministry of Education	China	14
4	Doctoral Research Foundation	China	11
5	National Aerospace Science Foundation	China	11

Source: enlisted by authors with assistance knowledge material from Scopus database

Thus, the enchanting charm of most cited publications finds its roots in the restless efforts of Chinese scientific institutions producing top-level scientists. With the immediate and ultimate help of the VOS viewer application, the research accomplished its objectives by thoroughly undergoing and unveiling what could have been the link between green competitive philosophy and its relevant embedded concepts, a deep analytical insight into the research being explored from a thematic conceptual view, and the possession of publication on the basis of authorship. The corresponding program envigored the struggle of our research and we have been able to successfully carry out analysis of disclosing different vector dimensions of scientific papers, thus devising a vast sketch of terminological mapping based on configuring the joint appearance of different terminologies with annotations also being included. The complex schedule of nurturing the analysis of determining cluster system of scientific publications has led to the unveiling of the mighty pandora box in the philosophical world of green competitiveness (Fig. 6).

Figure 6

Terminology map of the most common categories in publications on green competitiveness Source: composed by the authors using VOSviewer 1.6.13



Thus, the main components to enrich the first mega "Red" cluster with their magnificent existence and performance, when showing the dominancy of environmental marketing includes the following concepts: "marketing strategies to help in greening the society, entertaining the consumer in green way philosophy, building up the circular economy, producing and running a developed society in a green environmental friendly manner, embedding green features to the advanced technology, ensuring that renewable energy could be made green in every possible way, policies to regulate and innovate the environment must be implemented, bringing about corporate social responsibility, the supply chain should be empowered with green measures to adopt, reshaping the behaviour of diverse consumers to go in line with green society concept, green goods made and encouraged to be sold, and innovative measures and techniques flourished while implementing marketing strategies".

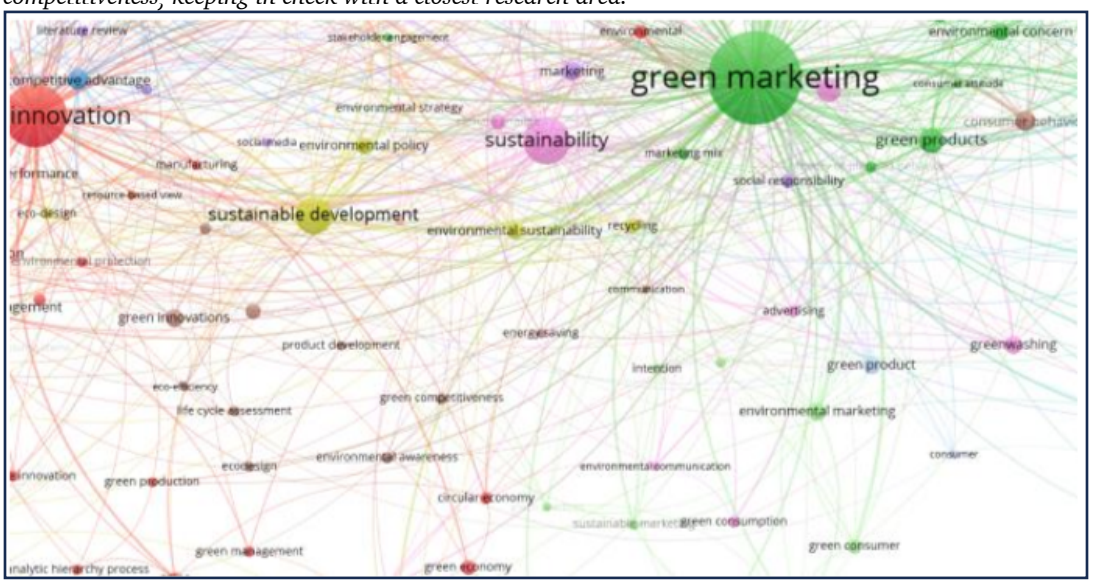
The mega blend of some multi phenomena scenario embedded in the nemesis of a splendid second magical cluster, when being affiliated with the category of green innovation, enlists concepts as appearing right below: " green innovative policies launched efficiently, ensuring sustainable corporations, continuous recycling, supply chain being crowned with green adaptive actions, efficient sources of energy being revitalized, implementing environmental regulation, achieving efficiency in the greening of products, positive change in climate being stable and green".

The third cluster encompassing a mega concept of sustainable development is composed of the following categories: "environment, managing innovation, a balanced demand going green, maintaining the healthy level in consumption of ecological treasured components, green economy, bringing competitive edge to environmentally friendly green level, launching environmental campaigns to spread out noble cause of awareness in society, producing individuals to bring about green environment in a responsible manner", etc. Even a minimal line of demarcation could hardly be established among the three clusters since they have been most close and interrelated. The philosophical regime of relationships based on different clusters and their respective determinants is destined and decided on the basis of where the location of a specific primary cluster has been marked up. Being an integral component of green marketing, green competitiveness thus ensures and determines how well green innovative programs have been implemented in society.

Besides, the visualized results place a milestone of markup on day-light vividly evident fact that green marketing has been a subject of keen study by most of the authors. Illustrating some phenomena about the relevant fields, maintaining a competitive green economy of scale, keeping in line with spreading messages about environmental issues and enlightening their awareness, environmental responsibility appears to be in the top array of research. An illustration of a relationship among magnificent categories of green competitiveness, marketing in a green manner and eco-innovation is explained in Figure 7.

Figure 7

Visual mapping illustration about scientific publications and their respective citations regarding green competitiveness, keeping in check with a closest research area.

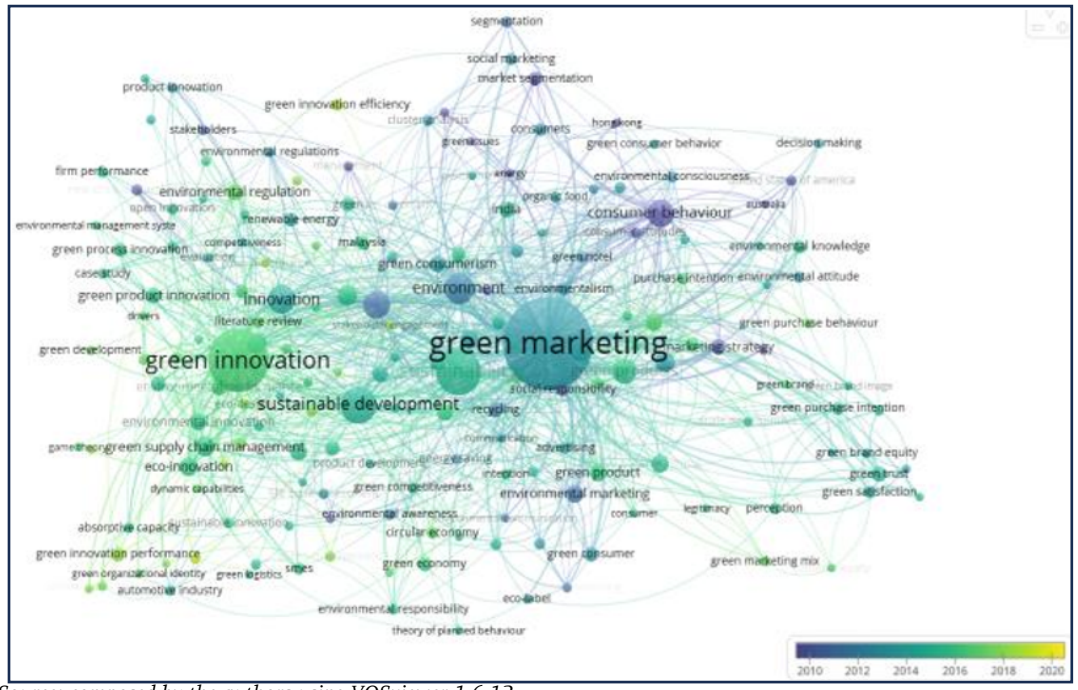


Source: composed by the authors using VOSviewer 1.6.13

Besides, the advanced feature of VOSviewer software proves to be a milestone towards displaying the time-line about the boom of visibility and appearance of studied categories, which obviously witnesses to have been prevailing as more common enlisted publications being welcomed from Scopus database (Fig. 8). Thus, a blue colour approximation would lead as a dominant mark of "maturity" of publication and a yellow colour mark would definitely label a badge of more ‘‘modernity’’ to the scientific articles. After analyzing a thorough framework regarding a consequently exploratory picture of visualizing the time horizon along with a fluent work to actualize the core key categories enacted by the green competitiveness, a conclusion about the enlisted scenario has been drawn that the horizon of focus of firstly studies was concreted around the topic being the enchanting green marketing regime, and then a phenomenal shift towards a productive empire of keeping a green society as innovative. Within the same time span of history, ample evidence of the publications serving as scientific work for green competitiveness occupied a timeline of the year 2017.

Figure 8

Categories devised in a terminological map, persisting to be most frequently prevailing in publication about green competitiveness, occupying a time range of 2010 to 2019

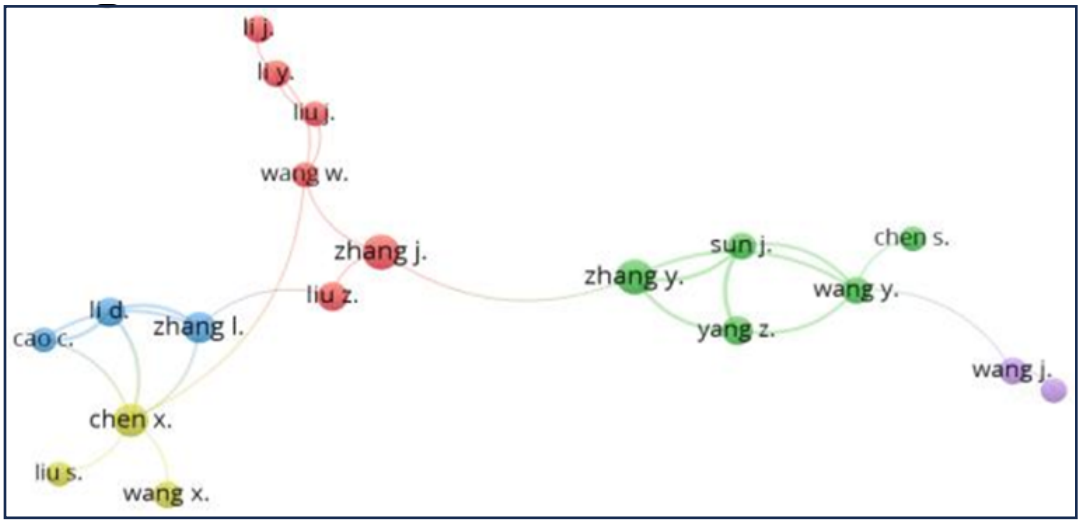


Source: composed by the authors using VOSviewer 1.6.13

Just right at the moment of summing up the potential at the same time, visualizing the terminology map proves to be helpful toward finding out and exploring the citations featured in the scientific publications in the relevant field. Figure 9 is a whole illustrative complementary picture of five clusters. The wholesome process to sum up the most cited authors accredited to the first cluster, recording the authors' names coming from the National University of Taipei (Taiwan) – Chen Y, a marvellous work done by his great serving scientific publications(Chen, Lin et al. 2015, Chen, Chang et al. 2016) lead as a guiding pillar to addressing the issues of environmentally friendly consumer behaviour, as well as maintaining trustworthy environmental cause along with aligning management of brand to utmost green standards.

Figure 9

Visualisation of the network of the most cited scientists in the field of green competitiveness



Source: composed by the authors using VOSviewer 1.6.13

the second cluster registers a kingship as the most cited author to Li D. serving the Central Southern University (China), and his restless efforts in the form of research papers(Li, Zheng et al. 2017, Zhang, Cao et al. 2019) certainly contribute to green innovations and providing with a scientific base for how to assess profitability for corporations. The third cluster clearly illustrates the wisdom of Zhang D. in the form of scientific articles(Zhang, Liang et al. 2020, Zhao, Zhang et al. 2020) that guide towards how to maintain and regulate green innovation at its best, as well as assessing what could have been the dark side, proving to be disastrous phase of green consumer integration. The scientific works and achievements of scientist Chen S. (Chen, Huang et al. 2019, Chen, Liao et al. 2019) belonging to the International Finance Institute of Guangzhou University (China) dominate the landscape of the fourth cluster, which focuses on financing green innovations. The fifth cluster stands as a living example of relentless efforts by the author Wang D. who devoted his work (Han, Lin et al. 2019) to determining how companies can increase productivity by launching green marketing programs.

Conclusion

Thus, after being able to accomplish a thorough fully concentrated study of the most cited works along with their content analysis, and after generalizing the results, the authors reach the following threshold of conclusion with the help of data processed by VOSviewer 1.6.13. The observed trend, witnessed from carefully analyzing and interpreting the publications generated on green competitiveness, strengthen its roots to conform to the cross-sector potential and capacity of multidisciplinary nature envisaged in the plethora of existing research. The rigorous and pivotal category paves the way to enlighten some precious points regarding the revitalization of environmental marketing, innovative green measures adopted along with sustainable long-term development. Besides, the authors also kept abreast of some core concepts related to fields and philosophies of behavioural economics, building up green trust on an ecological basis, how to empower socially responsible empire, attaining mixed marketing, provoking stakeholder theory to positive climax, focusing on cycle theory, and much more. The current five years have led to a vital upsurge and boost to research within the bounds of magical green competitiveness. Thus, present research can better explain and witness the increasing demand for dynamics to be explored in this field. In congruency with the above-illustrated

phenomenon, the green marketing horizon invites to be explored through some more intensive insights using some relevant affiliated fields as being supportive, namely digital and social marketing, development of socially organized networks, making full potential of stakeholder theories, keeping environmental management and maintaining full audit, managing and influencing the information and also designing Internet technologies. The heightened surge in the frequency of geographical affiliation certainly speaks about a piece of transparent and purified information and research invested in green competitiveness being carried out so intensively in scientific institutions in China.

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