Special Journal of Engineering, Physics & Math's /Statistics

Development and sustainability: the role of Engineering, Physics, Mathematics and Statistics Research

Scientific and Technical Advisory Council (STAC), of the Special Journals Publisher (SJP)

****

Citation:
Scientific and Technical Advisory Council (STAC) of the Special Journals Publisher (SJP): Development and Sustainability: the role of Engineering Physics, Mathematics, and Statistics, research. Special Journal of Engineering, Physics, Mathematics, and Statistics [SJ-EPM], 2020; 1 (1):1-21

Correspondence: editorialoffice@spparenet.org

****

Background

While there is no universal way of defining development, critical review of most definitions seems to tilt towards the fact that any process that leads to growth, progress, or change in physical, economic, environmental, and social components of a system may be taken as development (1). On the other hand, the ability to maintain or keep this growth, progress, or change continually both for today and for the future may be seen as sustainability (2). Development and sustainability, therefore, deal with any process that leads to a significantly measurable outcome in the growth, progress, and change of physical, economic, environmental, and social components of a system. Such change should provide our needs today without disturbing the ability of our children tomorrow to meet their own needs (3). A good Engineering, Physics, Mathematics, and Statistics research database provides information that can impact the achievement of this goal through Good disease management prevention and control.

The United Nations Development goals

The United nation' suggestions about sustainable development goals are the most popular pendulum on which most if not all discussions about sustainable development swing around probably because the evidence and significance of the suggested development goals are so overwhelming. The interconnectivity of the issues raised by the 17 United Nations development goals is so amazing and realistic that one wonders what the world would look like when these goals are achieved in the long run (4). This is because a society devoid of lack and starvation, in which the citizens are relatively in good health with some levels of education for everyone and with no discrimination, and no inequalities would be a great and appealing society.

Examples of sustainable development research areas

Engineering, Physics, Mathematics and Statistics research will provide the knowledge of host response to the use of high-quality drugs, to improve the quality of human resources for health that will join forces to make available clean water, clean energy, sanitation, education, good skills to impact the industry and infrastructure for sustainable cities and communities (5). Engineering, Physics, Mathematics, and Statistics research also encourages judicious use and re-use of natural resources through the elucidation of human and animal response to the exploration and recycling benefits derived from the environment including resources below water and land (6). Climate action and its influence on natural resources and the ecosystem is a threat to Engineering, Physics, Mathematics, and Statistics research, and understanding how we manage it will impact health security and safety both for us and for the future generation (7). Engineering, Physics, Mathematics, and Statistics research can impact the health status of the societies and a healthy society can be strong to talk about the partnership for Peace Justice, and strong institution, as a necessary panacea for war, conflicts instability, animosity, acrimony, and global confusion all of which militate against development and sustainability

Rationale

Engineering, Physics, Mathematics, and Statistics Research can play a central underpinning role in answering sustainable development research questions (8) that will invariably enhance our abilities to identify, harness, and utilize natural resources to our benefit. Engineering, Physics, Mathematics, and Statistics Research can also provide reliable and verifiable information that can impact interventions that will better the lives of people. Engineering, Physics, Mathematics, and Statistics Research-based information is reliable because the research question and research process are detailed and standardized and can be verified. (9)

Objective

In this 3-decade retrospective review of published papers that deals with development and sustainability, the role and contribution of Engineering, Physics, Mathematics, and Statistics research in development and sustainability is fully discussed

Materials and Methods

In this retrospective cross-sectional Engineering, Physics, Mathematics, and Statistics research, 346 published full-length original papers, were downloaded and perused including published addendum, corrections, editorials, abstracts of meetings, conference proceedings, and review article, on the general concept of development and sustainability. This searching and corresponding download of relevant papers were made from a globally recognized research-based data repository that included but not limited to the Web of Science (WoS) (10) core collection database on the nineteens of July 2020 at about 10.25 GMT+2). The database of PubMed, Research Gate, and Google scholars was perused to be sure no new documents relevant and necessary for this study were missed out. However, the web of science formed the major and reference database for this study because our software was more compatible to recovered data encoded in the web of science database while other databases consulted served to provide other relevant articles, we considered imported but probably missing in the web of science.

Boolean topic search approach

The Boolean topic search approach (11) used included "(development * AND sustainability$) OR (Sustainability of * AND development$) to encompass all relevant and available documents (12) on the subject of development and sustainability between 1990 and 2019. At the time of this study, we judged that the Web of Science Core Collection database had enough user-friendly and accessible academic research database relatively covering enough journals, books, conferences as well as millions of records from clarivate.libguides.com (references). To ensure the inclusion of abbreviated or shorten words, the wildcard * and $ were added to the end of the search algorithms. Thereafter, all documents that meet the eligibility criteria of sustainable development were retrieved and exported into BibTex file format and the authors, titles, abstracts mined in PDF file format.

Data analysis

All the bibliometric variables were retrieved filtered and normalized for quality control. The results were analyzed in a bibliophily plugin package of the 3.5.1 version of R-studio software, while the codes and commands were adopted from Https://www.bibliometrics.org to evaluate the bibliometrics indices. Tables and graph were made in Microsoft excel 16 version and network maps were visualized in 1,6 Vox-viewer software

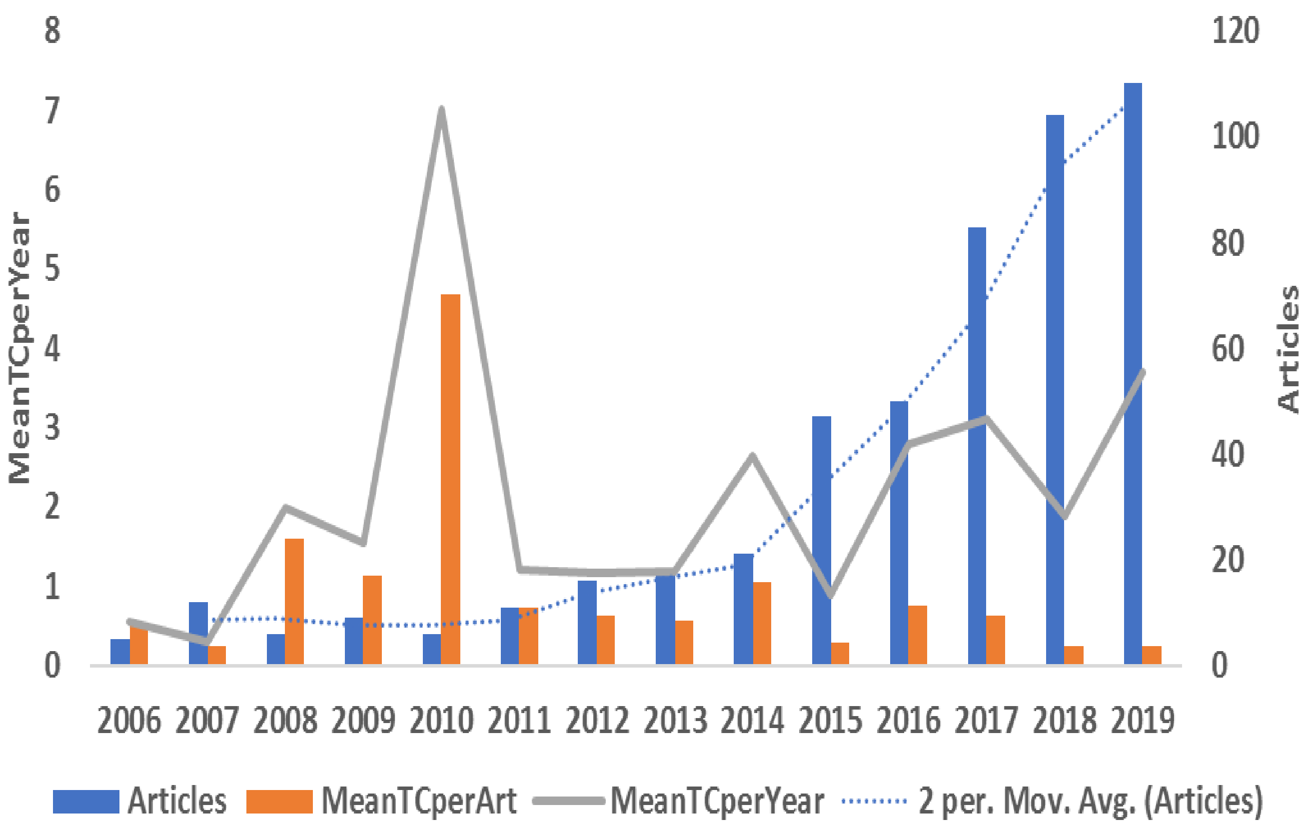
Results

In this Engineering, Physics, Mathematics, and Statistics research, 346 papers written by 1502 authors over three decades were recovered, perused, and analyzed as shown in table 1 below. Ninety-seven (97) documents were written by 95 authors while 1407 authors wrote 1407, multi-author documents giving 3.52 collaborative index and authors and co-authors per documents indexes of 3.02 and 3.15 respectively. Ninety-four proceedings papers, three of them were originally presented as journal articles while 25 were review articles and 14 articles were Editorial documents.

Table 1 Descriptive characteristics of extracted documents

Authors	1502
Author Appearances	1565
Authors of single-authored documents	95

Authors of multi-authored documents	1407
Single-authored documents	97
Documents per Author	0.331
Authors per Document	3.02
Co-Authors per Documents	3.15
Collaboration Index	3.52
Document types	
ARTICLE	346
ARTICLE; BOOK CHAPTER	1
ARTICLE; PROCEEDINGS PAPER	3
BOOK REVIEW	6
CORRECTION	6
EDITORIAL MATERIAL	14
LETTER	2
MEETING ABSTRACT	2
PROCEEDINGS PAPER	91
REVIEW	25
REVIEW; BOOK CHAPTER	1



Mean TC/Article = Mean Total Citation per articles, Mean TC/year =Mean Total citations per year,

Figure 1: Yearly distribution of article productions and citations concerning Engineering, Physics, Mathematics and Statistics **Research**

In the yearly distribution of articles written and cited during the studied period (Figure 1), it was observed that the mean total citation of articles was highest in 2010, followed by 2008, and then 2008 and 2014 respectively. An upward trend was seen in articles publication from 2014 to 2019 while publication staggered between 2006 and 20212.

Table 1: **For authors keywords and keywords plus in** Engineering, Physics, Mathematics and Statistics **Research**

Keywords plus	Occurrences		Author keywords	Occurrences
management	31		sustainability	126
framework	29		sustainable development	77
systems	24		environment	16
indicators	23		development	15
model	22		sustainability assessment	13
impact	20		china	12
performance	18		sustainable development goals	12
governance	17		climate change	11
knowledge	16		environmental sustainability	10
energy	15		indicators	10
climate change	14		higher education	9
policy	13		rural development	9
life cycle assessment	11		economic development	8
conservation	10		education for sustainable development	8
education	10		SDGs	7
cities	9		social sustainability	7
future	9		education for sustainability	6
impacts	9		community	5
innovation	9		education	5
strategy	9		governance	5

In the web of science, the term keywords plus appear to depict terminologies or phrases that regularly show in the titles of a paper's references, and may however not be seen in the title of the manuscripts in question. Authors' keywords show terms that authors prudently selected during manuscript development that they know or think most accurately represent their papers. The most common author's keywords terms in this study are 'Sustainability' which appeared 126 times followed by "sustainable development" which occurred 77 times, followed by environment and development that occurred 16 and 15 times respectively. Other keywords appeared in different decreasing order as shown in table 2 above. In the keywords plus section, management, framework, and systems were the terms that occurred 31, 29, and 24 times in decreasing order.

The keyword plus and authors' keywords show the trend and direction of research going on in the past three decades covered by this study.

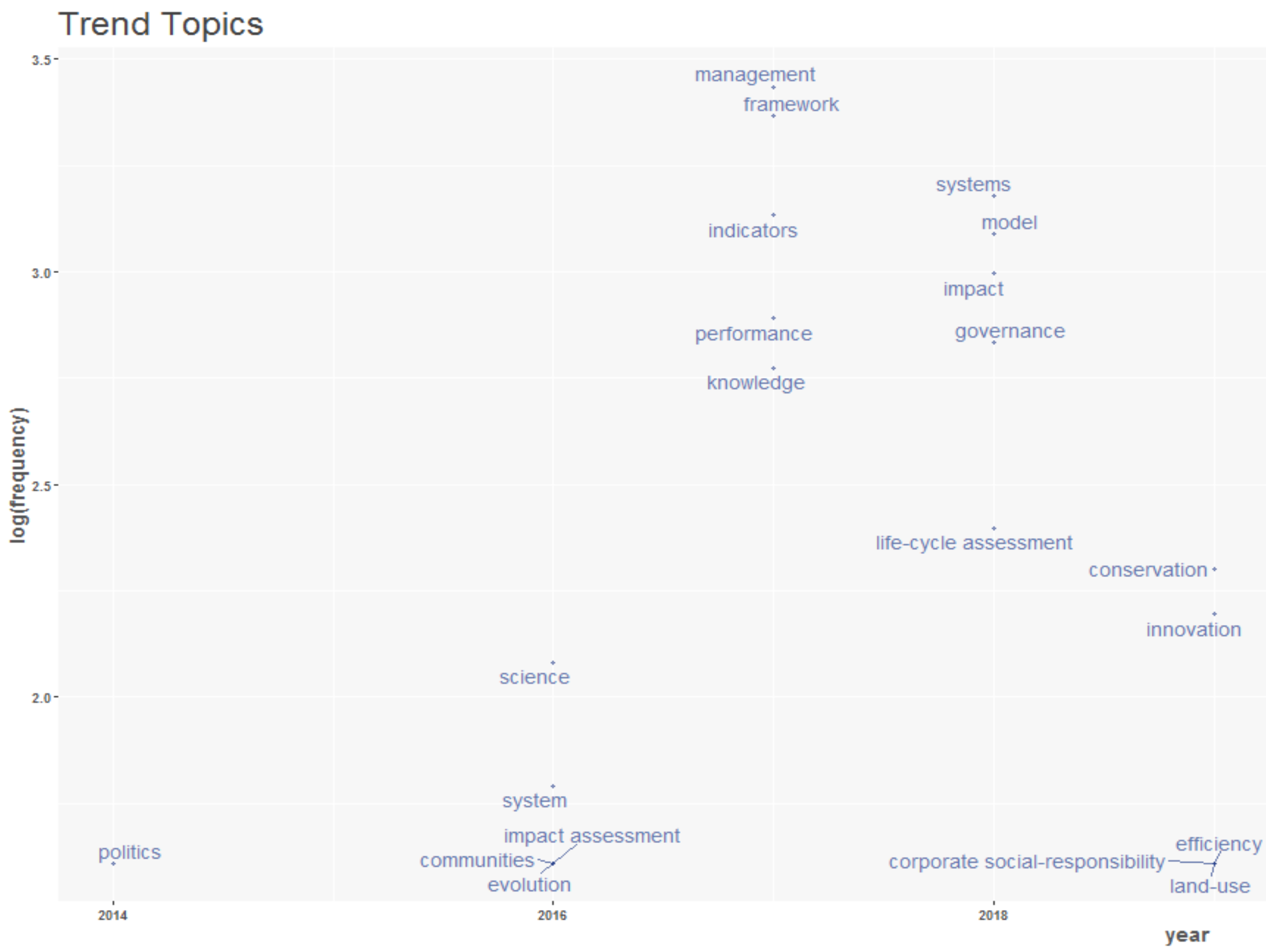


Figure 2: Topic trends associated with Engineering, Physics, Mathematics and Statistics **Research**

Figure 2, shows a log scale over a year to explain the trends of topics used in the research of development and sustainability, over 3 decades. Politics was the only word used in 2014. In 2016, topic usage increased in logarithmic proportion, with the addition of evolution, communities, impact assessment, systems, and science to politics. In 2017, knowledge, performance, indicators, framework, and management were added to the topic bank used. In 2018 topic bank swelled by the use of corporate social responsibility, efficiency, land use, life cycle assessment, governance, impact, models, and systems in increasing logarithmic proportion.

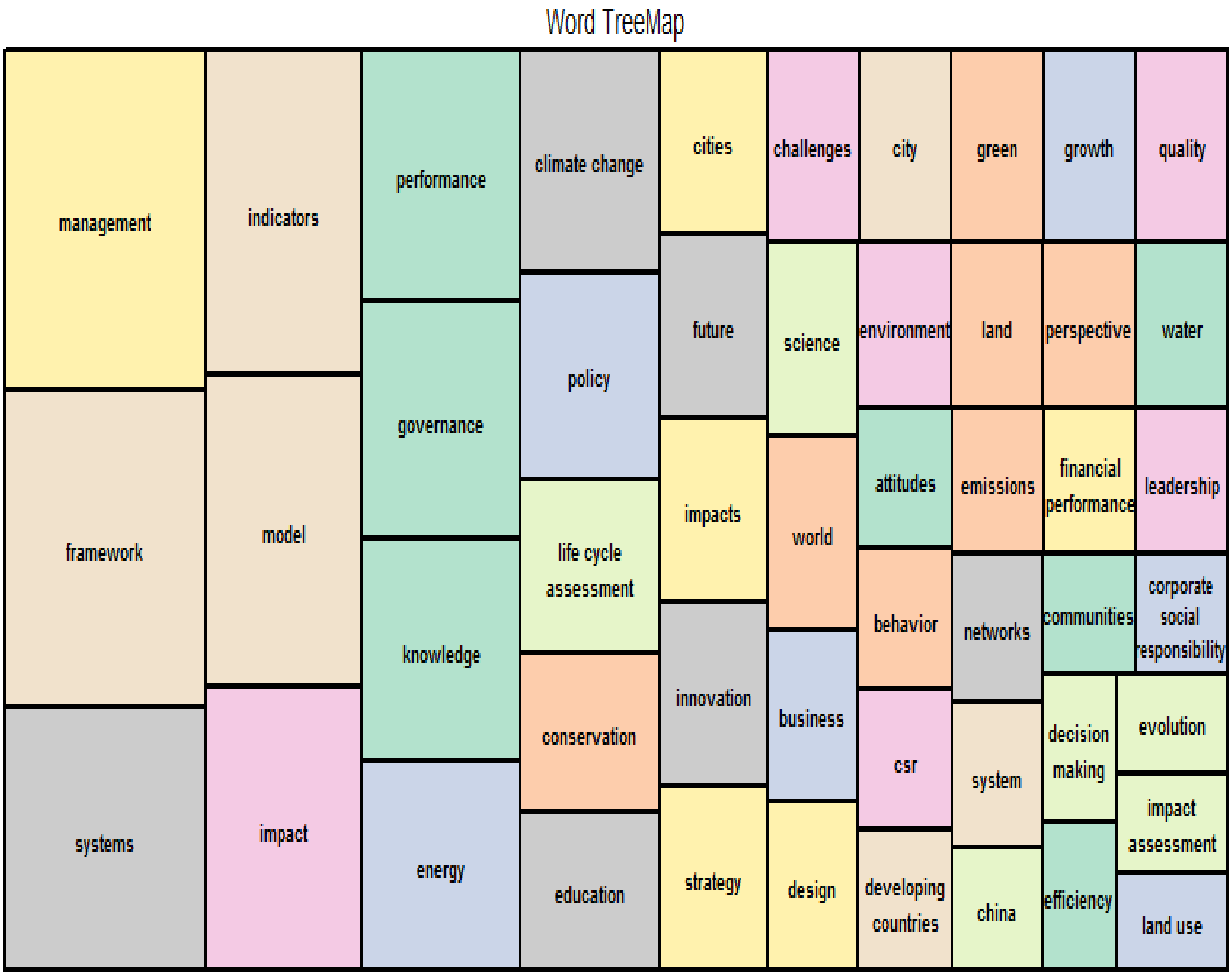


Figure 3: Word treemap of the development and sustainability in Engineering, Physics, Mathematics and Statistics **Research**

The above word treemap was used to look at the ranked structure of a Tree Diagram and at the same time showing the value of each category through area size. Each category is assigned a rectangle area with their subcategory rectangles nested beside it according to the size. All quantities assigned to a category have their area size displayed in proportion to that quantity and the other quantities within the same parent category in a part-to-whole relationship.

Also, the area size of the parent category is the total of its subcategories. All subcategories with no assigned quantities have their areas being divided equally amongst the other subcategories within their parent category. However, in Fig 3 all categories are assigned. The way rectangles are divided and ordered into sub-rectangles is dependent on the tiling algorithm used. Many tiling algorithms have been developed, but the "square' algorithm" which keeps each rectangle as square as possible is the one commonly used.

In fig 3, **Framework** is the highest with subcategories of model and indicators next in rank followed by city and developing countries and finally by the system. **The management** category was followed in rank by cities, impact, and strategy, and next in rank was design and finally by financial performance. The next category was **impacts** followed in rank by challenges followed by environment and followed by quantity and leadership. The next is **systems** followed by a subcategory of **climate change and education,** and then by future and innovations respectively. Performance, Knowledge, and governance are the next categories followed by attitudes; communities and efficiencies, and water. Again, **Energy, policy, business, growth, corporate responsibility,** and **land use** all follow each other in decreasing order or ranks as shown in fig 3. The way rectangles are divided and ordered into sub-rectangles is dependent on the tiling algorithm used. Many tiling algorithms have been developed, but the "qualified algorithm" which keeps each rectangle as square as possible is the one commonly used.

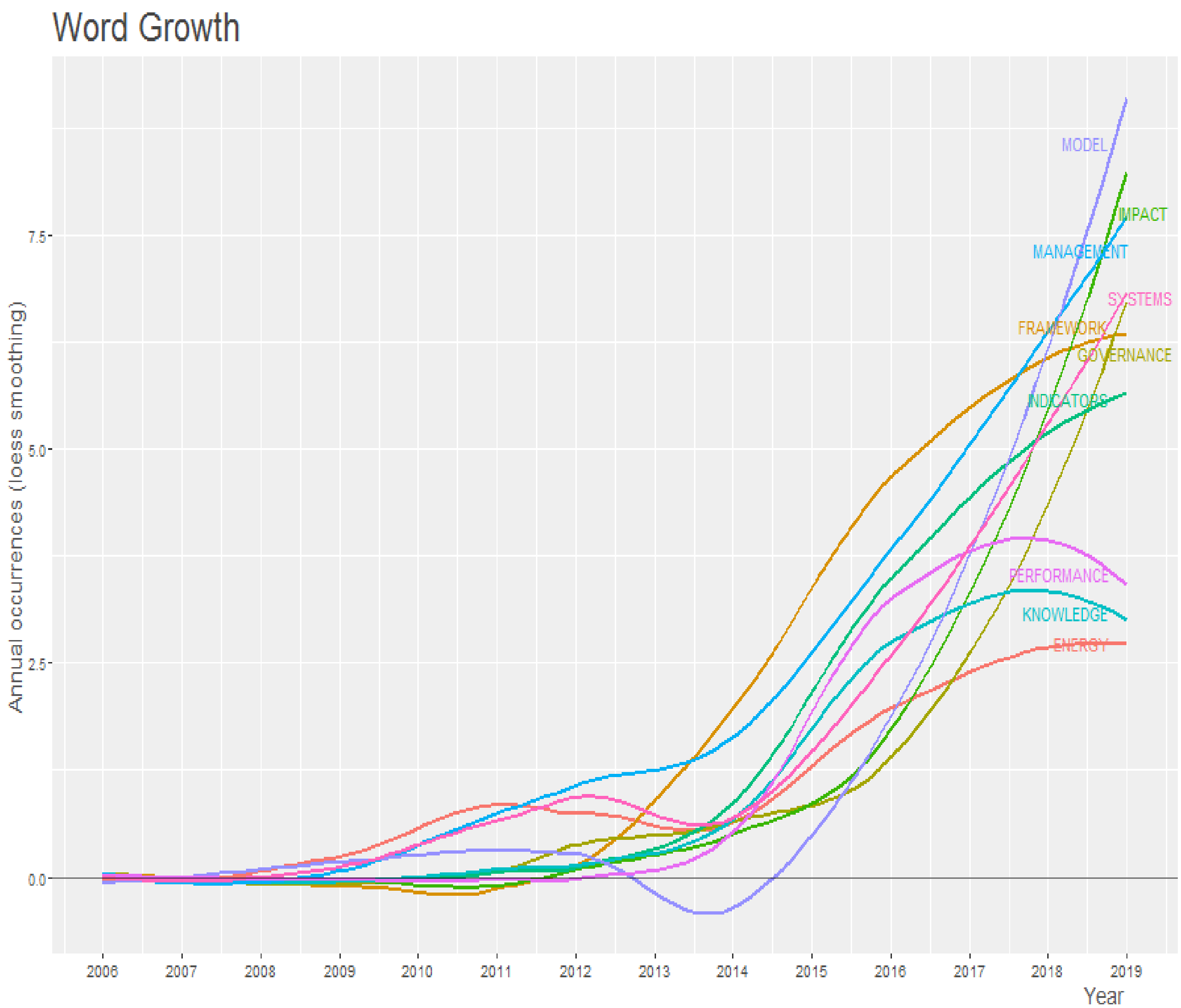


Fig 4. Word growth graph in Engineering, Physics, Mathematics and Statistics **Research**

Word growth graph showing the trend of usage of the words in various studies over time. The following words stood out as most prevalent in the studies covered. The words are Model, impact, management, systems, framework, governance, indicators, performance, knowledge, energy respectively. The use of the words in the covered research all had a steep logarithmic rise between 2013 and 2017 whereas model, impact, and management topped the list while performance, knowledge, and energy were least in occurrence as shown in Fig 4.

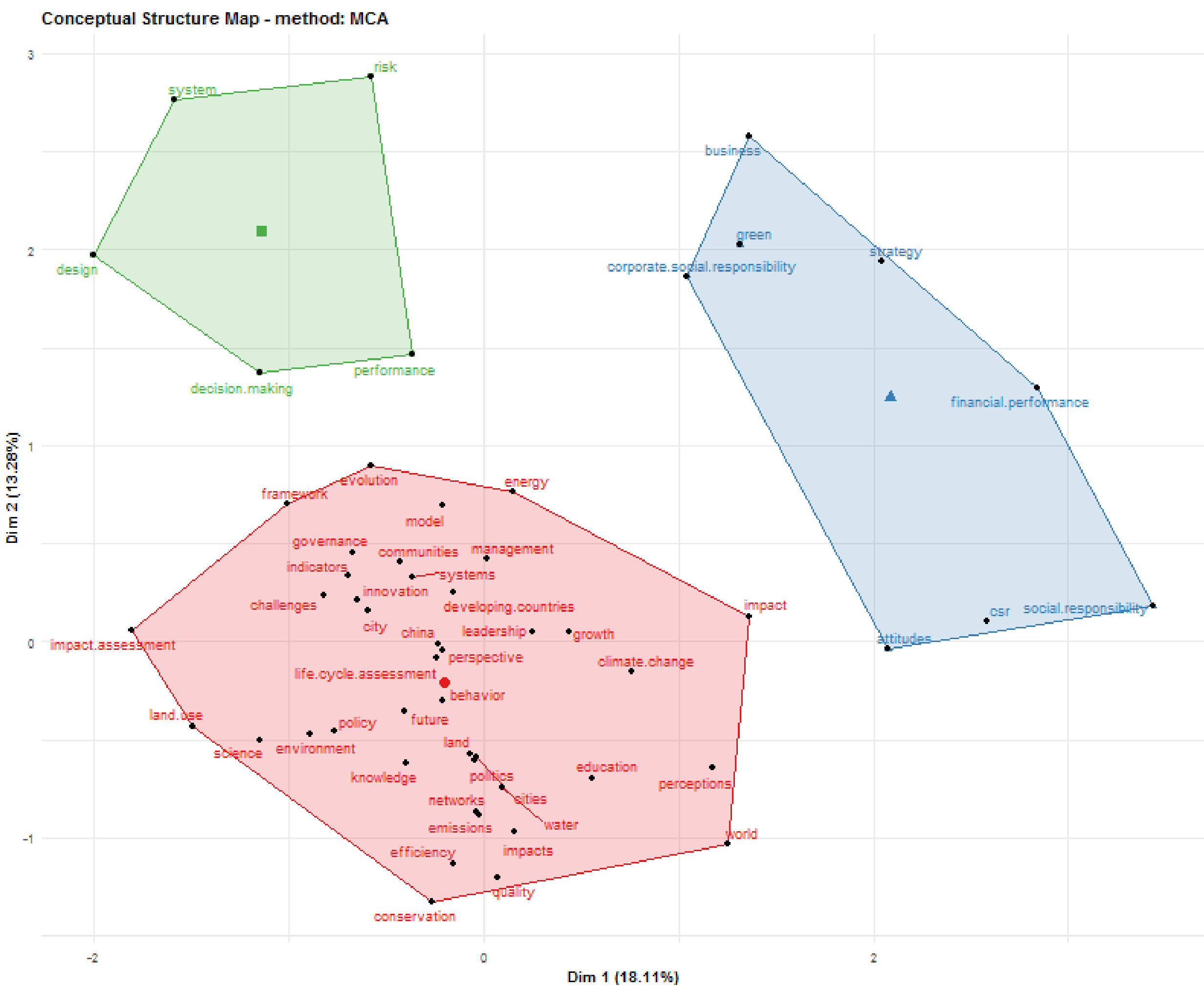


Fig 5: Conceptual Structure map using Multiple Correspondence Analysis in Engineering, Physics, Mathematics and Statistics **Research**

Figure 5 shows the 3 different clusters of development and sustainability categories and the corresponding variables. There are also the vertical and horizontal dimensions of the multiple comparison analysis used to analyze the conceptual structure map above. The interpretation of category points is guided by the centroid principle whereby the category coordinates are the weighted average of coordinates clustering around that category. Thus, the interpretation takes its bearing from the central topic (development and sustainability) which is the category and located at the zero coordinate while the variables are clustered around the categories.

For the horizontal category, the left side has no sustainability and development while the right side has sustainability and development. For the vertical dimension, the upper side has strong sustainability and development while the lower side has week sustainability and development. The father the variables are clustered away from the category the more they are decimated from the categories while the closer the variables are clustered away from the categories the less the discrimination and the more the association of the variables with the categories.

In Fig 5, the sustainability and development category are clustered in three different locations with associated variables depicting the strength and weakness of associations as well as the magnitude or severity of the category being studied. The green cluster depicts strong sustainability and development that is well discriminated by its associated variables (system, risk, performance, decision making, and design. The second blue cluster depicts very strong and better sustainability and development that is very well discriminated by its associated variables (business strategy, financial performance, social and cooperate responsibilities, and attitudes)

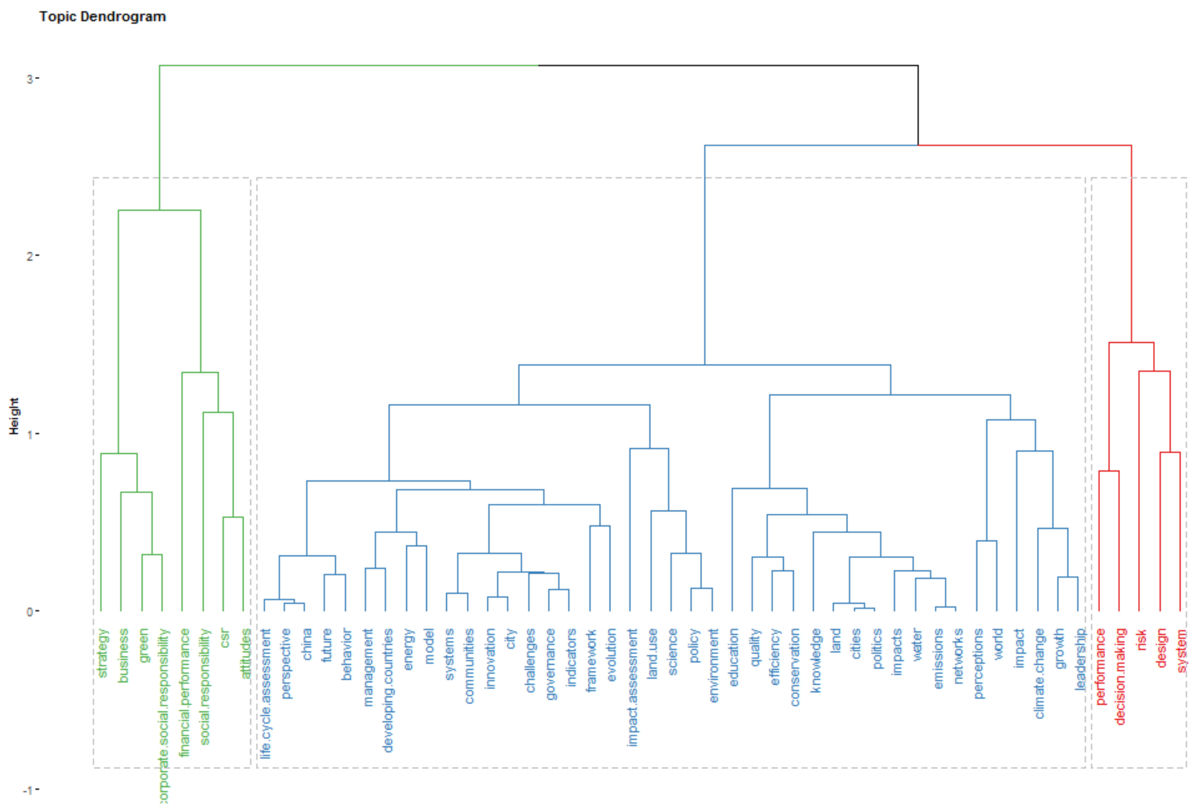


Figure 6 Dendrogram representing the key terminologies in Engineering, Physics, Mathematics and Statistics **Research**

Figure 6 is a **dendrogram** that **shows** the hierarchical relationship between clades (category) and variables (leaves}. It is most commonly created as an output from hierarchical clustering with its main use being to find the best way to allocate variables to clusters. The clades of the clusters or the category are arranged according to how similar (or dissimilar) they are to each other and other clusters. Clades that are close to the same height are similar to each other; clades with different heights have some kind of dissimilarity — **the greater the height difference, the more dissimilarity** (measure using Pearson's Correlation Coefficient). Social responsibility, cooperate social responsibility, and financial performance different from each other because the length of the branches is different in Hight. Perspective and china, behavior and future, developing countries and management, model and energy, innovation and city, policy and environment, framework and evolution, and more are similar to each other because their branch height is of similar length. All these are variables that cluster around the sustainability and development categories.

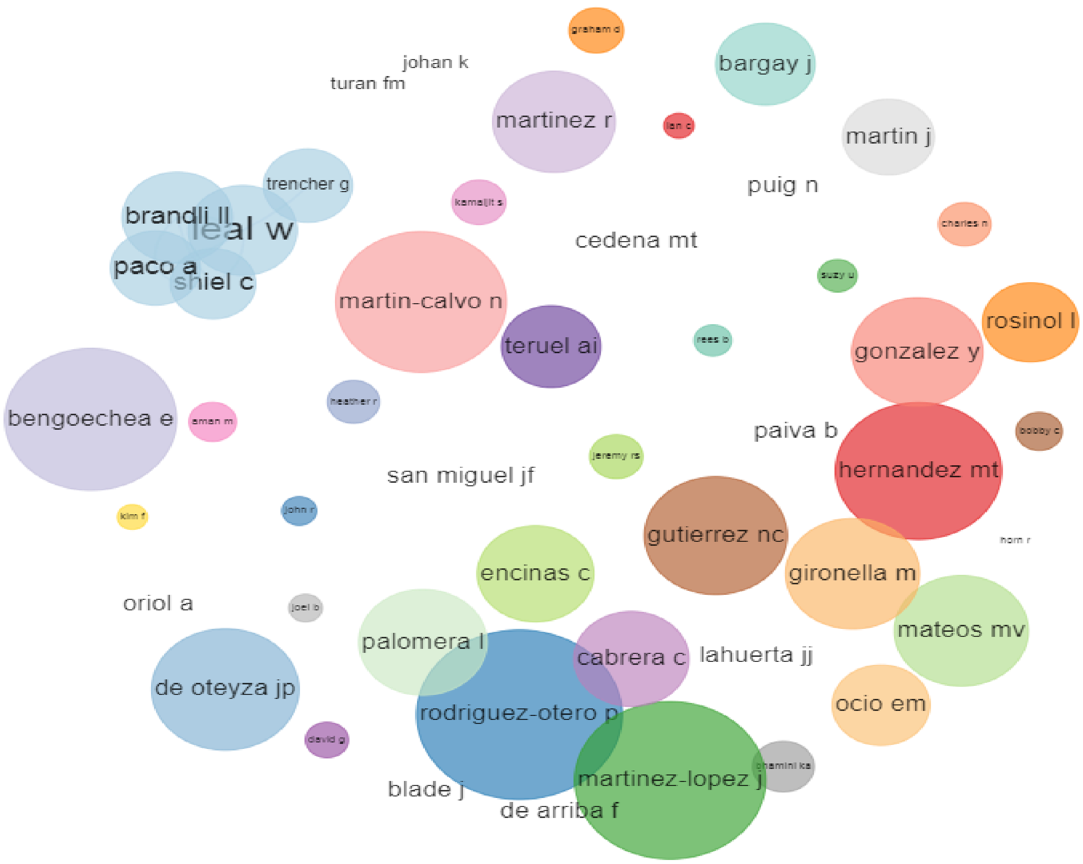


Figure 7. Topmost Authors collaboration networks in Engineering, Physics, Mathematics and Statistics **Research**

Fig 7 depicts 30 topmost authors collaboration networks. It should be noted that the circles represent authors and the close the circles the more likely there may have a collaboration network and collaboration should be represented by connecting lines. Generally, figure 6 shows that there was no significant collaboration as the circles are mainly far apart from each other with no connecting lines. Instead, there was some cooccurrence each time the circles coincided with each other. There was no collaboration but there were merely cooccurrence

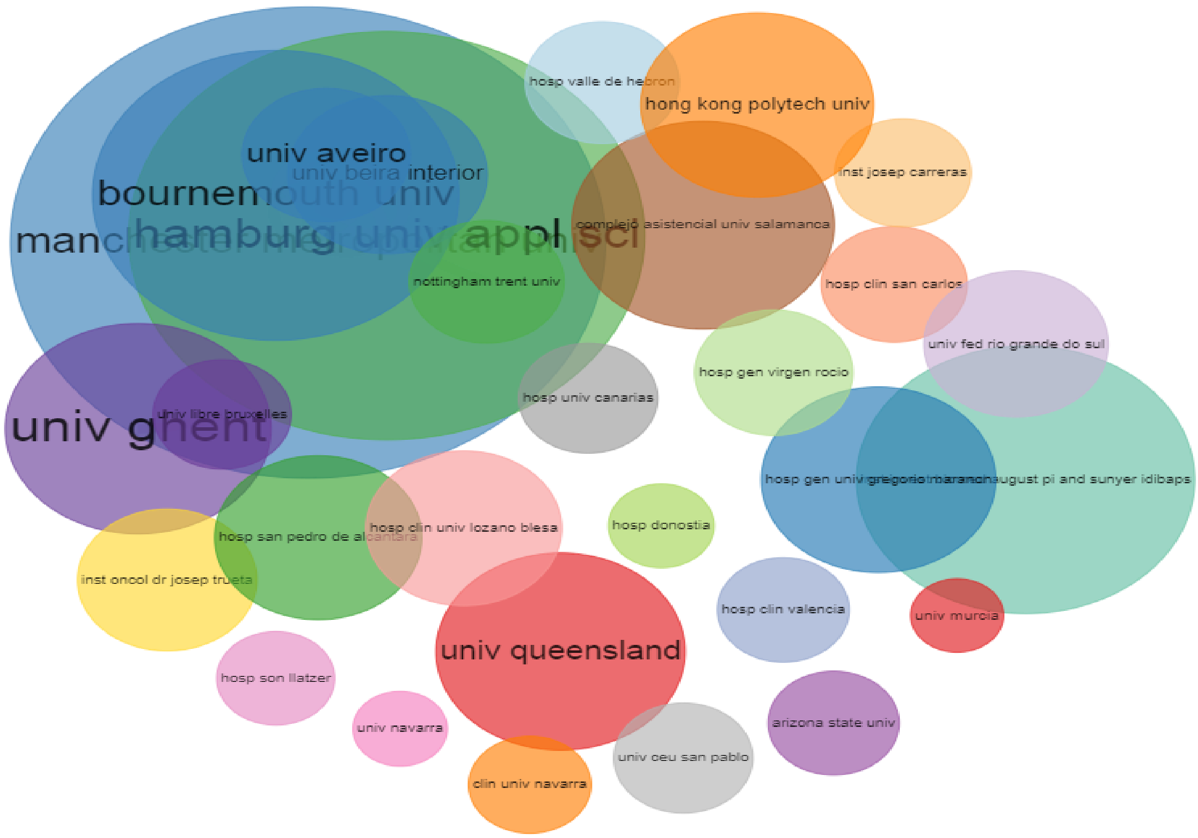


Figure 8: Institutional collaboration network in Engineering, Physics, Mathematics and Statistics **Research**

Fig 8 depicts the collaboration network, of institutional affiliates and the observations show that again there was no collaboration among analyzed institutions as there were no connecting lines seen linking the circles. However, there was a cooccurrence of institutions concerning development and sustainability research. The bigger the circle the more likely the institutions are involved in the development and sustainable research. Manchester, Aero, Hamburg, Bournemouth, and Nottingham Trent with big circles all show good involvement with development and sustainability as seen by their circles coinciding one with another but showed no collaboration with other institutions as there were no connecting lines to show collaboration on the sustainable development topic

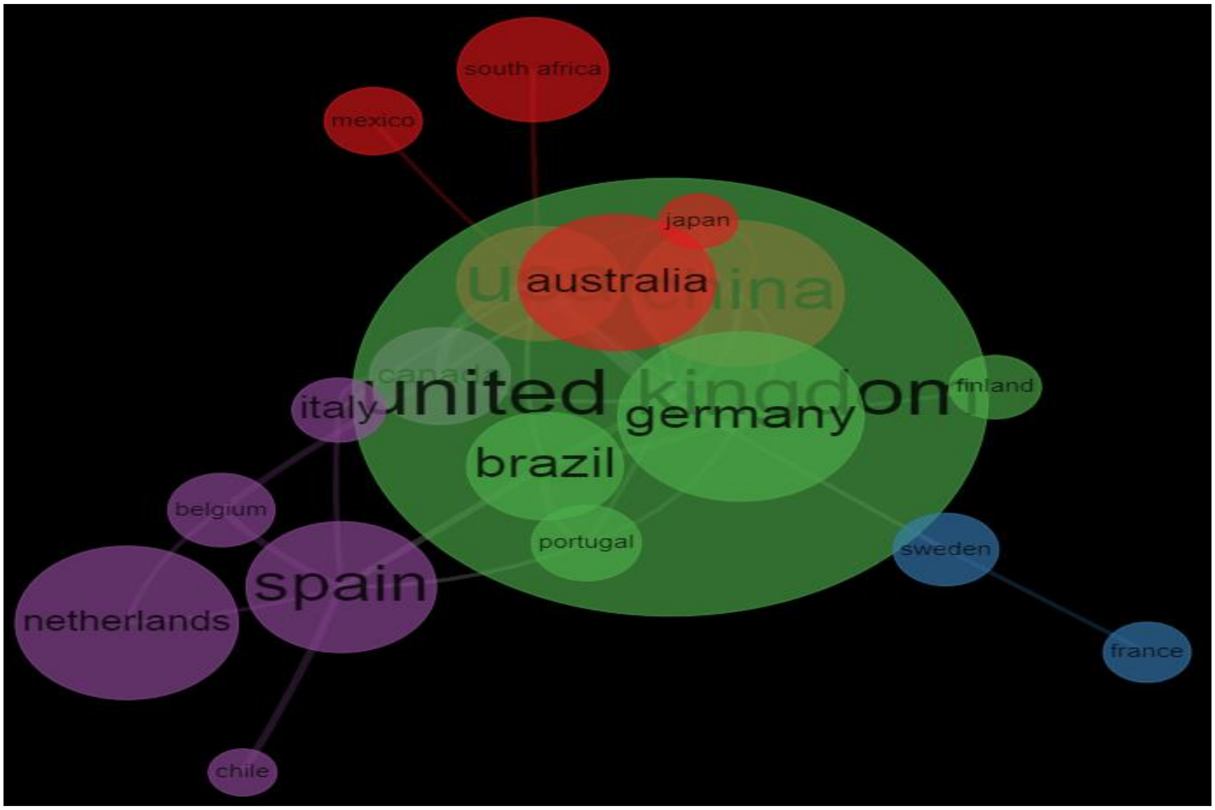


Figure 9. Countries collaboration network in Engineering, Physics, Mathematics and Statistics **Research**

Fig 9 shows four clusters of green, blue, red, and purple with a clear collaboration, and cooccurrence was seen among participating institutions analyzed. In decreasing order of magnitude of involvement with sustainable development, the United Kingdom, Germany, Netherlands, Australia, Spain brazil, and South Africa all depicted sustainable development activities with different levels of cooccurrence. On the other hand, it can be seen that countries collaborated more than the authors with the United Kingdom, Australia, Brazil, Japan, Portugal, Germany, and Finland collaborating with other counties. The bigger the circle the greater is the magnitude of the Institutions involvement with development and sustainability. Therefore, the United Kingdom showed the greatest activities followed by Germany and Australia while the Netherlands and Spain led the others that did not collaborate with other countries

Figure 10: Co-occurrence of author keywords network in Engineering, Physics, Mathematics and Statistics **Research**

Figure 10 shows the Co-occurrence of the author's keywords network showing 4 main clusters led by four key words category: sustainability (red), sustainable development (purple), sustainable development goals (green), and social sustainability (blue) respectively. The thicker the line connecting two words the closer the relationships. Therefore, looking at the sustainability cluster, it can be seen that sustainability and development have the closest relationship, followed by sustainability and the environment. Sustainability and education, china, and innovations. For the purple keywords category cluster sustainable development and indicators, sustainable development goals (SDGs), governance, life cycle assessment, and climate change has a similarly close relationship while the rest had similar relationships.

Discussions

Fig 1-10, depicts the results obtained from this retrospective review. The use of the words such as framework, model, education, science, systems, challenges, growth among others points to the facts that studies conducted in the past 3 decades took into consideration some elements of Engineering, Physics, Mathematics, and Statistics Research. The analysis involved topic trend, word treemap, word growth, conceptual structure map, using Multiple Correspondence Analysis, a dendrogram of key terminologies, collaboration networks of authors, institutions, and countries respectively, and cooccurrence of authors key words. There was no collaboration among authors and institutions (7 and 8) but there were Country collaborations (Fig 8) with the United Kingdom taking the lead. There was also a cooccurrence of authors' keywords with two major categories being sustainability and sustainable development with many subcategories Fig 10. These indicate to some extent compliance with the principle's development and sustainability

The development debates

The concept of development has continued to generate debate because of its relevance to the very factors that matter to the general populace all over the world. Inequality, hunger, and poverty are the common offspring of the market designed to favor advanced countries when they offer their services to help the underdeveloped countries to identify, harness, and utilize their natural resources (13, 14). The markets are made to make the services to utilize the resources more expensive than the resources themselves while the reverse should have been the case. Any developing country that can break out of this cocoon will be reclassified as its dependency on the services will have decreased drastically. That's where Engineering, Physics, Mathematics, and Statistics research comes in to provide detailed knowledge of the best ways to detect, manage, prevent and control diseases for the greater good of the general public (15, 16)

Subject-specific significance

Subject-specific areas where Engineering, Physics, Mathematics, and Statistics research can impact sustainability and development may include but are not limited to the following thematic research areas of global significance.

a. Engineering Mathematics of diseases management and use of the modelling mechanism to help determine the general population health status (17, 18)
b. Fluid dynamics of chronic respiratory diseases due to lifestyle choices such as smoking and environmental conditions like exposure to air pollution, poor air quality, and poor ventilation, Chronic obstructive pulmonary disease, asthma, occupational lung diseases, such as black lung, pulmonary hypertension, cystic fibrosis (19, 20)
c. Management of gestational diabetes, which causes elevated blood sugar in pregnancy, and prediabetes, a condition defined by higher-than-normal blood sugar levels that lead to a very high risk of developing type 2 diabetes shortly (21, 22)
d. Development of statistical methodology motivated by medical problems and to

provide statistical support to medical researchers (23)

e. Understanding how to use the connection between "theoretical applied mathematics" and "engineering applied mathematics" to solve real life problems (24, 25)
f. Preventive medicine with attention to indoor and outdoor pollution, water quality that can affect a population's health, neighborhood safety, and political empowerment, (26, 27)
g. Biomechanical Engineering that studies organisms and mechanics and how the two solve problems together with an emphasis on environmental challenges such as waste control and keeping our waterways free from pollution**.** (28, 29)
h. Research details on the molecular size and architecture of polymers in solution or the particle size distribution in a solid suspension. (30, 31)
i. Functional relationship of body parts and have a potential molecular biophysics impact on disease prevention through the study of the body's defense mechanisms involving proteins at the cell membrane level. (32, 33)
j. Molecular biophysics considers the structure of biological molecules such as enzymes, muscle proteins, and nucleic acids and how these molecules interact with various forms of energy. (34)
k. Biomarkers for renal disease leading to dialysis can be reduced if disease indicators are detected on time (35, 36)

Sustainability of development

Sustainability of development appears to hinge on a certain lifestyle and culture that characterizes the standard of living and expectations of every society in the world not minding the geographical or ethnic inclination (37). There is also an associated peculiar challenge that seems to seek the attention of such unique communities if life must go on (38). Ability to manage the challenges while still trying to live a normal life in society defines the living condition of society (39). The availability of natural resources and the skills to harness and utilize these natural resources to the maximum benefit of the general populace in a particular place and point in time defines the so-called levels of development (40, 41). Three kinds of development according to the United Nations include developed, developing, and developed. This classification is largely based on the economic growth and security of nations of the earth (42). Developed countries are on top of the list of high economic and security status followed by developing and underdeveloped respectively and all these are better understood when studied vis-à-vis the standard of living of the people in question (43)

Role of Engineering, Physics, Mathematics and Statistics **research**

Engineering, Physics, Mathematics, and Statistics Research methods offer the best approach to the struggle to understand how best to improve on our abilities to identify, harness, and utilize these natural resources (44). A society is developed if it can harness and process and utilize these resources in the best interest of the. Thus, the concept of development endorses how to best manage the identified resources to be enough to solve the challenges of the society as well as provide the necessary security of the society (45). The sustainable aspect of society's development is seen when a society can manage its resource to solve its problems as well as provide for security for its citizens today and for their children tomorrow (46). The human development index measures a countries average achievement in life expectancy, education, and income (47). Dependency refers to reliance on other nations for growth and by international trade and domestic development, low-income countries depend more and more on rich nations for support (48). There is an unequal power relationship between the rich and the poor nations and rules are made to favor the rich and making the poor even poorer (49)

Development concept debates

Engineering, Physics, Mathematics, and Statistics Research can impact the broader concept, of development and sustainability because the topic is very popular and extensively discussed in Social, Economic, and Environmental circles (50). There are many proposed definitions widely publicized but a generally acceptable or universal definition is yet to emerge. Most definitions available for perusal are contextual with everyone defining development based on prevailing circumstances or situation at hand. It centers on the use of economic principles to reduce poverty, remove inequality, and unemployment. It entails critical evaluation of our ability to ask ourselves what we can do effectively, what we can do with help, and what we cannot do even with help. So, development can be seen as people's ability to utilize their resources for their benefit as well as others in need (51), while sustainability of development may be seen as an ability to harness and manage these resources in such a way for it to be enough for us today and our children tomorrow (52).

Disparities in these abilities' contingent on the level of dependencies on other nations before utilizing these resources define the level of development in our societies (53). For developed countries, the Engineering, Physics, Mathematics, and Statistics Research that they can do without help from other countries are bigger than what they can do with help (54). For Developing and underdeveloped countries, the Engineering, Physics, Mathematics, and Statistics Research they can do with help are bigger than what they cannot do. Thus, disparities in the interdependence of counties in Engineering, Physics, Mathematics, and Statistics Research define their development and sustainability status. To impact the Engineering, Physics, Mathematics, and Statistics abilities of nations, there is the concept of balanced growth and development that requires all sectors including industries to start and grow at the same time and each generates the market demand and supply for one another (55). This again is defined by the income base of a country that also has a measurable influence on their support for Engineering, Physics, Mathematics, and Statistics Research. Thus, the main income base of countries (low income, middle income, and high-income) directly or indirectly influence the level of support for Engineering, Physics, Mathematics, and Statistics Research of that country (56).

Time factor

The time factor appears to be the major difference between the developed, developing, and underdeveloped countries are time (57). Time brought about positive changes in Engineering, Physics, Mathematics, and Statistics Research, and these measurable changes are the major drivers of development and sustainability. Those societies and stakeholders that belong to different stages of development have passed through challenges, setbacks, conflicts, disputes, explorations, experimentations, mistakes, lack, and more (58). All these milestones add up to their experiences and discoveries in Engineering, Physics, Mathematics, and **Statistics** Research components for making society better than yesterday and these took place over time. While there is no specified amount of time for each Engineering, Physics, Mathematics, and Research developmental process to be complete, the guiding principle should be that time is needed for development to move from one level to another.

While we struggle to harness our environment to impact Engineering, Physics, Mathematics, and Statistics research, all to our best benefit, we still have the challenge of preserving the society for our children tomorrow (45). Many confounding variables interfere with our ability to make Engineering, Physics, Mathematics, and Statistics Research development sustainable in the context of the economic, social, and environmental impact of activities and critical decisions we make. The resources we need to make Engineering, Physics, Mathematics, and Statistics Research development sustainable appears to be theoretically available but why the attainment of the different stages of development remains elusive to many stakeholders continue to be a topic for public debate (59). This debate and curiosity for answers provides the horizon for the next generation Engineering, Physics, Mathematics, and Statistics Research and curiosity for lasting answers

New tools and paradigm shift

The rationale for new Engineering, Physics, Mathematics, and Statistics Research tools and justification for a paradigm shift in the drive for sustainable development is predicated on the partial insight of the problems of poverty, environmental degradation, confusion about the role of economic growth, and the concepts of sustainability and participation (60). How these factors and weaknesses can lead to Engineering, Physics, Mathematics, and Statistics Research inadequacies and contradictions in relevant policy-making are seen at the global level of global trade, agriculture, manufacturing, and forestry. Therefore, if sustainable development in Engineering, Physics, Mathematics, and Statistics Research is to have a central impact, on society and the stakeholders, then political foot-dragging will have to be given up in favor of research-based intellectual clarity and precision (61). This will be the tool that will drive the speed, direction, and content of Engineering, Physics, Mathematics, and Statistics Research development in the next couple of decades

Conclusion

Because of the diverse nature of our society, today and the changing dynamics of associated challenges, the need for Engineering, Physics, Mathematics, and Statistics Research development and sustainability cannot be overemphasized. Engineering, Physics, Mathematics, and Statistics Research Databases that help expand our knowledge on how to be to identify, harness, and utilize our natural resources with minimum dependencies on others will significantly impact the sustainable development goals. Special Journal of Engineering, Physics, Mathematics, and Statistics published by the Special Journals publisher was launched to fill these gaps.

Reference

1. Schell LM, Gallo MV, Ravenscroft J. Environmental influences on human growth and development: historical review and case study of contemporary influences. Ann Hum Biol. 2009 Sep-Oct;36(5):459-77
2. Moore JE, Mascarenhas A, Bain J, Straus SE. Developing a comprehensive

definition of sustainability. Implement Sci. 2017 Sep 2;12(1):110.

3. Bryant JH, Harrison PF; Institute of Medicine (US) Board on International Health. Global Health in Transition: A Synthesis: Perspectives from International Organizations. Washington (DC): National Academies Press (US); 1996. Strategies for Sustainable Dev
4. Gera R, Narwal R, Jain M, Taneja G, Gupta S. Sustainable Development Goals: Leveraging the Global Agenda for Driving Health Policy Reforms and Achieving Universal Health Coverage in India. Indian J Community Med. 2018 Oct-Dec;43(4):255-259.
5. Hutton G, Chase C. The Knowledge Base for Achieving the Sustainable Development Goal Targets on Water Supply, Sanitation, and Hygiene. Int J Environ Res Public Health. 2016 May 27;13(6):536.
6. Hopewell J, Dvorak R, Kosior E. Plastics recycling: challenges and opportunities. Philos Trans R Soc Lond B Biol Sci. 2009 Jul 27;364(1526):2115-26
7. Dodo MK. Examining the potential impacts of climate change on international security: EU-Africa partnership on climate change. Springerplus. 2014 Apr 17;3:194.
8. Meunier-Beillard N, Ecarnot F, Rigaud JP, Quenot JP. Can qualitative research play a role in answering ethical questions in intensive care? Ann Transl Med. 2017 Dec;5(Suppl 4): S45
9. National Academy of Sciences (US), National Academy of Engineering (US), and the Institute of Medicine (US) Committee on Ensuring the Utility and Integrity of Research Data in a Digital Age. Ensuring the Integrity, Accessibility, and Stewardship of Research Data in the Digital Age. Washington (DC): National Academies Press (US); 2009. 2, Ensuring the Integrity of Research Data.
10. Sevinc A. Web of science: a unique method of cited reference searching. J Natl Med Assoc. 2004 Jul;96(7):980-3.
11. Bramer WM, de Jonge GB, Rethlefsen ML, Mast F, Kleijnen J. A systematic approach to searching: an efficient and complete method to develop literature searches. J Med Libr Assoc. 2018 Oct;106(4):531-541.
12. Chatterjee A, Ghosh A, Chakrabarti BK. The universality of Citation Distributions for Academic Institutions and Journals. PLoS One. 2016 Jan 11;11(1):e0146762. Erratum in: PLoS One. 2016;11(2):e0148863.
13. Pollard CM, Booth S. Food Insecurity and Hunger in Rich Countries-It Is Time for Action against Inequality. Int J Environ Res Public Health. 2019 May 21;16(10):1804.
14. Singh AR, Singh SA. Diseases of poverty and lifestyle, well-being and human development. Men's Sana Monogr. 2008 Jan;6(1):187-225.
15. University of Waterloo. "Mathematical modeling vital to tackling disease outbreaks." ScienceDaily. ScienceDaily, 17 October 2019.
16. Siettos CI, Russo L. Mathematical modeling of infectious disease dynamics. Virulence. 2013 May 15;4(4):295-306.
17. Bin S, Sun G, Chen CC. Spread of Infectious Disease Modeling and Analysis of Different Factors on Spread of Infectious Disease Based on Cellular Automata. Int J Environ Res Public Health. 2019 Nov 25;16(23):4683.
18. Tian D, Meng J. Exercise for Prevention and Relief of Cardiovascular Disease:

Prognoses, Mechanisms, and Approaches. Oxid Med Cell Longev. 2019 Apr 9;2019:3756750.
19. Shukla SD, Swaroop Vanka K, Chavelier A, Shastri MD, Tambuwala MM, Bakshi HA, Pabreja K, Mahmood MQ, O'Toole RF. Chronic respiratory diseases: An introduction and need for novel drug delivery approaches. Targeting Chronic Inflammatory Lung Diseases Using Advanced Drug Delivery Systems. 2020:1–31.
20. Agarwal AK, Raja A, Brown BD. Chronic Obstructive Pulmonary Disease. [Updated 2020 Aug 10]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan
21. Quintanilla Rodriguez BS, Mahdy H. Gestational Diabetes. [Updated 2020 Nov 20]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-
22. Buschur E, Stetson B, Barbour LA. Diabetes In Pregnancy. [Updated 2018 Jan 17]. In: Feingold KR, Anawalt B, Boyce A, et al., editors. Endotext [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000
23. Yan F, Robert M, Li Y. Statistical methods and common problems in medical or biomedical science research. Int J Physiol Pathophysiol Pharmacol. 2017 Nov 1;9(5):157-163.
24. \Mazzoli M, Molas A, Bassolas A, Lenormand M, Colet P, Ramasco JJ. Field theory for recurrent mobility. Nat Commun. 2019 Aug 29;10(1):3895.
25. Moctezuma LA, Molinas M. Multi-objective optimization for EEG channel selection and accurate intruder detection in an EEG-based subject identification system. Sci Rep. 2020 Apr 3;10(1):5850.
26. Ramírez AS, Ramondt S, Van Bogart K, Perez-Zuniga R. Public Awareness of Air Pollution and Health Threats: Challenges and Opportunities for Communication Strategies To Improve Environmental Health Literacy. J Health Commun. 2019;24(1):75-83.
27. Manisalidis I, Stavropoulou E, Stavropoulos A, Bezirtzoglou E. Environmental and Health Impacts of Air Pollution: A Review. Front Public Health. 2020 Feb 20;8:14.
28. Harper CE, Hernandez CJ. Cell biomechanics and mechanobiology in bacteria: Challenges and opportunities. APL Bioeng. 2020 Apr 1;4(2):021501
29. Kim AA, Nekimken AL, Fechner S, O'Brien LE, Pruitt BL. Microfluidics for mechanobiology of model organisms. Methods Cell Biol. 2018;146:217-259.
30. Liechty WB, Kryscio DR, Slaughter BV, Peppas NA. Polymers for drug delivery systems. Annu Rev Chem Biomol Eng. 2010;1:149-73.
31. Patanarut A, Luchini A, Botterell PJ, Mohan A, Longo C, Vorster P, Petricoin EF 3rd, Liotta LA, Bishop B. Synthesis and characterization of hydrogel particles containing Cibacron Blue F3G-A. Colloids Surf A Physicochem Eng Asp. 2010 Jun;362(1-3):8-19.
32. Shao A, Drewnowski A, Willcox DC, Krämer L, Lausted C, Eggersdorfer M, Mathers J, Bell JD, Randolph RK, Witkamp R, Griffiths JC. Optimal nutrition and the ever-changing dietary landscape: a conference report. Eur J Nutr. 2017 May;56(Suppl 1):1-21.
33. Horwitz R. Cellular Biophysics. Biophys J. 2016 Mar 8;110(5):993-6.
34. McCulloch AD. Systems Biophysics: Multiscale Biophysical Modeling of Organ Systems. Biophys J. 2016 Mar 8;110(5):1023-7.
35. Leake MC. The physics of life: one molecule at a time. Philos Trans R Soc Lond B Biol Sci. 2012 Dec 24;368(1611):20120248.
36. Lopez-Giacoman S, Madero M. Biomarkers in chronic kidney disease,

from kidney function to kidney damage. World J Nephrol. 2015 Feb 6;4(1):57-73.
37. Gowda S, Desai PB, Kulkarni SS, Hull VV, Math AA, Vernekar SN. Markers of renal function tests. N Am J Med Sci. 2010 Apr;2(4):170-3. PMID: 22624135; PMCID: PMC3354405.
38. Tsai Y. Relationship between organizational culture, leadership behavior, and job satisfaction. BMC Health Serv Res. 2011 May 14;11:98.
39. Ekor M. The growing use of herbal medicines: issues relating to adverse reactions and challenges in monitoring safety. Front Pharmacol. 2014 Jan 10;4:177.
40. Mechanic D. Population health: challenges for science and society. Milbank Q. 2007 Sep;85(3):533-59.
41. Pretty J, Bharucha ZP. Sustainable intensification in agricultural systems. Ann Bot. 2014 Dec;114(8):1571-96.
42. Seetharaman, Moorthy K, Patwa N, Saravanan, Gupta Y. Breaking barriers in the deployment of renewable energy. Heliyon. 2019 Jan 26;5(1):e01166.
43. National Research Council (US) Panel on Biodiversity Research Priorities. Conserving Biodiversity: A Research Agenda for Development Agencies. Washington (DC): National Academies Press (US); 1992. 1, Biodiversity, & Dev
44. Gonzalez-Brambila CN, Reyes-Gonzalez L, Veloso F, Perez-Angón MA. The Scientific Impact of Developing Nations. PLoS One. 2016 Mar 29;11(3):e0151328
45. Monroe-Wise A, Kinuthia J, Fuller S, Dunbar M, Masuda D, Opiyo E, Muchai B, Chepken C, Omwenga E, Oboko R, Osoti A, Masys D, Chung MH. Improving Information and Communications Technology (ICT) Knowledge and Skills to Develop Health Research Capacity in Kenya. Online J Public Health Inform. 2019 Dec 31;11(3):e22
46. Sinding SW. Population, poverty, and economic development. Philos Trans R Soc Lond B Biol Sci. 2009 Oct 27;364(1532):3023-30
47. Spady D. The environment and our responsibility to our children and youth: A message for adults. Paediatr Child Health. 2009 May;14(5):290-2.
48. Basic B, Devic Z, Denic N, Zlatkovic D, Ilic ID, Cao Y, Jermsittiparsert K, Le HV. Human development index in the context of human development: Review on the western Balkans countries. Brain Behav. 2020 Aug 9;10(9): e01755.
49. Henderson V, Squires T, Storeygard A, Weil D. THE GLOBAL DISTRIBUTION OF ECONOMIC ACTIVITY: NATURE, HISTORY, AND THE ROLE OF TRADE. Q J Econ. 2018 Feb;133(1):357-406.
50. Schuftan C. Poverty and Inequity in the Era of Globalization: Our Need to Change and Re-conceptualize. Int J Equity Health. 2003 Mar 19;2(1):4.
51. Nunes AR, Lee K, O'Riordan T. The importance of an integrating framework for achieving the Sustainable Development Goals: the example of health and well-being. BMJ Glob Health. 2016 Nov 24;1(3):e000068.
52. Braveman P, Gottlieb L. The social determinants of health: it's time to consider the causes of the causes. Public Health Rep. 2014 Jan-Feb;129 Suppl 2(Suppl 2):19-31.
53. Clark WC, van Kerkhoff L, Lebel L, Gallopin GC. Crafting usable knowledge for sustainable development. Proc Natl Acad Sci U S A. 2016 Apr 26;113(17):4570-8.

54. Arcaya MC, Arcaya AL, Subramanian SV. Inequalities in health: definitions, concepts, and theories. Glob Health Action. 2015 Jun 24;8:27106.
55. Neirotti RA. Barriers to development: pushing the boundaries. Rev Bras Cir Cardiovasc. 2015 Jan-Mar;30(1):104-13.
56. Delanka-Pedige HMK, Munasinghe-Arachchige SP, Abeysiriwardana-Arachchige ISA, Nirmalakhandan N. (2020) Wastewater infrastructure for sustainable cities: an assessment based on UN sustainable development goals (SDGs). International Journal of Sustainable Development & World Ecology 0:0, pages 1-7.
57. Rathod S, Pinninti N, Irfan M, Gorczynski P, Rathod P, Gega L, Naeem F. Mental Health Service Provision in Low- and Middle-Income Countries. Health Serv Insights. 2017 Mar 28;10:1178632917694350.
58. Stewart F. Root causes of violent conflict in developing countries. BMJ. 2002 Feb 9;324(7333):342-5.
59. Lemke AA, Harris-Wai JN. Stakeholder engagement in policy development: challenges and opportunities for human genomics. Genet Med. 2015 Dec;17(12):949-57.
60. Hansen HA, Bjorktomta SB, Svalastog AL. Digital society generates new challenges for child welfare services. Croat Med J. 2017 Feb 28;58(1):80-83.
61. Cairns J Jr. Defining goals and conditions for a sustainable world. Environ Health Perspect. 1997 Nov;105(11):1164-70.
62. Azevedo MJ. Public Health in Africa: Theoretical Framework. Historical Perspectives on the State of Health and Health Systems in Africa, Volume I. 2017 Feb 1:1–77.