International Journal of Information Technology and Management
Vol. 15, Issue No. 2, August-2020, ISSN 2249-4510

DOI: https://doi.org/10.29070/1v926g29

Study on Strategy for a Sustainable Environment

Sachin [1] , **Dr. Vijay D. Kulkarni** [2]

1. PhD Student, Kalinga University, Raipur, CG, India ,
2. PhD Guide, Kalinga University, Raipur, CG, India

Abstract: The aim of this paper is to outline the research trend, define the literature categorization and research focuses of environmental sustainability engineering research from the perspective of historical evaluation based on the top five highest impact factor journals in the Journal Citation Report of the Institute of Scientific Information. Time horizon is used as the methodology to classify the research articles. This paper will reflect the evolution of research in the field of environmental sustainability by carrying out the comprehensive assessment of 29,616 research articles across a 24-year time span. The research in sustainability is growing rapidly and two research focuses appear at the highest count—water research and pollution control and prevention. Moreover, the Journal of Environmental Science and Technology has emerged as the journal with the highest sustainability research published over the years. The implication of the results in our study contributes to the direction of future research in the discipline of sustainability.

Keywords: Sustainability, Environmental Engineering, Research Trend, Research Focus

X

INTRODUCTION

In recent years natural disasters and climate disasters often occur in Indonesia which Cause many losses both lives and property. According to BNPB, in 2017, there were 2,372 disasters in Indonesia. In 2018 it increased to 2,426 times disaster events Unfortunately, some types of natural disasters can actually be predicted beforehand by studying the physical condition of nature by avoiding development in certain locations. As a result, despite spatial planning, natural disasters in regions throughout Indonesia continue to occur and cause losses that can actually be minimized by spatial planning that is adaptive to environmental conditions. Any changes in the regional space in the form of development will cause changes in the quality of the environment both positive and negative. [1]

In May 1996, the United Nations Population Fund reported that in the year 2006 more than half the world's projected 6.6 billion people will be living in urban areas. This raises the prospect of crowded, violent and unhealthy cities threatened by the escalation of social conflict, and intolerable environmental degradation, and the collapse of basic services Los Angeles Times 1996. As an antidote to these economic, social, and environmental ills, city and regional planning regimes embodying 'urban sustainability' must be constituted. However, planning regimes oriented towards 'urban sustainability' can be adapted from approaches formulated in cities and regions where problems of infrastructure, social equity, and urbanization of the environment have been creatively addressed. [2]

The Rio Summit established sustainable development as the guiding vision for the development efforts of all countries. At Rio, and in later commitments, all governments undertook to establish and implement

national sustainable development strategies. The strategies for sustainable development called for at Rio are foreseen as highly participatory instruments intended "to ensure socially responsible economic development while protecting the resource base and the environment for the benefit of future generations". The Rio Agenda 21 was reaffirmed most recently in the Millennium Summit Declaration. The International Development Goals call specifically for the "establishment of sustainable development strategies by 2005. [3]

The environment itself is a system of systems that, from the viewpoint of human existence and development, is a part of the superior system of systems, the human system . From the given fact that it is evidently impossible to elevate the environment existence and return to original state under the interests connected with human existence and development, but, simultaneously, it is impossible to damage the environment irresponsibly, because it creates the medium necessary for human existence itself. Therefore, we have to introduce the compromises that respect human needs and environment into the practice, based on our knowledge and experience. Their impact and benefits are monitored in the way that allows carrying out the corrective measures if they seem to be necessary. [4]

Today's Industrial growth in India is tremendous and showing accelerative trend, since the enactment of economic liberalization policies in 1991. Economic liberalisation had a great impact on industrial units exclusively on manufacturing units, because the growth of this sector is magnificent over the time periods that is pre-liberalisation period to post liberalisation i.e., increase in the presence of manufacturing units, from 98,379 in a pre-liberalization period of 1987 to 1,40,355 industrial units in 2007 reflecting a 42.67% growth during this 20 year period, and a rise in the production capacity and output within individual manufacturing facilities. [5]

LITERATURE REVIEW

Prof. Richard Welford (2020) It seeks to examine links between competitive strategy and environmental management as well as providing results of research into systems and standards, corporate environmental management tools, organisations and management, particular industry sectors and responses of business to contemporary environmental issues. It examines the role of regulation and policy in the business sector and encourages cross-country analysis. Contributions are encouraged which extend the scope of activity from environmental management to sustainable development in business. The journal should be of interest to a broad interdisciplinary audience including academics, practitioners, business managers and consultants. [6]

Christina Wulf Petra Zapp Andrea Schreiber and Wilhelm Kuckshinrichs(2020) In this paper, a new approach is presented to identify and quantify such thresholds for Preference Ranking Organization METHod for Enrichment Evaluation (PROMETHEE) based on uncertainty of Life Cycle Impact Assessment (LCIA) methods. Common thresholds and this new approach are discussed using a case study on finding a preferred location for sustainable industrial hydrogen production, comparing three locations in European countries. The single LCSA results indicated different preferences for the environmental, economic and social assessment. The application of PROMETHEE helped to find a clear solution. The comparison of the newly-specified thresholds based on LCIA uncertainty with default thresholds provided. [7]

Fotis Kitsios Maria Kamariotou and Michael A. Talias (2020) the purpose of this paper is to conduct a bibliometric analysis exploring the integration of strategic management, decision-making and corporate sustainability, providing a framework of interrelated issues according to the current literature in this area. 72 peer-reviewed papers were analyzed based on Webster's and Watson's methodology. The results of this review revealed that the number of publications in this domain has increased in the last decade, and there is a need to foster research (especially empirical) in this field because managers should find out ways to implement, in action, corporate sustainability strategies and integrate their action plans with their business strategy. This review concludes with a framework that includes the most commonly addressed issues of this topic and provides opportunities and challenges for further research. [8]

R V Aryani(2020) The purpose of this study is to identify the effectiveness of strategic environmental assessment activities in supporting sustainable development in Sumbawa Regency. This study uses a descriptive qualitative method by examining the substance of the strategic environmental assessment in Sumbawa Regency. The type of data obtained is primary data obtained from the results of focus group discussions with the community and related agencies. The results of the research are that the strategic environmental study has been quite effective in assessing the negative impacts of a policy, plan and program on the environment, but has not been effective in solving the problem of sustainable development. [9]

Krunal Trivedi1 Pooja Trivedi2 Vandana Goswami (2018) According to World Bank Report of 2015, economic growth of past two decades has lifted more than 660 million people out of poverty and has raised the income levels of millions more. Along with the development of emerging markets, the size and growth of affluent class in these markets has also improved. However, the development comes at an expense of environment and poor communities. Growth patterns have left hundreds of millions of people behind: 1.2 billion still lack access to electricity, 870 million are malnourished, and 780 million are still without access to clean, safe drinking water. This lopsided development has contributed too many environmental and social challenges.

METHODOLOGY

This study adopted time horizon analysis as used by Rungtusanatham, etc. et. al. There are four phases of methodology: estimation of the time, determination of the scope of the journal, article selection, and analysis. Estimation of the time—A 24-year time horizon is chose for the evaluation between 1987 and 2010.

Determination of the scope of journal—The JCR's database of the ISI is used to select the journals. Top five high impact factor journals are selected from the engineering environmental category. These journals are Energy Education Science and Technology, Environmental Science and Technology, Applied Catalysis B-environmental, Water Research, International Journal of Greenhouse Gas Control.

Article selection two criteria are applied to select articles from all potential articles published in the five journals noted above. First, the selected articles should address an issue that falls under the sustainability development research concept. Second, the selected articles should have a data collection approach.

Analysis All articles are analyzed in order to obtain the information regarding several evaluation dimensions: research growth in sustainability and research focus in the sustainability development concept. This study engages in trend and pattern analysis in order to contribute in a greater understanding on the development and evolution of sustainability research and to identify potential areas for improvement. The analytical results are presented in the form of tables and graphs.

ANALYSIS

Research Trend in Sustainability Research

The environmental sustainability articles published in the five selected journals since 1987 has been counted and they are shown in Table I.

Based on the total number of environmental engineering sustainability articles year-by-year, it can infer that there has been an increase in the quantity of this research discipline since 1987. Comparing the total number of articles published in each journal, Environmental Science and Technology at 16,292 appears as the journal that published the highest number of articles in sustainability research. In the next tier, the Water Research Journal published 9,309 research articles. These two journals then become the gatekeeper of publishing articles in sustainability because they existed since 1967.

Literature categorization of sustainability research

In order to analyze the primary research focus of published sustainability articles, the literature categorization of sustainability research based on reviewed articles is identified. The sustainability development research in this framework consists of three main categories. They are sustainability in the built environment, sustainability in industry and energy sustainability. These categories consist of 21 detail research focuses that can be evidenced in Figure 1.

Sustainability Research Focus

The authors classified 29,616 sustainability articles into 21 detailed research focuses, where one published article can be classified into one or more research focus.

Table I Sustainability articles published.

Year	Journals					Total
(List)	1	2	3	4	5	by year
1997	NA	169	NA	199	NA	368
1998	NA	218	NA	204	NA	422
1999	NA	220	NA	203	NA	423
2000	NA	260	NA	209	NA	469
2001	NA	273	NA	191	NA	464
2002	NA	341	18	198	NA	557
2003	NA	366	27	221	NA	614
2004	NA	338	31	300	NA	669
2005	NA	461	50	364	NA	875
2006	NA	489	91	387	NA	967
2007	NA	505	89	383	NA	977
2008	23	536	119	439	NA	1117
2009	25	628	92	397	NA	1142
2010	15	791	108	527	NA	1441
2011	20	691	185	534	NA	1430
2012	17	737	126	571	NA	1451
2013	24	782	243	537	NA	1586
2014	21	877	225	468	NA	1591
2015	15	1238	229	506	NA	1988
2016	11	1082	252	431	NA	1776
2017	16	1175	360	497	49	2097
2018	19	1365	358	515	56	2313
2019	25	1360	469	530	79	2463
2020	21	1390	394	498	113	2416
Total by journal	252	16292	3466	9309	297	29616

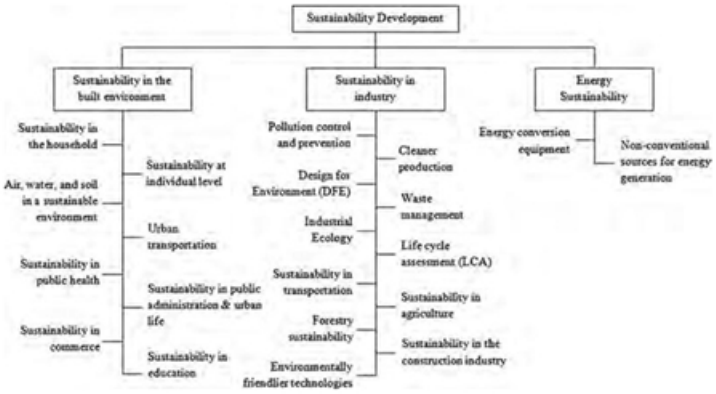

Figure 1: Literature categorization of sustainability research

For example, Wiedinmyer and Hurteau assigned one to forestry sustainability and one to pollution control and prevention whereas the research article from Hu, Martinez, and Hornbuckle8 is assigned one to water, air and soil in a sustainable environment and one to pollution control and prevention. After knowing the number of articles from each research focus, five primary research focuses with the highest number of published articles are identified. These research focuses are use of materials and technologies, green engineering/manufacture, pollution control and prevention, sustainable energy/energy management, and water research. The classification of sustainability articles by research focuses is portrayed in Table II.

As indicated in Table II, water research shows the highest count with 62.7 followed by, pollution control and prevention at 59.1. Green engineering/manufacture shows the lowest at 30.8. The cumulative counts of each research focus as per Table II are then plotted into a curve to comparatively indicate

sustainability research growth over a 24-year period.

The sustainability research focused constantly on water research growth. This is in contrast to pollution control and prevention. The growth of this research focus was faster than water research especially, in 2000 to 2003 showing the steepest sloped curve that serves as an indication of the quick growth of publications. Green engineering/manufacture

Table II. Sustainability research articles by research focus.

Research focus	Sustainability articles across five journals
Use of materials and technologies	46.7
(waste minimization)	
Green engineering/manufacture	30.8
Pollution control and prevention	59.1
Sustainable energy/energy management	49.7
Water research	62.7
Total sustainability articles classified	249
All sustainability articles published	29616

DISCUSSION

This study takes a more comprehensive assessment in sustain-ability survey research although, there have been other articles published with a similar objective. About 29,616 survey articles that have impact factor journals of more than four in sustain-ability, spanning a 24-year time period from 1987 to 2001 has been evaluated. The authors believed that this working paper is necessary for a historical overview of sustainability research and to direct future sustainability research.

The results of analysis depicted in Table I show that the total number of articles from all of the journals consistently increases over the years. This indicates the expeditious growth of sustainability research published across a 24-year time span. With regards to the research focus, Environmental Science and Technology and Applied Catalysis B-environmental have more varieties of research focus whereas Energy Education Science and Technology.

Greenhouse Gas Control is more specifically focused on one area of research. The authors firmly believe that these results can direct researchers for selecting and evaluating their citation in the journals.

This study proposed a literature categorization that could be helpful to researchers in categorizing their citation based on research focus. The three main categories, including sustain-ability in the built environment, sustainability in industry, and energy sustainability, consist of several research focuses deter-mined based on articles reviewed. The conclusion from these results is that over the years, the majority of sustainability articles are largely focused on water research/pollution control and prevention. The least number of researches focused on green engineering/manufacture. In spite of the fact that this research focus has a limited amount of published articles, the trend of the sustainability research continues to be on the rise

In contrast, research focused on green engineering/manufacture has indolent growth. Indeed, water research as well as pollution control and prevention as a research focus has been the most dominant throughout the history of sustainability research. Hopefully the research topic of green engineering/manufacture will increase considering the important role of industries especially, manufacturers, to apply sustainability concept for designing and producing their products including the integration between sustainability and supply chain manage-ment perspective.

CONCLUSION

Over the past couple of decades, the research in sustainability has progressed significantly. In addition, the sustainability research focused constantly on water research; however, the growth of research focus on green engineering/manufacture is slow. Therefore, there is a need for academic researchers to focus their study more on green engineering/manufacture as this area has significant impaction sustainable development. Survey research in sustainability is able to furnish a deeper understanding about the core issues and problems that researchers face. The authors believe that this study can direct researchers in selecting their research focus because the results in this study show actual information about the growth of sustainability research. Be that as it may, the authors acknowledge that opportunities for improvements still exist in order to encourage this study to advance into a greater arena of acceptance in sustainability research.

References

1. Pearce, D. W. and Redclift, M. eds (1988). Sustainable Ž .Ž development Futures, 20 Ž .Special Issue
2. Anon 2009 Law of the Repulic of Indonesia Number 32 Year 2009 Concerning Protection and Management of Environment (Jakarta)
3. Minister of Environment Regulation 2017 Number 69 of 2017 concerning Implementation of Government Regulation and Number 46 of 2016 concerning Procedures How to carry out an Environmental Study.
4. Wastewater treatment and use in agriculture, Pescod, M.B. (1992). “Wastewater treatment and use in agriculture. Food and Agriculture Organization Rome Italy
5. Butle, Brian P. (2009). “Ecological Balance: The Greater Goal of the Environmental Manager. (Graduate Thesis). Rochester Institute of Technology, Rochester, NY, USA.
6. Prof. Richard Welford (2020). “Business Strategy and the Environment,” Journal Citation Reports (Clarivate Analytics): 9/153 (Business)5/125 (Environmental Studies)12/226 (Management)Online ISSN:1099-0836
7. Christina Wulf Petra Zapp Andrea Schreiber and Wilhelm Kuckshinrichs (2020). “Setting Thresholds to Define Indifferences and Preferences in PROMETHEE for Life Cycle Sustainability Assessment of European Hydrogen Production,” EISSN 2071-1050, Published by MDPI
8. Fotis Kitsios Maria Kamariotou and Michael A. Talias (2020). “Corporate Sustainability Strategies and

Decision Support Methods: A Bibliometric Analysis," 2020, 12, 521; doi:10.3390/su12020521

9. R V Aryani (2020) Effectiveness of Strategic Environmental Studies in Supporting Sustainable Development Goals," IOP Conference Series Earth and Environmental Science 409: 012056 DOI:10.1088/1755-1315/409/1/012056

10. Krunal Trivedi, Pooja Trivedi, Vandana Goswami (2018)," Sustainable Marketing Strategies: Creating Business Value by Meeting Consumer Expectation," International Journal of Management, Economics and Social Sciences, Vol. 7(2), pp. 186 – 205. ISSN 2304 – 1366 http://www.ijmess.com

11. Minister of Environment Regulation 2017 Number 69 of 2017 concerning Implementation of Government Regulation and Number 46 of 2016 concerning Procedures How to Carry out an Environmental Study. (Jakart)

12. G. H. Brundtland (1987). World commission on environment and development, OurCommon Future, Oxford University Press, UK.

13. M. Redclift (1992). Sustainable development and global environmental change: Implications of a changing agenda, Global Environmental Change, 2, pp. 32.

14. Mebratu, D. (1998). "Sustainability and Sustainable Development: Historical and Conceptual Review." Environmental Impact Assessment Review 18: pp. 493-520