Sustainable Water Management and Treatment: Systems, Processes and Technologies

Environmental Science and Engineering • Book Chapter • 2025 • DOI: 10.1007/978-3-031-85327-2_7

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Abstract

Global water resources are rapidly diminishing, driven by population growth, climate changeClimate change, and expanding industrialization. Experts estimate that by 2050, 52% of the projected 9.7 billion people worldwide will reside in areas experiencing water stress or scarcity. The global challenge of accessing clean, potable water will persist as sustainable solutions remain elusive. Water sustainabilitySustainability involves meeting the current generation's water needs without jeopardizing future generations' ability to meet their own. Water is the cornerstone of sustainable developmentSustainable development, serving as a common thread linking global challenges such as energy, food securityFood security, health, peace, security, and poverty eradication. Our survival and well-being depend heavily on effective water resource systems. However, with growing development pressures on land in watersheds and increasing demands for water in streams, rivers, lakes, and aquifers, it is unrealistic to expect these water systems to return to or maintain their pristine, most productive states. Sustainable water managementWater management (SWM) is crucial for addressing these pressures and achieving sustainable development goalsSustainable Development Goals (SDGs). SWM ensures that current water needs are met for all users without compromising the ability of future generations to meet their own needs. This concept aligns with broader sustainability principlesSustainability principles, addressing both present and future water challenges. Enhancing the efficiency of conventional membrane technologies for water treatment is now crucial to minimizing their environmental impactEnvironmental impact.

WastewaterWastewater treatmenttreatmentWastewater treatment removes pollutants, coarse particles, and toxic substances while killing pathogens and producing bio-methaneMethane (CH_4) and manure for agricultureAgriculture. It is crucial in reducing water waste, easing pressure on natural water sources, and supporting clean energy, forming the foundation for sustainable waste managementWaste management. Membrane technologies are increasingly favored forSustainable wastewater treatmentwastewater treatmentWastewater treatment due to their sustainabilitySustainability advantages, including cost-effectiveness, operational ease, and safety. Sustainable water treatment technologies utilize innovative methods such as membrane filtrationMembrane filtration, advanced oxidation processesAdvanced Oxidation Processes (AOPs), and nanotechnologyNanotechnology. Techniques like reverse osmosisReverse osmosis and ultrafiltration are highly effective in removing contaminantsContaminants, microorganisms, and nanoparticles from water. Sustainable water technologies include wastewater treatmentWastewater treatment plants, intelligent irrigation systems, fog catchers, rainwater harvestingRainwater harvesting, tap aerators, seawater desalinationDesalination, portable filters, and solar-powered desalinationDesalination units.

Author keywords

Electro deionization; Membrane technology; Water management; Water pollution; Water scarcity; Water Stress Index; Waterborne diseases

Indexed keywords

Engineering controlled terms

Agriculture; Cost effectiveness; Environmental technology; Microfiltration; Population statistics; Potable water; River pollution; Sustainable development; Sustainable development goals; Wastewater treatment; Water conservation; Water filtration; Waterworks

Engineering uncontrolled terms

Electro-deionization; Future generations; Global challenges; Sustainable water; Sustainable water management; Water needs; Water scarcity; Water stress indices; Water-borne disease; Waters managements

Engineering main heading

Membrane technology

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Author keywords

Indexed keywords

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Circular economy and agriculture: mapping scientific productivity, research pattern and future research direction

Environment, Development and Sustainability • Review • 2024 • DOI: 10.1007/s10668-023-03963-x

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Abstract

This study aims at assessing the global research productivity and discovery of knowledge clusters on circular economy and agriculture using bibliometric analysis. A total of 757 articles have been retrieved from the Scopus database covering the period from 2008 to 2022 on the theme of circular economy and agriculture. The analysis reveals interesting theoretical and practical implications of scientific publications on circular economy and agriculture. The idea of a circular economy in agriculture started gaining importance after 2015 and gradually received significant focus from the scientific community with exponential growth in research publications and citations. Out of the top 10 leading publishing countries on circular economy and agriculture, 6 countries belong to the European Union. The keyword analysis identified four key research areas of CE and agriculture. Highly relevant and less developed research themes such as agricultural sustainability, waste management & recycling, anaerobic digestion and food security have been identified as future research focus areas. The thematic research evolution indicates the merging of multiple themes over time and the emergence of circular agriculture as a core model. A comprehensive knowledge synthesis about circular agricultural practices may help in the

adoption of strategic, operational, and competitive advantages, and motivate researchers to undertake further scientific investigations to strengthen the circularity in agriculture. © The Author(s), under exclusive licence to Springer Nature B.V. 2023.

Author keywords

Agriculture; Bibliometric analysis; Circular economy; Recycling; Sustainability; Waste

Indexed keywords

GEOBASE Subject Index

anaerobic digestion; emergence; food security; growth rate; recycling; sustainability; waste management

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Does corporate social responsibility improve value-added intellectual capital efficiency in food and agribusiness firms in India?

International Journal of Disclosure and Governance • Article • 2024 •
DOI: 10.1057/s41310-023-00196-2

Ali, Jabir [a] ; Naaz, Ishrat [b] ; Ali, Tabassum [c]

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Abstract

This study empirically investigates the implications of corporate social responsibility (CSR) on the value-added intellectual capital efficiency of food and agribusiness firms in India. This study uses the firm-level data collected from the Prowess database of the Center for Monitoring Indian Economy for 362 food and agribusiness companies in 2019. The study contributes to the theoretical and managerial practices by assessing the causal relationship between the value-added intellectual capital (VAIC) and CSR for food and agribusiness firms in an emerging economy, i.e., India. The results suggest a significant mean difference in the key characteristics of firms with and without CSR expenditure. Further, there is a significant relationship between CSR and Value-Added Intellectual Capital Efficiency in the Indian food and agribusiness firms. Finally, the regression analysis indicates that CSR expenditure has a positive and significant implication on value-added intellectual capital (ß = 0.119, $p < 0.01$), including all the dimensions of firm's capital efficiency except structural capital; i.e., capital employed (ß = 0.095, $p < 0.01$), human capital (ß = 0.145, $p < 0.01$) and intellectual capital (ß = 0.124, $p < 0.01$).

However, CSR does not seem to have significant implications on structural capital standalone (ß = 0.044, p > 0.10), implying that the structural capital efficiency of the firms does not get affected by CSR expenditure. The findings of the study provide a good reason for implementing mandatory CSR, which goes beyond the performance of firms, as there is a positive and significant impact of CSR on the Value-Added Intellectual Capital of the firms. This paper contributes to the existing literature by providing extended understanding on the relationship between CSR and VAIC among food and agribusiness firms. © The Author(s), under exclusive licence to Springer Nature Limited 2023.

Author keywords

Agribusiness; Corporate social responsibility; Food processing firms; India; Value-added intellectual capital

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Analysing the entrepreneurial intentions through intellectual capital: Evidences from India

International Journal of Intelligent Enterprise • Review • 2022 • DOI: 10.1504/IJIE.2022.119622

Khan, Ahmed Musa [a] ; Arafat, Mohd Yasir [a] ; Raushan, Mohd Anas [b]

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Abstract

Intellectual capital is defined as the knowledge that can be converted into value. Intellectual capital has received a considerable attention in the field of innovation performance. Still, there is a paucity of research which identifies the role of intellectual capital in creating ventures. This research is an attempt to examine the influence of intellectual capital on start-ups. A large data set of responses from 3360 respondents from India has been provided by the largest entrepreneurship research project, Global Entrepreneurship Monitor. A logistic regression technique is employed to measure the influence of intellectual capital on entrepreneurial intentions. The results show that all the components of intellectual capital, human capital, structural capital and relational capital have a positive and significant impact on entrepreneurial intentions. The study suggests that policies should be proposed to develop human capital, structural capital and facilitate interaction between existing and potential entrepreneurs so that new venture creation can be fostered. This research falls among the initial studies investigating the relationship between intellectual capital and entrepreneurial intentions. The review of literature reveals that very few studies based on large data set are conducted in developing countries like India.

Author keywords

Entrepreneurial intentions; Human capital; India; Intellectual capital; Relational capital; Structural capital

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Measuring the Impact of Intellectual Capital on the Financial Performance of the Finance Sector of India

Journal of the Knowledge Economy • Article • 2021 • DOI: 10.1007/s13132-020-00654-0

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Abstract

In the current scenario, intellectual capital has been recognised as a vital corporate asset because the conventional performance measurement techniques are incapable of measuring intangible dimensions of corporate performance. It is a challenge, especially for knowledge-driven firms, to measure the impact of intangibles on their financial performance. This study tries to explore the impact of intellectual capital on the financial performance of knowledge-driven firms of India. For conducting the study, Bombay Stock Exchange's finance index has been taken for a period ranging from 2009 to 2018, and the Value Added Intellectual Coefficient (VAIC™) methodology has been used to measure the intangible aspects of these firms. The results reveal that Value Added Intellectual Coefficient has an insignificant association with the profitability and productivity of the sample companies. While among the components of Value Added Intellectual Coefficient, the capital employed efficiency has a significant positive relationship only with the profitability of the financial sector. In the case of productivity, all the components of intellectual capital have an insignificant effect on the financial companies of India. The SCE remain insignificant for all the financial performance measures, whereas human capital efficiency is substantial only for enhancing the return on assets of the sample companies. © 2020, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Capital employed efficiency; Human capital efficiency; Intellectual capital; Productivity; Profitability; Structural capital efficiency

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Building a Low Carbon Indian Economy

IOP Conference Series: Earth and Environmental Science • Conference Paper • *Open Access* • 2021 •
DOI: 10.1088/1755-1315/795/1/012023

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Abstract

Climate change has bought unprecedented challenges to humanity. The world has witnessed the dark side of climate change in terms of rising sea level and increase in temperature of world. Low carbon emission is the key to minimize the impact of climate change. Widespread significance attached to reduction in carbon emission has given birth to the new notion of low carbon economy (LCE). The LCE suggests sustainable development of economy by minimizing the ecological damage through the adoption of green practices. The countries across the globe are aiming to become LCE. This paper provides insights into the new notion of low carbon economy and how India is moving towards the encouraging path to become low carbon economy to tackle impending climate change and balancing its developmental needs. © Published under licence by IOP Publishing Ltd.

Author keywords

Carbon emission; Climate change; Low carbon economy

Indexed keywords

Engineering controlled terms

Carbon; Energy conservation; Environmental management; Sea level; Sustainable development

Engineering uncontrolled terms

Carbon emissions; Ecological damage; Low carbon; Low carbon economy; Low-carbon emissions

Engineering main heading

Climate change

Abstract

Author keywords

Indexed keywords

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Examining the relevance of intellectual capital in improving the entrepreneurial propensity among Indians

International Journal of Knowledge Management • Article • 2020 • DOI: 10.4018/IJKM.2020010106

Khan, Ahmed Musa [a]; Arafat, Mohd Yasir [a]; Raushan, Mohd Anas [b]; Saleem, Imran [a]

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Abstract

Intellectual capital is considered as knowledge which can transform into value. Recently, it has gained currency in the field of innovation and entrepreneurship. Only a handful of studies have been conducted to examine the role of intellectual capital in explaining the venture creation process. The main aim of this study is to examine the influence of intellectual capital on start-up. A large data set of Adult Population Survey (APS) provided by the Global Entrepreneurship Monitor (GEM) used. The logistic regression technique was used to analyze the effect of intellectual capital on entrepreneurial intention. The finding suggests that policymakers should frame policy and programs focused on developing human capital, structural capital and encourage interaction between existing and potential entrepreneurs so that entrepreneurship can be boosted. This study is also among the few studies measuring the relationship between intellectual capital and entrepreneurial intention. A systematic literature survey shows that only small numbers of researches, based on large data set, have been conducted in developing countries like India. Copyright © 2020, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.

Author keywords

Cognitive Capital; Entrepreneurial Intentions; Human Capital; Intellectual Capital; Relational Capital; Structural Capital

Indexed keywords

Engineering controlled terms

Developing countries; Logistic regression; Personnel; Population statistics; Surveys

Engineering uncontrolled terms

Cognitive Capital; Entrepreneurial Intentions; Human capitals; Intellectual capital; Relational capital; Structural Capital

Engineering main heading

Knowledge management

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International Export Orientation and Firm's Performance: Evidence from Enterprise Survey Data of India

Journal of Asia-Pacific Business • Article • 2018 • DOI: 10.1080/10599231.2018.1525248

Ali, Jabir [a] ; Yusuf, Nadia [b] ; Ali, Tabassum [c]

[a] National Institute of Agricultural Extension Management (MANAGE), Hyderabad, Telangana, India

Abstract

This study aims at analyzing the performance of firms by international export orientation vis-à-vis domestic orientation, based on World Enterprise Survey Data of 9,281 firms of India. Simple statistical techniques such as chi-squared test, ANOVA, and regression model have been used to analyze the data with the help of SPSS version 20.0. Chi-square statistics indicate that there is significant difference in enterprise characteristics by business orientationdomestic versus export-oriented businesses. Result of the ANOVA indicates a significant difference in business performance between export versus domestic orientation of firms in terms of sales and employment growth rates. Export-oriented enterprises perceive comparatively fewer obstacles than domestic enterprises. Regression analysis indicates that enterprise characteristics, performance indicators, and business obstacles have influence on export orientation of the firms. This study provides insights on differences in firms' performance across business orientations and factors affecting the internationalization of business. This study can be helpful in designing policies for promoting export-oriented enterprises in a focused manner. © 2018, © 2018 Taylor & Francis Group, LLC.

Author keywords

business obstacles; business performance; enterprise survey; export-orientation; India

Indexed keywords

Regional Index

India

GEOBASE Subject Index

business; employment; export; globalization; growth rate; industrial performance

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