Collections for Economic Growth, Social Development, and Technological Innovation Under Climate Change

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Introduction

Climate change is a global concern in recent years as the average global temperature has increased by more than 0.5°C due to the continuous increase in atmospheric CO2 levels since the industrial Revolution (Intergovernmental Panel on Climate Change, 2014, 2018). Such a temperature increase has caused serious problems to the environment such as sea-level rise, invasion of groundwater, desertification, and extreme environmental events (e.g., Agblevor et al., 2020; Guieysse et al., 2013; Kung & Wu, 2021), and consequently induces significant impacts on various sectors including forestry, agriculture, water, fishery, and manufacturing (e.g., European Commission, 2015; Krupa & Harveya, 2017).

While the climate-induced impacts may benefit certain high-latitude regions by making them warmer and more humid, more countries are suffering from the unstable environmental conditions. Thus, it is necessary to realize how the climate is shifting across the world and find ways to combat, alleviate, or adapt to its impact to sustain economic growth, maintain social welfare, improve social development, and continue with technological innovation. This special collection showcases five articles that address these issues.

Contributions of Collections

In the first article, Rafiq et al. (2021) introduce how irreversible environmental impacts such as sea-level rise, desertification, diminished land productivity, and extreme events may be induced by climate change, and then employ the life-cycle assessment to investigate how the development of waste-based biopower increases regional energy security and alleviates environmental impacts. In this study, the authors first analyze the amounts of waste available for power generation in China, and then examine whether the composition of the wastes results in substantial difference in biopower potential. Finally, to make the results more robust, they apply the sensitivity analysis and scenario analysis to explore whether the effectiveness of the waste-based biopower production may be altered in the face of changes in market conditions. This study points out that by fully utilizing the unrecycled wastes, biopower production can increase by approximately 11,107 GWh that would make a profit of $1.2 billion from energy sales and sequester 9.7 million metric tons of CO2 emissions. This paper further investigates the alternative uses of the food waste. The results indicate that to avoid the supply shortage of composting and animal feed, food waste would need to be removed from power generation, and consequently the net biopower production and emission reduction will decrease to 8,216 GWh and 7.32 million metric tons, respectively. Based on these findings, the authors conclude that the utilization of recycled wastes for biopower production could be an effective approach to reduce the reliance on fossil fuels, improve regional energy security, and manage environmental quality.

The second paper by Chen et al. (2021) demonstrates that the improvement of energy efficiency is crucial to strengthen a country’s competitiveness and development, and then uses the data from Association of Southeast Asian Nations plus Six’ (ASEAN+6) to illustrate how an optimal status of energy use would benefit. This study firstly discusses the strengths and weakness of the data envelopment analysis (DEA) and presents how incorporation of a decision-making unit into a progressive time-weighted dynamic efficiency model could be used to estimate energy efficiency, energy decoupling rates, and decarbonization. The paper reveals that (1) ASEAN countries have achieved greater improvements in energy efficiency than the other six countries; (2) the improvement in energy efficiency is not optimized yet if the standard ratio of the energy decoupling is taken into account; and (3) the effect of convergence to decarbonization within ASEAN+6 is not significant and requires further investigation.
In the following paper, Ma et al. (2021) illustrate how the supply of green human capital (GHC) may be affected in the face of environmental degradation. Studies have pointed out that employees’ satisfaction in the workplace is probably the most important factor influencing productivity, and thus based on trait theory and ability–motivation–opportunity theory, this study examines the antecedents and outcomes of GHC from the manufacturing and service companies in Guangdong Province, China. The authors apply the partial least squares structural equation model to investigate how job satisfaction is affected by Big Five personality and green training. The key findings of this study are summarized as follows: first, in the domains of Big Five personality, agreeableness and openness has positive significant impacts on the individuals’ GHC. Furthermore, the study shows that while green training that establishes the concept of social responsibility would improve job satisfaction, its effect is relatively smaller than those of Big Five personality.

The fourth paper by Yu, Ma, and Ren (2021) discusses how tourists respond to the changes in environmental quality and whether the pro-environmental behavior of tourists could help protect the environment. To do this the authors survey 159 articles in the “Web of Science” database and use CiteSpace and Vosviewer to analyze the overall characteristics, core knowledge, and knowledge evolution so that the development panorama can be systematically unfolded. Thus, this study accommodates three regional research circles, eight-core scientific communities, and four core prior knowledge groups to form the pro-environmental behavior of tourists (PEBT) and focuses on how it is influenced by measurement and forming mechanism. The results show that economics, ecology, and psychology have resulted in a strong knowledge spillover effect and the study indicates that the effect of attitude or place attachment might implicitly influence the behavior of tourists. Based on these findings, this study provides a series of potential directions for scholars to investigate pro-environmental behavior of tourists in the face of environmental impacts.

The main theme of the fifth paper by Yu, Chao, et al. (2021) develops a model to predict whether patients’ behavioral intention is affected when they have immediate access to a health education website and weather information. To explore the behavioral intention of perspective consumers, the study extends the Unified Theory of Acceptance and Use of Technology two model and takes mobile literacy as moderators. Approximately 1,650 patients are surveyed at hospitals in Taiwan and the collected data is analyzed by a variance-based structural equation modeling system and a partial least squares regression is used to test the proposed hypothesis. The results reveal that the behavioral intention of patients could be properly predicted by the factors including performance expectancy, effort expectancy, social influence, facilitating conditions, and habit. The effort and performance expectancy are positively related to the level of mobile self-efficacy and is significantly determined by the motivation of patients’ using this application. Meanwhile, the results point out that mobile literacy is found to be negatively related to performance expectancy and behavioral intention, and how this could be internalized into the promotion of mobile health education in hospitals require additional investigations.

**Conclusion**

All the papers in this Special Collection provide novel insights on how climate change may affect future economic growth, social development, and technological innovation. Besides multiple and sometimes complex techniques and methods are employed by the papers to develop a analytical framework, the ultimate reason for this collection is an attempt to gain insight into applicable approaches that integrate economic and climate issues. The discourse is to motivate actions, share and distribute important findings, and stimulate additional research on the field.

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