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Editorial

Editorial: Sustainable Waste Management Innovations: Developing New Ventures for Improved Health and Environmental Wellbeing

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In this Editorial, we synthesise the articles in the Special Issue with unique insights into sustainable waste management innovations and sustainable business practices. We also offer some reflections on the accepted papers. The exponential increase in waste production remains a monumental problem confronting the world. This clearly typifies a contemporary sustainability challenge. As demonstrated by the World Bank report, the lack of effective and robust global intervention means that global waste is set to surge by 70 percent by 2050 [1]. This is also partly driven by mismanagement of waste, rapid urbanisation and a growing global population, which has been projected to increase from 7.7 billion in 2020 to over 10 billion by 2057, with much of the growth occurring in developing countries [2]. Clearly, we do not concur with the idea of 'overpopulation' since there is no such thing (to talk of overpopulation is to identify which population is the excess). Rather, we agree with the reality of population growth leading to over crowdedness in cities due to urbanisation and the attendant problem of improper waste management as a cause for concern. For many developing countries, the effects of waste mismanagement manifest in contributing to flooding and respiratory problems via airborne particles from incinerating domestic and industrial waste [1].

Accordingly, viewing waste management as a central pillar in countries' ability to achieve global Sustainable Development Goals (SDGs) is a necessity and there are vital roles of multiple actors to make this a reality. Thus, there is a need for society to identify and utilise creative mechanisms to help convert waste into a valuable resource, which can then be reused.

In view of the above, this Special Issue has been nothing short of a timely project to address an increasingly disturbing issue of electronic waste (e-waste) and other types of waste, and the extent to which they affect the environment and population health. It also plays into the broader discourse of climate change and environmental degradation, which have massive effects on our very survival. It must be iterated that the e-waste question is a longstanding problem, but it is more the problem of developing economies than of industrialised ones. The existing socioeconomic, political and industrial constraints lead to unacceptable arrangements which in turn make this problem even more difficult to solve. In recent years, electronic waste (e-waste) in tandem with plastic, pharmaceutical and chemical waste has grown exponentially across the globe [3,4]. Overconsumption, poor waste-management strategies and technology obsolescence have also imposed pressures on national and local governments to develop more effective environmental, economic and social policies aimed at reducing electronic and other forms of waste that contaminate the environment and bring about serious adverse effects on population health. It is also worth noting that several start-up businesses have sprung up in the global recycling industry for processing and managing waste. These businesses also have the potential to create employment opportunities.

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Extant literature has offered important preliminary analysis of the impact of such waste. However, there are gaps in our understanding of the complexity of the phenomenon and emerging innovations meant to halt its damaging effects. Novel policies and techno-scientific innovations are turning the take-make-use-dispose paradigm into a regenerative, restorative and environmentally conscious design economy, also known as circular economy. Against this backdrop, this Special Issue sought articles that explain the nature, dynamism and complexity of the phenomenon and the emergence of (recycling) firms that are harnessing clean techno-scientific innovations to stem the tide of chemical (especially plastic), pharmaceutical, and e-waste. The conversations on e-waste management continue even though they seem to have gone to the background in recent times due to the COVID-19 pandemic. What is more interesting is that the use of electronic appliances has become the lifeline for global communications and virtual interactions during this pandemic. That also means an increased use of energy. Our hyper-hygienic lifestyles also translate into more production of waste (mainly disposable plastics and billions of face masks) [5]. As new electronic gadgets arrive, old models are disposed of [6–8]. The problem of environmental pollution being the results of improper waste disposal remains, and serious actions must be taken through green innovations that also require green energy, which Singh et al. [9] touch on. We received several papers but accepted only 5 of them from a total of 11 authors. The accepted papers are diverse but interconnected in several ways, and they all fall under the umbrella of sustainability. The papers conduct us to the critical point where we recognize the consequences of unsustainability and what we need to do about it in order to return the environment to its once-pristine state of purity [10].

Interesting results emerging from the contributions demonstrate how the production of renewable energy positively affects developing economies more than the industrialized economies [9]. This suggests that renewable energy production has the potential to increase future economic growth that is environmentally sustainable in nature. Nadia Singh, Richard Nyuur and Ben Richmond [9] suggest that the implications for sustainable policy innovations are vast since green energy is clearly the basis or plays a larger part of greener production and consumption.

Andrea Lučić [11] focuses on how sustainable market orientation (SMO) should be optimally implemented using the SMO strategy. This is an approach that combines strategic integration, ethical capabilities, and social engagement to produce socially and environmentally desired outcomes. The paper provides a framework of multidimensional SMO; the measurement tool captures how the concept is activated in practice. This also allows it to be employed in studying other industries.

We switch gears with Richard Nyuur, Ružica Brečić and Patrick Murphy [12], whose contribution centres on managerial perceptions of firms' corporate sustainability strategies. Here, we learn from the profound insights from Croatia that there is a lack of a better understanding of how managerial perceptions serve as the bedrock for whether firms engage in practices that can be deemed sustainable or not. The study therefore sought to explain the perceptions of managers regarding sustainability practices. Contrary to what is known in research settings that tend to place emphasis on environmental and stakeholder issues such as employees and customers and suppliers, this study identifies three different stepwise categories undertaken by firms. More specifically, these distinct levels of strategic organisational responses are described as "sustainability as a minimal response, corporate culture-driven and committed response." These managerial perceptions are the bases for formulating novel research questions for future investigations into sustainability strategies.

Our penultimate paper was authored by Fred Yamoah, James Kaba, David Botchie and Joseph Amankwah-Amoah [13]. They employ a case study that focuses on "sustainable innovation for green waste benefit". The authors investigate the role of "awareness of consequences" in the adoption of shaded cocoa agroforestry in Ghana (the largest producers of cocoa in the world, along with Ivory Coast). They demonstrate how awareness of full-sun cocoa production is a step towards the adoption of shaded cocoa agroforestry practices that do three major things: (1) ensure soil perseveration; (2) facilitate better management

of wastes from cocoa farms; and (3), offer better yields in the medium and long term. Their main recommendation in a nutshell is that the employment of an "awareness of consequences"' strategy along with the spread of information on sustainable agro-practices (such as sustainable cocoa waste management) that affect the environment has several added sustainable advantages.

The final paper by Frederick Ahen and Joseph Amankwah-Amoah draws our attention to sustainable waste management innovations in Africa and proposes new perspectives and a research agenda for improving global health. Most importantly, this article sheds light on how exploitative extraction as a form of market violence affects the environment and population health and sustainability in general. The authors supply a framework that delineates the structural composition of costs imposed by market violence. This ranges from extraction to e-waste disposal. Additionally, the authors highlight a set of fundamental issues regarding enablers and inhibitors of sustainable innovations and policies for waste management worth considering as promising lines of future research. These include programmed obsolescence, irresponsible extraction, production, and consumption, all seen through the theoretical lens of market violence.

Put together, all five articles elucidate from different perspectives how we can achieve innovative sustainable waste management in very practical ways. As usual, all these interesting insights provide foundations for formulating new questions for future research. As Ahen and Amankwah-Amoah [14] propose, there is a need to re-evaluate the composition of costs incurred by developing nations, starting not only from waste disposal but also from the extraction. There are several avenues for research in this underdeveloped area as well. At this juncture, we want to express our gratitude to the reviewers of this issue for their precious time in reviewing the manuscripts, as well as the authors for their intellectual contributions to the discourse on sustainability. Our hope is that this Special Issue will inspire change and new streams of research that will broaden our understanding about the issue of waste management.

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