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THE ROLE OF TECHNOLOGY IN FOSTERING A CIRCULAR ECONOMY: LITERATURE REVIEW AND PRACTICAL IMPLICATIONS

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Abstract

The purpose of this research is to examine the role of technology in supporting the implementation of a circular economy through a literature review and identify the practical implications of adopting these technologies. The circular economy offers an alternative approach to the traditional linear model, prioritising waste minimisation and resource use optimisation. This research highlights various information and communication technologies, such as big data, blockchain, and the Internet of Things (IoT), which have the potential to revolutionise resource management and improve the efficiency of industrial processes. In addition, innovations in product design and manufacturing, including 3D printing and the development of new environmentally-friendly materials, are discussed as key factors in ensuring longer and more sustainable product lifecycles. The study also reviews the challenges and opportunities in the application of these technologies, including the need for cross-sector collaboration and supportive regulations. The results show that technology integration in the circular economy not only contributes to environmental sustainability but also to increased economic value. Therefore, recommendations are provided to support the acceleration of technology adoption through education and public awareness initiatives.

Keywords: Role of Technology, Circular Economy, Literature Review, Practical Implications.

Introduction

Over the past few decades, rapid global economic growth has led to significant environmental degradation due to overexploitation of natural resources. The traditional concept of linear economy - based on the practice of "take, make, dispose" - has proven to be unsustainable in the long run. The circular economy is an economic paradigm that aims to reduce waste and natural resource use by redesigning production and consumption systems so that materials and products can be sustainably reused or recycled (Clarke & Thomas, 2024) . The circular economy not only focuses on reducing negative environmental impacts, but also seeks to deliver economic and social value by promoting innovation and creating new opportunities in the value chain. As a response to these sustainability challenges, the concept of circular economy is emerging as a promising alternative. The circular economy emphasises waste reduction, reuse, and recycling of materials to create a more sustainable and environmentally friendly economic system (Svensson & Eriksson, 2023) .