

Assessing the Implementation of Blockchain Technology for Sustainable Electronic Waste Management Practices in Australia

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Abstract

Electronic waste commonly known as e-waste is among the fastest growing waste streams and has remained both a local and a global problem. Consequently, efficient management of e-waste has become a concern due to increasing urbanization, population growth and early obsolescence of electrical and electronic equipment. In Australia alone, it is estimated that more than 44 million tons of e-waste mainly from computers, laptops, television and mobile phones will be disposed of by 2028. This creates enormous environmental and health risks due to inappropriate recycling and disposal practices. This warrants the need to develop innovative approaches to address e-waste collection and recycling practices using technological innovations such as blockchain technology. Blockchain technology has the potential to substitute the slow manual processes used in e-waste management through creating digital asset token (e.g. security token) associated with e-waste tracking and tracing, and preventing e-waste ending up in landfills. This study aims to examine how blockchain technology can be used in the automation of processes for achieving sustainable e-waste management practices in Australia. The detailed processes involved in the implementation of blockchain technology for tracing, tracking and transparent e-waste management is examined. This study adopts a qualitative research method and employs semi-structured interviews of managers of local governments with responsibilities of managing e-waste. The findings of this study will significantly assist government agencies, industry, researchers, and other e-waste management agencies in reducing e-waste management costs and

streamlining business operations. This will ensure that e-waste is managed within established e-waste management guidelines to protect human health and the environment.

Keywords

E-waste management, blockchain technology, e-waste tracing, implementation and Australia.

Biographies

Lynda Andeobu is currently Lecturer – ICT in the School of Engineering and Technology at CQUniversity. Dr Andeobu is an active researcher and has published several research papers in international research conferences, refereed journals and book chapters. Her research interests include green ICT, electronic waste management, sustainability, artificial intelligence, information systems analysis, blockchain technologies, IoT, network and cybersecurity.

Santoso Wibowo is currently an Associate Professor - ICT and a Postgraduate Research Coordinator for the School of Engineering & Technology at CQUniversity. His research interests are in the areas of intelligent information systems, multicriteria decision analysis, image processing, knowledge management and e-learning. He has published in several international refereed journals such as Computers and Industrial Engineering, Computers and Mathematics with Applications, Expert Systems with Applications, International Journal of Fuzzy Systems, Waste Management, Journal of Cleaner Production and Science of the Total Environment as well as book chapters for Lecture Notes in Artificial Intelligence, Lecture Notes in Computer Science and Lecture Notes in Electrical Engineering.

Srimannarayana Grandhi is an Associate Professor and the Head of College, in the College of Information and Communications Technology. Dr Grandhi is an active researcher with research interests in educational technology, technology adoption, sustainability and multicriteria decision making. He has published several papers in reputed international conferences, and refereed journals and also participated in collaborative book chapters. He is currently teaching Blockchain technologies and Enterprise systems at Undergraduate and Postgraduate levels and supervising research students. Over the years, Dr Grandhi has published research papers at Excellence in Research for Australia (ERA) listed conferences and journals. He is also a guest editor for the special issue (Environmental Research and Public Health) of the International Journal of Environmental Research and Public Health.