

Technology Road Mapping in the Fourth Industrial Revolution: A Comprehensive Analysis and Strategic Framework

Authors : Abdul Rahman Hamdan

Abstract : The Fourth Industrial Revolution (4IR) has brought unprecedented technological advancements that have disrupted many industries worldwide. In keeping up with the technological advances and rapid disruption by the introduction of many technological advancements brought forth by the 4IR, the use of technology road mapping has emerged as one of the critical tools for organizations to leverage. Technology road mapping can be used by many companies to guide them to become more adaptable and anticipate future transformation and innovation, and avoid being redundant or irrelevant due to the rapid changes in technological advancement. This research paper provides a comprehensive analysis of technology road mapping within the context of the 4IR. The objectives of the paper are to provide companies with practical insights and a strategic framework of technology road mapping for them to navigate the fast-changing nature of the 4IR. This study also contributes to the understanding and practice of technology road mapping in the 4IR and, at the same time, provides organizations with the necessary tools and critical insight to navigate the 4IR transformation by leveraging technology road mapping. Based on the literature review and case studies, the study analyses key principles, methodologies, and best practices in technology road mapping and integrates them with the unique characteristics and challenges of the 4IR. The research paper gives the background of the fourth industrial revolution. It explores the disruptive potential of technologies in the 4IR and the critical need for technology road mapping that consists of strategic planning and foresight to remain competitive and relevant in the 4IR era. It also highlights the importance of technology road mapping as an organisation's proactive approach to align the organisation's objectives and resources to their technology and product development in meeting the fast-evolving technological 4IR landscape. The paper also includes the theoretical foundations of technology road mapping and examines various methodological approaches, and identifies external stakeholders in the process, such as external experts, stakeholders, collaborative platforms, and cross-functional teams to ensure an integrated and robust technological roadmap for the organisation. Moreover, this study presents a comprehensive framework for technology road mapping in the 4IR by incorporating key elements and processes such as technology assessment, competitive intelligence, risk analysis, and resource allocation. It provides a framework for implementing technology road mapping from strategic planning, goal setting, and technology scanning to road mapping visualisation, implementation planning, monitoring, and evaluation. In addition, the study also addresses the challenges and limitations related to technology roadmapping in 4IR, including the gap analysis. In conclusion of the study, the study will propose a set of practical recommendations for organizations that intend to leverage technology road mapping as a strategic tool in the 4IR in driving innovation and becoming competitive in the current and future ecosystem.

Keywords : technology management, technology road mapping, technology transfer, technology planning

Conference Title : ICTMI 2024 : International Conference on Technology Management and Innovation

Conference Location : Sydney, Australia

Conference Dates : February 26-27, 2024