Abstract:

The Internet of Things (IoT) represents a global network of interconnected smart devices, bridging the physical and digital realms. This study explores the utilization of IoT in supply chain management within the context of Industry 4.0, focusing on the opportunities and challenges faced by the retail sector in Australia. Through grounded theory-inspired interviews with executive managers, the research reveals how IoT implementation enhances the visibility of agricultural product transportation, facilitates data gathering, fosters partner interactions, and drives operational innovation.However, despite its potential benefits, the adoption of IoT in supply chains is hindered by several critical challenges. These include a lack of top administrative leadership commitment, the high costs associated with new technology integration, and resistance from stakeholders to embrace change. Additionally, issues such as reluctance to share data and compatibility problems between different partner systems further complicate the landscape. Thematic analysis conducted with NVivo software highlights these barriers, underscoring the need for strategic approaches to mitigate them. Ultimately, this study sheds light on the dual nature of IoT in supply chains, emphasizing both its transformative potential and the significant obstacles that must be addressed for successful implementation. As industries continue to navigate the complexities of digital transformation, understanding these dynamics will be crucial for leveraging IoT effectively in the evolving landscape of Industry 4.0.

1.Introduction:-

The study's origin, a supply chain manager, defined his views as "the influence of the Internet of Things is crazy." His perspective corresponds to an increasing amount of academic literature on the Internet of Things (IoT), which is defined as an Internet-enabled worldwide knowledgeable platform of uniquely addressable devices with sensing, networking, and actuation capabilities that facilitates information exchange between humans and machines in heterogeneous environments (Atzori, Iera & Morabito 2010; Birkel & Hartmann 2019; Borgia 2014; de Vass, Shee & Miah 2018). Based on Gartner, 5.8 billion enterprise and automotive IoT touchpoints will be used in 2020 (Gartner 2019).

As a result of its larger potential, Industry 4.0 regards the Online World of Things as the basic technology of cyber-physical systems. Their ability to use the power of the Internet to facilitating autonomy and communication is a necessity to .The conception of the "smart factory" (Ben-Daya et al. 2019; Hofmann & Rüsch 2017), which has been distinguished by self-sufficient ,Highly intelligent, sensor-driven, self-adjusting manufacturing systems (Rüsch & Hofmann, 2017). Along with the Internet growing worldwide rivalry, market turbulence, and Client demand provides more challenges to companies and their Supply networks will require innovative methods of creating value. (Manavalan & Jayakrishna 2018; Balaji & Roy 2017). As though There may have been suggestions that this new paradigm will come to life soon. The actuality of automation and digital technology caused by IoT in the context of logistics and supply chains has been employed for a long. Now (Hofmann & Rüsch 2017; Majeed & Rupasinghe 2017).Given that the SC s compete with each other, a digitallysynchronised one provides better visibility in an extended SC(Ben-Daya et al. 2019; Vanpoucke, Vereecke & Muylle2017).

According to Huddiniah and ER (2019), digitalisation is the best option for companies that are having trouble keeping up with the arising flow of goods and the lack of information essential for making timely decisions. A "smart" supply chain that helps get over the present constraints on real-time data collection and exchange relies on new technologies, such as IoT deployment at the endpoints (Attaran 2020; Birkel & Hartmann 2019; Sharma & Khanna 2020). Because of the Internet of Things' potential, affordability, and disruptive nature, it is necessary to integrate its sophisticated digital capabilities into core ICT infrastructure (Ben-Daya et al. 2019; de Vass et al. 2018; Hofmann & Rüsch 2017). However, managers experience multiple challenges while using it (Mishra et al. 2016).

2. LITERATURE REVIEW

2.1 The Internet of Things

An innovative mix of knowledge that connects the digital and physical worlds is the Internet of Things (IoT). It was first presented in 1999 with an emphasis on online item tracking by MIT's Auto-ID Unit for SCM. IoT devices are very powerful; they use the Internet as a data processing substrate, store mechanism ,and communication infrastructure. These days, large-scale analytics, online computing, social networks, and GPS telematics are included in IoT networks. Self-awareness, individuality, control, interconnectedness, adaptability, and smart behaviour are a few of the key features of the Internet of Things.

2.2 Industry 4.0 and IoT

Automation and digitisation are made possible by the Internet of Things (IoT), which is revolutionising the Industrial 4.0 era. The focus of this era is on intelligent machinery, goods, and services including maintenance, transportation, and quality-controlled production. Industry 4.0 requires the integration of Internet-connected technology with logistics procedures. The IoT platform offers notable performance advantages by assisting in the integration of supply chain operations with outside partners. There is a chance for a fully automated supply chain platform that requires little to no human involvement. Through information sharing, automated handling, and real-time tracking of product flows, the Internet of Things (IoT) can close information gaps between the three previous industrial revolutions.

2.3 IoT and Supply Chain Management

The Internet of Things (IoT) is a crucial technology in supply chain management, providing real-time data for various roles such as vendor communication, inventory tracking, and product monitoring. However, challenges like integration with diverse technologies, security, ethical considerations, and reducing e-waste are still present Future research should focus on interoperability and understanding how smart devices connect all channel partners to improve visibility and benefit channel partners. Open-ended questions and grounded theory approaches can help overcome these challenges.

3.Research methodology

This study uses an experimental design and grounded theory method to investigate IoT applications in retail supply chains in the Australian retail industry. The study focusses on the opinions of top managers regarding the usage of IoT in supply chain management. Non-random sampling was used to conduct thirteen interviews with participants and their organisations. The study examines IoT uptake and utilisation in retail enterprises using open-ended questions. NVivo 11 was utilised for line-by-line coding and categorisation during the open coding procedure and content analysis method analyses of the data. Through axial coding, the researchers also aimed to find patterns and connections within the data.

4.Research Analysis

4.1 Overview

The sample, comprising 12 retail sectors, includes large firms (7+200 employees) and medium-sized (5) firms, categorized into bricks-and-mortar, e-tailing, and omnichannel retail forms, with anonymized individual identities.

4.2 Perception and Progression of the IoT

Devices that use the Internet to connect anywhere, at any time, and access information whenever and wherever they choose are referred to as the Internet of Things (IoT) in general. It enables real-time information access, remote device updates, and quick communication. Rather than being a single specialised technology, the Internet of Things is a brilliant fusion of multiple core technologies that are evolving into new forms. Retailers are keen to investigate its possibilities and have high hopes for it in supply chain management (SCM). Although no subject SC has used RFID technology yet, it is anticipated to have benefits for product identification. The recommended short-term method for product identification is still open and closed standard barcoding, while image recognition is being investigated as a potential substitute.

4.3 Data Capture, Analysis, and Sharing

Since IoT simply gathers data, Whitmore et al. (2014) highlight the significance of IoT in the "big data movement" while limiting the breadth and power of analysis. Ten retailers and seven merchants talked on the benefits of analysing IoT data, emphasising the possibility it brings in comparison to traditional ICT and the enormous volume of data being collected. Businesses must collect data effectively if they want to remain competitive and change with the times.

5.Discussion

IoT technologies are being adopted by Australia's retail sector in order to boost worker productivity, communication speed, and operational efficiency. RFID technology built on the chip provides improved partner communication, data collecting, and visibility. The expense of investments, a lack of managerial vision, employee opposition, and apprehension about new technologies are obstacles, nevertheless. Adoption is further hampered by problems with standardisation, interoperability, and data sharing. Retailers could fund training initiatives, set aside time for self-education, and encourage collaboration among supply chain participants in order to overcome challenges. Using 5G and Industry 4.0 networks will accelerate the adoption of IoT. The topic of discussion will include the role of 5G networks, safe data sharing, and how merchants may weigh the costs and advantages of IoT investments.

6.Implementation

This study explores the challenges and opportunities of IoT adoption in Supply Chain Management (SCM) despite the literature's hype. It identifies opportunities and challenges, such as limited willingness to share data with trading partners, issues of interoperability, and standardization in the adoption of these technologies. The study also highlights the importance of IoT adoptio in accelerating digitalization globally to effectively manage supply chains in the post-COVID-19 context. Retailers are aware of IoT-driven real-time streaming analytics and reporting, but face challenges like time constraints, lack of top management initiatives, inadequate interoperability with legacy technologies, employee resistance, privacy issues, and reliable internet connectivity. The study suggests that SCs need to be proactive in adopting and integrating ICT systems rather than being reactive in a piecemeal basis. The findings also suggest a drive for consolidation of devices and the development of alternative skills suitable for Industry 4.0.

7.Conclusion

This qualitative study examines the drivers, enablers, benefits, challenges, and barriers of IoT adoption in Supply Chain Management (SCM) in Australia. The interdisciplinary study between SCM and Information Systems provides insights for researchers and practitioners, guiding the digitalisation of supply chains during and after the COVID-19 context. Future studies should include vertical and horizontal collaborators and incorporate 3PL service providers.

8.Refernces:

Alieva, J., & Haartman, R. (2020). Digital Muda-The New Form of Waste by Industry 4.0. Operations and Supply Chain Management: An International Journal, 13(3), 269-278. Ardolino, M., Rapaccini, M., Saccani, N., Gaiardelli, P., Crespi, G., & Ruggeri, C. (2017). The role of digital technologies for the service transformation of industrial companies. International Journal of Production Research, 56(6), 2116-2132. Attaran, M. (2020). Digital technology enablers and their implications for supply chain management.