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Implementation of IoT in 3PL/4PL Industry - Challenges; Enablers & Success Factors

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ABSTRACT: The integration of Internet of Things (IoT) technology in the realm of third-party logistics (3PL) and fourth-party logistics (4PL) has garnered significant attention in recent years. IoT offers promising prospects for enhancing efficiency, visibility, and control across the supply chain. However, the implementation of IoT in the 3PL/4PL industry is not devoid of challenges. This research report aims to explore the challenges, enablers, and success factors associated with the adoption of IoT in the 3PL/4PL domain. The advent of the Internet of Things (IoT) has heralded a new era of connectivity and digital transformation across various industries, revolutionizing the way businesses operate and interact with their environments. In the realm of logistics and supply chain management, the integration of IoT technology holds immense promise for enhancing efficiency, visibility, and control throughout the entire value chain. Third-party logistics (3PL) and fourth-party logistics (4PL) providers, tasked with orchestrating complex logistics operations on behalf of their clients, stand to benefit significantly from the adoption of IoT solutions. However, the journey towards IoT implementation in the 3PL/4PL industry is fraught with challenges, while also being propelled by a multitude of enablers and success factors. This study investigates the application of the Internet of Things (IoT) in third- and fourth-party logistics. The text examines the impact of modern technology on logistics organisations and how they have had to modify their business strategies to stay competitive in the global market. The study examines pertinent literature on the application of Internet of Things (IoT) and the aspects related with it. Furthermore, a main research study is undertaken, which involves conducting four qualitative interviews with different companies. The results illustrate the efficacy of IoT in revolutionising the business models of third- and fourth-party logistics, empowering them to flourish in a dynamic landscape and maintain their competitiveness. This study investigates the influence of Internet of Things (IoT) integration on logistics, taking into account both the advantages and difficulties it presents. The logistics and transport sectors are crucial for modern economies, as they contribute to enhancing a country's competitiveness. However, they also pose important social and environmental issues. In 2015, the expenses related to the management and movement of goods, known as logistics and transportation costs, represented 7.85% and 9-10% of the Gross Domestic Products (GDPs) of the United States and the European Union, respectively. This thesis aims to explore the diverse possibilities of the Internet of Things (IoT) and how emerging technologies and enhanced connectivity and visibility might enhance the supply chain. This chapter will begin with a brief introduction, followed by an assessment of the existing lack of information in this field.

KEYWORDS - IoT, supply chain, Industry 4.0, Logistics 4.0, IoT adoption, IoT systems, 3PL, 4 PL

I.OVERVIEW OF IOT IN 3PL/4PL INDUSTRY

To understand the significance of implementing IoT in the 3PL/4PL industry, it is imperative to grasp the fundamental concepts of IoT and its relevance to logistics and supply chain management. IoT refers to a network of interconnected devices embedded with sensors, actuators, and communication technologies, enabling them to collect, exchange, and analyze data autonomously. These IoT-enabled devices, ranging from RFID tags and GPS trackers to temperature sensors and smart pallets, empower organizations to monitor assets, track shipments, optimize routes, and streamline operations in real-time.

IoT refers to a network of interconnected devices embedded with sensors, software, and other technologies, enabling them to collect and exchange data. In the context of 3PL/4PL, IoT facilitates real-time tracking, monitoring, and management of goods, assets, and processes throughout the supply chain.

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II.LITERATURE REVIEW

A. The Internet of Things

The Internet of Things (IoT) is not a singular technology, but rather a collaborative union of multiple complimentary technologies aimed at connecting the digital and physical realms. The term 'Internet of Things' was initially introduced in 1999 by the members of the Massachusetts Institute of Technology's (MIT) Auto-ID Centre for Supply Chain Management. It refers to a system that enables the tracking of items through the Internet using radio-frequency identification (RFID) technology. This technology is linked to an Electronic Product Code (EPC), which serves as a unique identifier for each individual item. The Internet of Things (IoT) has emerged as a transformative technology paradigm with far-reaching implications across various domains, including healthcare, agriculture, manufacturing, transportation, and smart cities. This literature review provides an overview of key concepts, trends, challenges, and opportunities surrounding IoT, drawing insights from scholarly research and industry publications.

B. Industry 4.0 and the Internet of Things (IoT)

The Internet of Things (IoT) is said to facilitate the emergence of the Industry 4.0 era, characterised by automation and digitalization. The first three industrial revolutions were characterised by the use of mechanical power (Industry 1.0), mass production (Industry 2.0), and the digital revolution (Industry 3.0). In contrast, Industry 4.0 introduces smart products, smart machines, and intelligent services, including quality-controlled production logistics and maintenance. Germany's introduction of the Industry 4.0 programme in 2011, followed by its inclusion as a key topic on the 2016 World Economic Forum's agenda, has brought the Internet of Things (IoT) into the spotlight as one of the most impactful technologies. In order for Industry 4.0 to truly revolutionise industrial production, it is essential for supply chains (SCs) to operate seamlessly by embracing digitalization, self-assistance, and information sharing. The integration of Industry 4.0 and IoT technologies has profound implications across various domains within the manufacturing sector. Smart factories leverage IoT-enabled sensors and devices to monitor equipment health, optimize production processes, and enable predictive maintenance (Lu et al., 2017).

C. The intersection of IoT and Supply Chain Management

The implementation of the Internet of Things (IoT) in the industry extends beyond just major, well-equipped companies and their supply chains (SCs). It is a widely accessible and extensively utilised technology in supply chain management (SCM). It serves various functions such as connecting information with vendors, collecting real-time progress data from vendors, offering visibility on parts and raw materials, generating real-time quality and maintenance data, tracking inventory, sharing information and joint ordering, monitoring quality and controlling logistics, facilitating reverse logistics, and capturing product data during use to optimise operational efficiency and maximise revenue opportunities. Sensor technologies are becoming more widespread in vehicles, allowing for immediate communication between the vehicle and its surroundings. This contributes to higher speeds, vehicle platooning to cut travel times, and improved utilisation of existing infrastructure. The presence and examination of real-time data from IoT devices ultimately help stakeholders to make more informed operational decisions and improve their strategic capabilities. Hopkins and Hawking (2018) provide evidence of the impact of IoT and big data analytics on a logistics firm's driver safety, operational efficiency, and environmental performance at both the supply chain and firm levels.

III.METHODOLOGY

This study examines the use of Internet of Things (IoT) applications in retail supply chains. The research approach involves conducting interviews with a sample of participants from the Australian retail industry. Therefore, it produces fresh empirical data and perspectives to verify, expand, and enhance the IoT proof-of-concept. The interviews are considered appropriate for the following reasons:

a) The exploratory design allows for the early identification of the phenomenon.

b) Qualitative methods are effective in understanding managers' perspectives on the phenomena, as demonstrated by Mello and Flint (2009).

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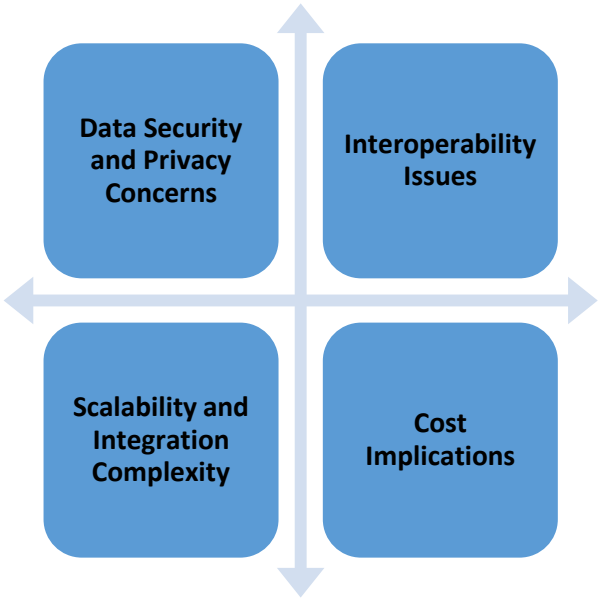
c) Interviews provide insight into the complex phenomena by investigating the interaction between individuals and technologies in a complex supply chain, as shown by Randall, Flint, and Mello (2012).

Research Approach

A grounded theory (GT) technique is appropriate for evolving and complicated research circumstances since it enables researchers to maintain an unbiased perspective. Previous studies on the Internet of Things (IoT) in the supply chain management (SCM) setting have utilised Grounded Theory (GT) as a means to commence the research process with a receptive mind-set (Tu 2018). The GT methodology focuses on the methodical collection and analysis of data in order to generate theories, gain insights into a novel phenomenon, and formulate research hypotheses for further investigation. The GT is crucial as it enables researchers to maintain a receptive mind-set in order to discover novel notions that are inspired by emergent patterns.

Challenges:



a. Data Security and Privacy Concerns:

One of the primary challenges in implementing IoT in the 3PL/4PL industry is ensuring the security and privacy of sensitive data transmitted by IoT devices. With a plethora of interconnected devices, the risk of cyber-attacks and data breaches increases, posing a significant threat to the integrity of the supply chain. Despite the promises of IoT in revolutionizing the logistics industry, its implementation in the 3PL/4PL domain is not without challenges. One of the primary hurdles is data security and privacy concerns. With a plethora of interconnected devices transmitting sensitive information across networks, the risk of cyber-attacks, data breaches, and unauthorized access looms large.

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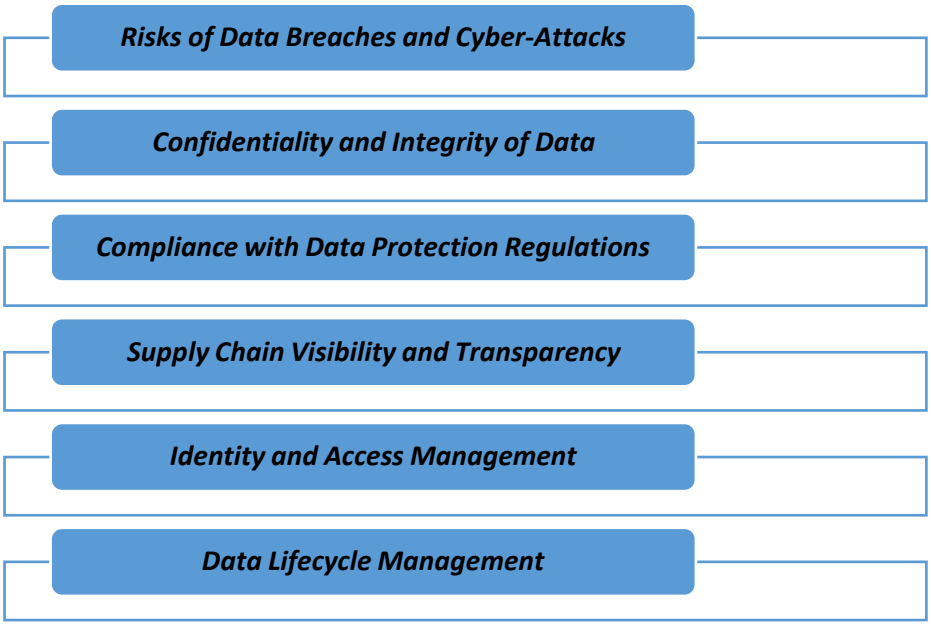

- ***Risks of Data Breaches and Cyber-Attacks:***

One of the primary concerns in the implementation of IoT in the 3PL/4PL industry is the risk of data breaches and cyber-attacks. With an increasing number of IoT devices deployed throughout the supply chain, the attack surface for malicious actors expands, making logistics networks vulnerable to various security threats.

- ***Confidentiality and Integrity of Data:***

Maintaining the confidentiality and integrity of data transmitted by IoT devices is paramount in the 3PL/4PL industry. IoT devices often collect and transmit sensitive information such as shipment details, location data, and inventory levels. Unauthorized access to this data can lead to breaches of confidentiality, exposing proprietary information or sensitive customer data to unauthorized parties.

- ***Compliance with Data Protection Regulations:***

Compliance with data protection regulations such as the General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA) presents a significant challenge for logistics providers implementing IoT solutions.

- ***Supply Chain Visibility and Transparency:***

While IoT technology enhances supply chain visibility and transparency, it also raises concerns about data ownership, sharing, and control. In multi-party logistics ecosystems involving multiple stakeholders such as shippers, carriers, and third-party logistics providers, determining ownership and responsibility for IoT-generated data can be challenging.

- ***Identity and Access Management:***

Identity and access management (IAM) is critical in mitigating data security risks associated with IoT deployments in the 3PL/4PL industry. IoT devices and sensors authenticate users and grant access to data based on predefined permissions and policies. Weaknesses in IAM practices, such as inadequate password policies, lack of multifactor authentication, or unauthorized access privileges, can result in unauthorized access to IoT devices or data.

- ***Data Lifecycle Management:***

Effective management of the data lifecycle is essential to address data security and privacy concerns in IoT implementations. From data collection and transmission to storage, processing, and disposal, each stage of the data

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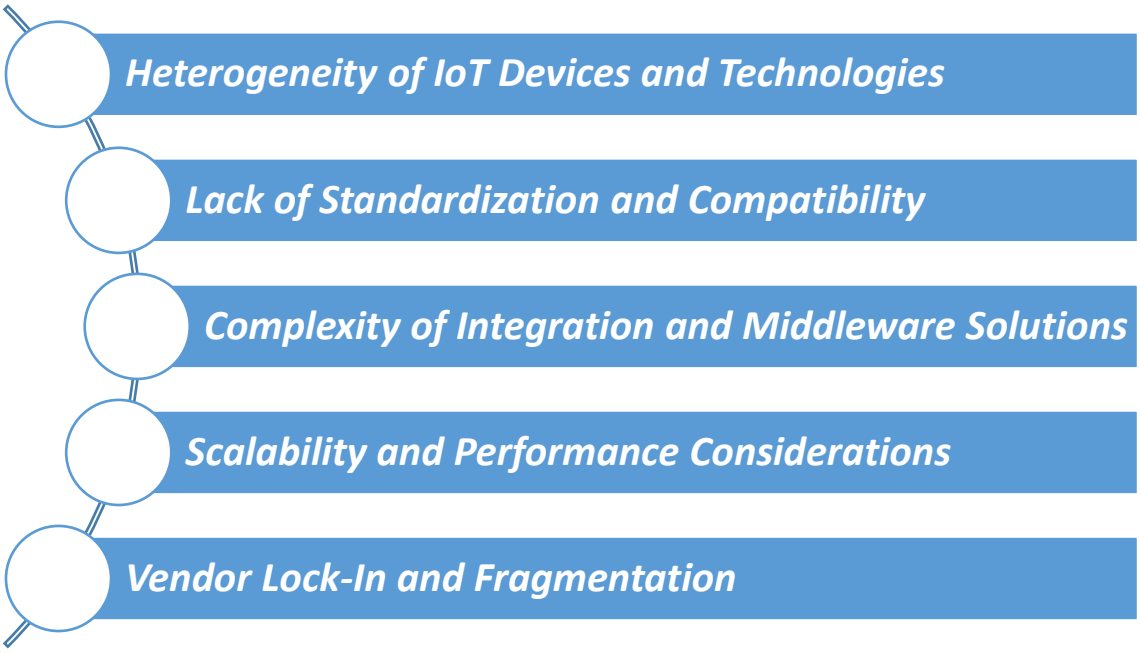
lifecycle presents unique security challenges and considerations. Implementing data encryption, anonymization, techniques during data transmission and storage helps protect data confidentiality and privacy.

b. Interoperability Issues:

The diverse array of IoT devices, protocols, and standards from different manufacturers often leads to compatibility challenges, hindering seamless data exchange and integration across the supply chain ecosystem. The implementation of Internet of Things (IoT) technology in the third-party logistics (3PL) and fourth-party logistics (4PL) industry holds the promise of enhancing operational efficiency, visibility, and decision-making capabilities.

- ***Heterogeneity of IoT Devices and Technologies:***

One of the primary challenges in achieving interoperability in the 3PL/4PL industry is the heterogeneity of IoT devices, protocols, and technologies. IoT devices come in various forms, ranging from sensors and RFID tags to GPS trackers and telematics devices, each employing different communication protocols, data formats, and connectivity standards



- ***Lack of Standardization and Compatibility:***

The absence of standardized protocols and interoperability frameworks hinders the seamless communication and integration of IoT devices and systems in the 3PL/4PL industry. Unlike traditional IT systems and networks, which often adhere to well-defined standards and protocols, IoT ecosystems lack uniformity and consistency in terms of communication protocols, data formats, and interfaces.

- ***Complexity of Integration and Middleware Solutions:***

  Integrating diverse IoT devices and systems into existing 3PL/4PL operations entails significant complexity and requires robust middleware solutions capable of bridging interoperability gaps. Middleware platforms act as intermediaries between IoT devices and backend systems, translating data between different protocols, formats, and standards.

- ***Scalability and Performance Considerations:***

Achieving interoperability at scale is a critical consideration in the implementation of IoT in the 3PL/4PL industry. As IoT deployments expand to encompass a multitude of devices and sensors across the supply chain, ensuring scalability and performance becomes paramount. Interoperability solutions must be capable of supporting large-scale IoT deployments with thousands or even millions of devices, while maintaining low latency, high throughput, and reliability.

- ***Vendor Lock-In and Fragmentation:***

Vendor lock-in and fragmentation pose additional interoperability challenges in the 3PL/4PL industry, limiting choice, flexibility, and interoperability among IoT solutions. Some logistics providers may rely on proprietary IoT platforms or solutions offered by specific vendors, leading to vendor lock-in and dependency on proprietary technologies.

C. Scalability and Integration Complexity:

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Scalability and integration complexity represent additional challenges in the implementation of IoT in the 3PL/4PL industry. As the scale of IoT deployment expands to encompass a multitude of devices and sensors across various touchpoints in the supply chain, managing and integrating the vast volumes of data generated becomes increasingly complex. As the scale of IoT deployment expands, managing and integrating a large volume of data generated by disparate devices become increasingly complex. Organizations may encounter difficulties in scaling up IoT infrastructure and integrating IoT data with existing systems, leading to operational inefficiencies.

- ***Scalability Challenges in IoT Deployments:***

One of the primary challenges in implementing IoT in the 3PL/4PL industry is ensuring scalability to support the growing volume of devices, data, and interactions within the logistics ecosystem. As IoT deployments expand to encompass a multitude of sensors, devices, and endpoints across the supply chain, managing scalability becomes increasingly complex. Scalability challenges may arise in various aspects of IoT deployments, including network infrastructure, data storage, processing power, and device management.

- ***Network Bandwidth and Connectivity Constraints:***

Network bandwidth and connectivity constraints pose significant scalability challenges in IoT deployments, particularly in remote or resource-constrained environments. IoT devices transmit large volumes of data over wireless or cellular networks, placing strain on network bandwidth and infrastructure. Limited bandwidth and connectivity may result in latency, packet loss, or network congestion, adversely affecting the performance and responsiveness of IoT applications.

- ***Data Storage and Processing Requirements***:

Managing the vast amounts of data generated by IoT devices poses scalability challenges in terms of data storage and processing requirements. IoT deployments generate terabytes or even petabytes of data daily, necessitating scalable storage solutions capable of handling large volumes of data efficiently. Moreover, processing and analysing IoT data in real-time or near real-time require scalable computing resources, such as cloud computing or edge computing platforms.

- ***Device Management and Lifecycle Support:***

Managing a diverse fleet of IoT devices deployed across the supply chain poses scalability challenges in terms of device provisioning, configuration, monitoring, and maintenance. As the number of IoT devices increases, logistics providers must manage device lifecycle activities, such as firmware updates, security patches, and asset tracking, at scale.

- ***Integration Complexity with Existing Systems:***

Integrating IoT solutions with existing 3PL/4PL systems and processes presents significant integration complexity challengesAdditionally, integrating IoT data with enterprise systems such as Warehouse Management Systems (WMS), Transportation Management Systems (TMS), and Enterprise Resource Planning (ERP) systems requires extensive customization, configuration, and integration efforts. Addressing integration complexity requires adopting standardized interfaces, middleware solutions, and integration platforms that facilitate interoperability and seamless data exchange between IoT systems and existing infrastructure.

d. Cost Implications:

The upfront costs associated with deploying IoT infrastructure, including sensors, connectivity, and data analytics platforms, can be substantial. Additionally, ongoing expenses related to maintenance, upgrades, and cybersecurity measures further escalate the total cost of ownership, posing financial challenges for organizations, especially smaller players in the 3PL/4PL industry. Moreover, the cost implications associated with IoT implementation pose significant challenges for logistics providers, particularly smaller players with limited resources. This article explores the various cost implications associated with the implementation of IoT in the 3PL/4PL industry, examining their impact, drivers, and potential strategies for cost optimization.

- ***Upfront Investment in IoT Infrastructure:***

One of the primary cost implications of implementing IoT in the 3PL/4PL industry is the upfront investment required in IoT infrastructure. Deploying IoT solutions entails acquiring and deploying a diverse array of IoT devices, sensors, gateways, and connectivity hardware throughout the supply chain network. Additionally, logistics providers need to invest in IoT platforms, software, and analytics tools to manage and analyze the vast amounts of data generated by IoT devices.

- ***Cost of IoT Devices and Sensors:***

The cost of IoT devices and sensors represents another significant component of the overall cost of implementing IoT in the 3PL/4PL industry. IoT devices come in various forms, ranging from simple RFID tags and barcode scanners to sophisticated GPS trackers and temperature sensors. The cost of IoT devices varies depending on factors such as functionality, performance, connectivity options, and scalability. High-quality, reliable IoT devices may command higher upfront costs, particularly for specialized applications requiring ruggedized, industrial-grade hardware.

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- ***Connectivity Costs and Data Transmission Fees:***

Connectivity costs and data transmission fees constitute ongoing operational expenses associated with IoT deployments in the 3PL/4PL industry. IoT devices transmit data over wireless, cellular, or satellite networks, incurring costs based on data usage, bandwidth consumption, and network connectivity options.

- ***Maintenance, Upkeep, and Support Costs:***

Maintenance, upkeep, and support costs represent ongoing operational expenses associated with maintaining and managing IoT infrastructure in the 3PL/4PL industry. IoT devices require regular maintenance, firmware updates, and software patches to ensure optimal performance, reliability, and security.

- ***Data Storage and Analytics Costs:***

The storage and analysis of vast amounts of data generated by IoT devices incur additional costs for logistics providers. IoT deployments generate terabytes or even petabytes of data daily, requiring scalable storage solutions and data analytics platforms capable of handling large volumes of data efficiently. Cloud-based storage and analytics services offer scalability, flexibility, and cost-effectiveness compared to traditional on-premises infrastructure.

- ***Total Cost of Ownership (TCO) Considerations:***

Evaluating the total cost of ownership (TCO) is essential in assessing the overall cost implications of implementing IoT in the 3PL/4PL industry. TCO encompasses not only upfront investment and operational expenses but also indirect costs such as downtime, training, scalability, and opportunity costs. Logistics providers must consider the long-term financial implications of IoT deployments, including ROI projections, payback periods, and cost-benefit analyses.

Enablers

Despite the challenges posed by IoT implementation in the 3PL/4PL industry, several enablers contribute to its successful adoption and integration. Standardization and interoperability frameworks play a pivotal role in addressing interoperability challenges and facilitating seamless communication among IoT devices and systems.

a. Standardization and Interoperability Frameworks:

Standardization efforts by industry consortia and regulatory bodies play a crucial role in addressing interoperability challenges. Establishing common protocols, interfaces, and data formats enhances compatibility and facilitates seamless communication among IoT devices and systems. The implementation of Internet of Things (IoT) technology in the third-party logistics (3PL) and fourth-party logistics (4PL) industry promises to revolutionize supply chain operations by enhancing visibility, efficiency, and decision-making capabilities.

b. Advances in Sensor Technology:

Continuous advancements in sensor technology, including miniaturization, enhanced sensing capabilities, and reduced costs, enable the deployment of cost-effective and efficient IoT solutions in the 3PL/4PL domain. Sensor innovations contribute to improved data accuracy, reliability, and real-time monitoring capabilities. Advancements in sensor technology represent another significant enabler of IoT implementation in the logistics industry.

c. Cloud Computing and Edge Computing:

Cloud computing and edge computing technologies offer scalable and flexible infrastructure for processing and analysing IoT data. Cloud-based platforms facilitate centralized data storage, analytics, and visualization, while edge computing enables real-time data processing at the network edge, reducing latency and enhancing responsiveness in mission-critical applications.

d. Regulatory Support and Compliance:

Regulatory frameworks governing data privacy, security, and interoperability standards provide a conducive environment for IoT adoption in the 3PL/4PL industry. Compliance with regulatory requirements enhances trust among stakeholders and fosters greater confidence in IoT-enabled supply chain solutions. The implementation of Internet of Things (IoT) technology in the third-party logistics (3PL) and fourth-party logistics (4PL) industry has the potential to

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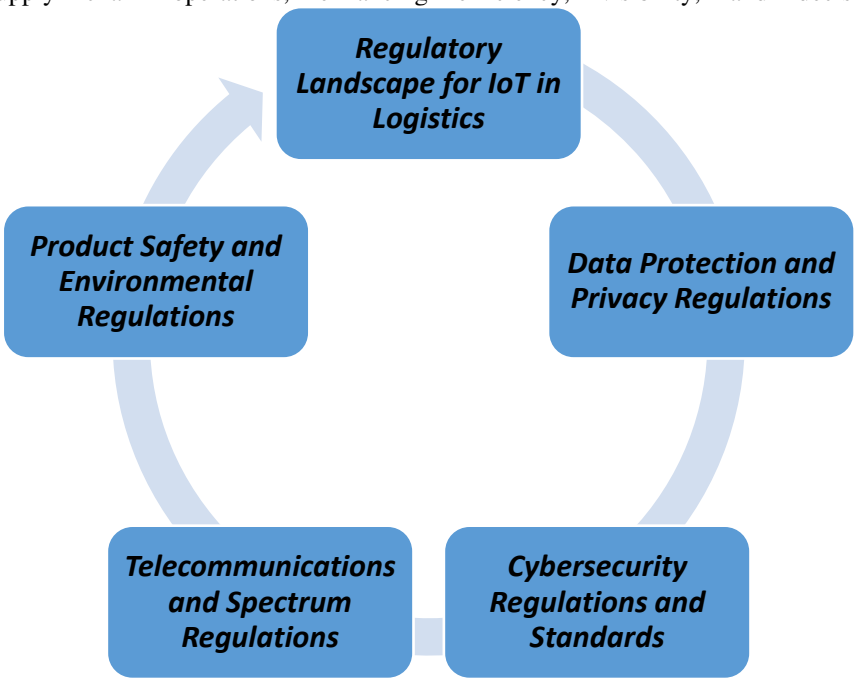
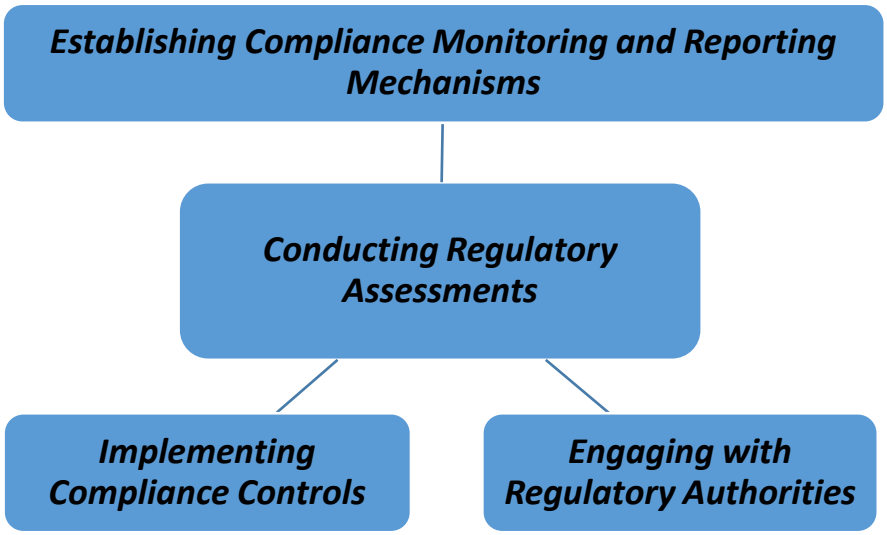
transform supply chain operations, enhancing efficiency, visibility, and decision-making capabilities.



Challenges and Strategies for Compliance:

Achieving regulatory compliance in IoT deployments in the 3PL/4PL industry poses several challenges, including the complexity of regulatory requirements, jurisdictional differences, and evolving regulatory landscapes. To address these challenges, logistics providers must adopt a proactive approach to compliance that involves:



Success Factors

While addressing challenges and leveraging enablers are crucial steps towards successful IoT implementation in the 3PL/4PL industry, several success factors further contribute to achieving desired outcomes and driving tangible business value.

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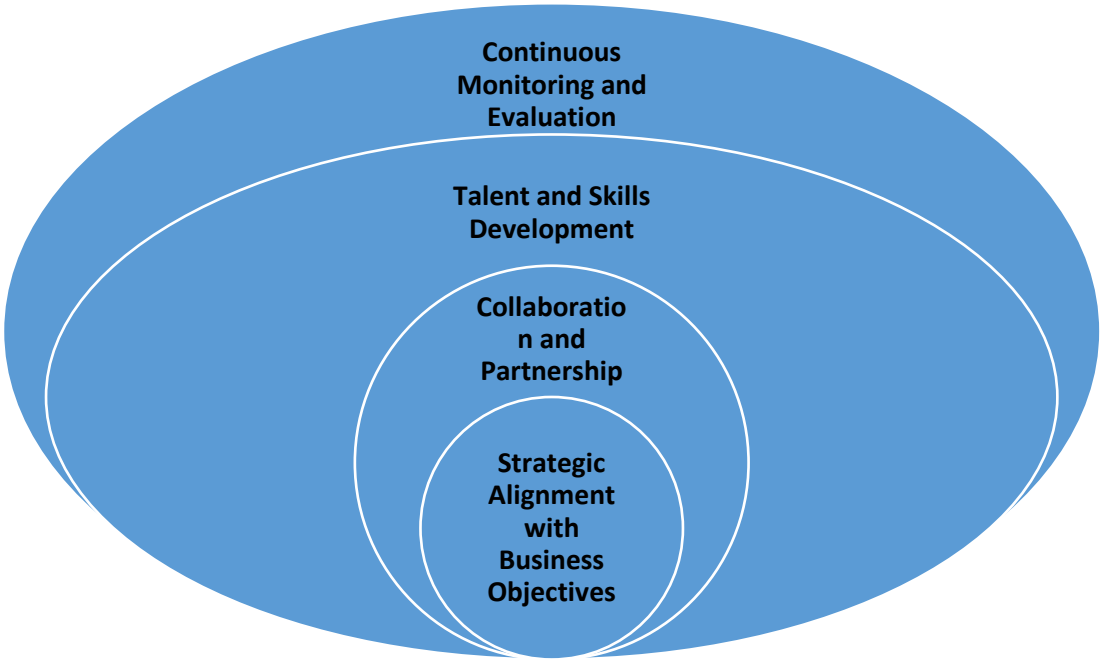

IV.CONCLUSION

In conclusion, while the implementation of IoT in the 3PL/4PL industry presents numerous challenges, leveraging the right enablers and focusing on key success factors can mitigate risks and unlock significant opportunities for enhancing supply chain efficiency, visibility, and competitiveness. By addressing issues such as data security, interoperability, and scalability, organizations can harness the transformative potential of IoT to drive innovation and create value in the dynamic landscape of logistics and supply chain management. The implementation of IoT in the 3PL/4PL industry represents a transformative opportunity to enhance efficiency, visibility, and control across the supply chain. While challenges such as data security, interoperability, scalability, and cost pose significant hurdles, leveraging enablers such as standardization, sensor technology, cloud computing, and regulatory support can mitigate risks and unlock the full potential of the area.

REFERENCES

1. 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), pp. 269-78
2. 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), pp. 2116-32.
3. Attaran, M. (2020), Digital technology enablers and their implications for supply chain management, Supply Chain Forum: An International Journal, pp.1-15. DOI: 10.1080/16258312.2020.1751568
4. Atzori, L, Iera, A & Morabito, G. (2010), The Internet of Things: A survey', Computer Networks, 54(15), pp. 2787-805.
5. Balaji, M & Roy, SK. (2017), Value co-creation with Internet of things technology in the retail industry, Journal of Marketing Management, 33(1-2), pp. 7-31.
6. Baldwin, R & Tomiura, E. (2020), Thinking ahead about the trade impact of COVID-19, Economics in the Time of COVID-19, 59, pp.59-71.
7. Ben-Daya, M., Hassini, E., & Bahroun, Z. (2019), Internet of things and supply chain management: a literature review, International Journal of Production Research, 57(15-16), pp. 4719-4742.

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