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IMMERSIVE TECHNOLOGIES AND SUPPLY CHAIN MANAGEMENT: A SYSTEMATIC LITERATURE REVIEW.

TECHNOLOGIES IMMERSIVES ET SUPPLY CHAIN MANAGEMENT : UNE REVUE SYSTÉMATIQUE DE LA LITTÉRATURE.

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ABSTRACT

As consumer preferences evolve toward transparency and fast delivery, companies are increasingly turning to immersive technologies such as Augmented Reality (AR), Virtual Reality (VR), and the Metaverse to enhance their supply chain management (SCM). These technologies, which have been evolving for over six decades, offer significant advantages, including improved operational efficiency, customer experience, and sustainability. Despite their growing adoption, there is a noticeable gap in the literature regarding a comprehensive analysis of their impact on SCM.

This paper presents a systematic review, following the PRISMA model, of immersive technologies in SCM. We identify three key areas where these technologies are transforming SCM: intelligent manufacturing, customer experience, and sustainability. Additionally, we highlight the challenges and transformative opportunities that these technologies present for businesses. Our findings contribute to the theoretical understanding of the relationship between immersive technologies and SCM and provide directions for future research.

This study offers valuable insights for both researchers and practitioners, demonstrating how immersive technologies can optimize inventory management, enhance product design, and improve logistics, while also fostering sustainability and customer engagement. Future research should focus on empirical studies to better understand the practical application of these technologies across sectors and industries.

Key Words: **Immersive technologies; Supply chain management; Augmented reality; Virtual reality; Metaverse.**

RÉSUMÉ

À mesure que les préférences des consommateurs évoluent vers plus de transparence et de rapidité de livraison, les entreprises se tournent de plus en plus vers les technologies immersives telles que la réalité augmentée (RA), la réalité virtuelle (RV) et le métavers pour améliorer leur gestion de la chaîne d'approvisionnement (GCA). Ces technologies, en développement depuis plus de six décennies, offrent des avantages significatifs, notamment en termes d'efficacité opérationnelle, d'expérience client et de durabilité. Malgré leur adoption croissante, il existe un manque notable dans la littérature concernant une analyse globale de leur impact sur la GCA.

Cet article présente une revue systématique, suivant le modèle PRISMA, des technologies immersives dans la GCA. Nous identifions trois domaines clés dans lesquels ces technologies transforment la GCA : la fabrication intelligente, l'expérience client et la durabilité. De plus, nous mettons en évidence les défis et les opportunités de transformation que ces technologies offrent aux entreprises. Nos résultats contribuent à la compréhension théorique de la relation entre les technologies immersives et la GCA, et offrent des pistes pour de futures recherches.

Cette étude fournit des éclairages précieux tant pour les chercheurs que pour les praticiens, en démontrant comment les technologies immersives peuvent optimiser la gestion des stocks, améliorer la conception des produits et renforcer la logistique, tout en favorisant la durabilité et l'engagement des clients. Les recherches futures devraient se concentrer sur des études empiriques afin de mieux comprendre l'application pratique de ces technologies dans différents secteurs et industries.

***Mot clefs*: Technologies immersives, Supply Chain Management, Réalité augmentée, Réalité virtuelle, Métavers**

1. INTRODUCTION

As consumer preferences continue to evolve, Flexibility, adaptability, and proactivity are becoming increasingly important, companies increasingly turn to advanced tech to anticipate market trends, customized their offer and maintain competitiveness.

With shifting consumer preferences toward transparency and fast delivery, and the rise of immersive technologies, Supply chain management is undergoing a significant revolution with digital transformation.

The concept of immersive technology dates back 60 years, with the creation of the "Man-Machine Graphical Communication System" (Sutherland, 1964). Over time, scholars have developed varying definitions to capture its multifaceted nature. (Slater, 2009) defines immersive technology as systems providing users with high-quality sensory input, focusing on its ability to enhance user engagement through sensory immersion. Lee, Chung, and Lee (2012) emphasize its capacity to blur the boundaries between real and virtual worlds, creating a deep sense of presence.

A more comprehensive perspective is offered by Suh and Prophet (2018), who describe immersive technology as encompassing Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR), all positioned along the reality-virtuality continuum (Milgram & Kishino, 1994). This continuum spans from the real environment to fully virtual environments, with AR overlaying digital elements onto the physical world to enhance user experience (Azuma, 1997), and MR blending physical and virtual elements interactively in a shared space (Milgram & Kishino, 1994; Tang et al., 2018).

By implementing immersive technologies to their supply chain management, companies can enhance inventory management (Bag, 2023), improve product design (Domingos et al., 2024),

optimize logistics costs (Epe et al.,2024), reduce working load and training time (Fahian Huq, 2022), and ensure an effective retail merchandising (Wei-Han Tan, et al.,2023)

These innovative technologies not only boost companies SCM performance by enabling the Stimulation of Supply chain scenarios but also provide opportunities to better understand consumer behavior and elevate customer engagement (Chylinski et al.,2020); (Heller et al.,2020).

The existing literature reveals several noteworthy gaps on the intersection areas of immersive technologies and supply chain management highlighting the need for a comprehensive systematic review.

While previous studies have explored the role of immersive technologies in improving the company's productivity and customer experience, a holistic analysis of the implications of immersive technologies across the companies supply chain management is conspicuously absent.

Furthermore, while addressing supply chain management digitalization, the existing literature focuses majorly on IT systems and technologies like blockchain, robotics and automation and AI, few researchers discuss the Immersive technologies.

This article seeks to fill this gap, our aim is to explore in what way the Immersive technologies impact supply chain management and to present the challenges and the opportunities of these emerging technologies for SCM. Thus, offering new insights for researchers and practitioners.

To achieve this aim, this paper presents a rigorous Systematic Review reported following the PRISMA model of immersive technologies in supply chain management. It offers a comprehensive analysis of the application of various advanced technologies to supply chain management

This review emphasizes the originality of the contributions to the theoretical understanding of the relationship between SCM and immersive technologies such as augmented reality, virtual reality, and the metaverse, and lays the foundation for future studies that can provide robust empirical evidence.

This study presents 2 key contributions:

1. It identifies through the existing literature the 3 relevant dimensions of the relation between immersive technologies and Supply chain management. The three perspectives are explained and analyzed in the three sections of the discussion and findings part of this paper as followed: 1- Intelligent manufacturing, 2- Customer experience, 3- Sustainability.

2. It presents the challenges and the transformative opportunities provided by immersive technologies in supply chain management.

2. METHODOLOGY

This article is based on a systematic review to provide a structured and evidence-based foundation for understanding the integration of immersive technologies within SCM. The adherence to PRISMA 2020 guidelines ensures that the study is not only methodologically sound but also replicable, offering a high level of credibility to the findings.

2.1. IDENTIFYING THE RESEARCH QUESTIONS

This systematic review aims to comprehensively explore the evolving role of immersive technologies within the field of supply chain management (SCM). The integration of immersive technologies, such

as augmented reality (AR), virtual reality (VR), and mixed reality (MR), has been identified as a transformative force capable of enhancing various aspects of supply chain operations. To structure the review and guide the exploration of existing literature, this study addresses two key research questions (RQs):

RQ1: To what extent do immersive technologies play a role in supply chain management?

RQ2: What are the opportunities and challenges of implementing immersive technologies in supply chain management ?

2.2. DEFINING SEARCH KEYWORDS

To achieve the objective of this study, a well-defined search strategy was developed to retrieve relevant articles from databases. The focus was on articles related to immersive technologies, specifically augmented reality (AR) and virtual reality (VR), in the context of supply chain management. The search query incorporated the keywords **"Supply chain management," "Immersive technologies," "Augmented reality,"** and **"Virtual reality."** Boolean operators such as **"AND"** and **"OR"** were used to combine and refine the search terms for precise results as illustrated in Table1

The query was restricted to articles indexed in **Scopus** and **Web of Science**, ensuring the inclusion of high-quality, peer-reviewed publications. The search was further refined to include articles and reviews published in **English** within the subject areas of **Business, Economics, and Social Sciences.** Articles from other sources, such as conference proceedings, magazines, or books, were excluded to maintain academic rigor.

To ensure relevance, we chose articles that specifically discuss either **augmented reality** or **virtual reality** in the context of **supply chain management**. This focused approach allowed us to capture recent advancements and significant applications of AR and VR technologies within the supply chain management domain.

Table -1: The search query

Database	Search query
Scopus	TITLE-ABS-KEY ("Supply chain management" AND ("Immersive technologies" OR "Augmented reality" OR "Virtual reality")) AND (LIMIT-TO (SUBJAREA , "BUSI") OR LIMIT-TO (SUBJAREA , "ECON") OR LIMIT-TO (SUBJAREA , "SOCI")) AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "re")) AND (LIMIT-TO (LANGUAGE , "English"))
Web of science	TS=("immersive technologies" OR "augmented reality" OR "virtual reality") AND TS=("supply chain management")

2.3. STUDY SELECTION

The study selection process followed the PRISMA 2020 guidelines to ensure transparency and reproducibility. A comprehensive search was conducted in two electronic databases, Scopus and Web of Science, resulting in 98 initial records (48 from Scopus and 50 from Web of Science). These two databases were selected because they remain, to this day, the primary sources for citation data. Moreover, the interdisciplinary coverage of these platforms represents a significant strength for the study and comparison of different scientific fields **(Philippe Mongeon and Adèle Paul-Hus, 2016).** In fact, Web of Science (WoS) and Scopus are widely recognized as the two most comprehensive

bibliographic databases used for various academic and research purposes. WoS, being the first international database of its kind, held a dominant position for over four decades as the sole major source of bibliographic data. However, since the launch of Scopus in 2004, the landscape has evolved considerably. Scopus has since established itself as a reliable and comprehensive alternative to WoS and, in certain aspects, has even surpassed WoS in terms of coverage and functionality **(Raminta Pranckutė, 2021).**

After the removal of 15 duplicate records, 83 unique articles remained for screening. The research covered the period from 1997 up to January 7, 2025. This extended timeframe was chosen due to the limited number of relevant articles available, allowing us to include as many sources as possible for a more robust analysis.

In the screening phase, titles and abstracts were carefully reviewed against predefined inclusion and exclusion criteria. Articles were included if they (1) focused on immersive technologies such as augmented reality (AR), virtual reality (VR), or mixed reality (MR); (2) addressed applications of these technologies in supply chain management (SCM); and (3) were peer-reviewed studies published in English. Conversely, articles were excluded if they (1) did not pertain to SCM, focusing instead on marketing, retail, or customer behavior (e.g., AR in purchase intention or digital customer experience); (2) did not involve immersive technologies, instead exploring broader technologies like the Internet of Things (IoT), Big Data, or Analytics; or (3) lacked sufficient relevance or depth to contribute to the research objectives.

A total of 21 articles were excluded at this stage due to their lack of relevance to the research topic. Consequently, 62 articles were sought for full-text retrieval. Of these, 12 articles could not be accessed due to database restrictions or unavailability.

The remaining 50 articles underwent a thorough eligibility assessment, resulting in the exclusion of 26 articles for the following reasons:

- **Not related to SCM (15 articles):** These studies focused on broader technological implementations or domains such as AR-driven customer psychology in retail, retail marketing, and purchase intention.
- **Not related to immersive technologies (8 articles):** These articles addressed other digital technologies, such as IoT and Big Data, without incorporating immersive technologies like AR or VR.
- **Not relevant (3 articles):** These studies either lacked substantive content on SCM or immersive technologies or were insufficiently detailed to align with the research objectives.

Ultimately, 24 studies were deemed eligible and included in the final review, as presented in the PRISMA flow diagram (Figure 1). These selected studies provide critical insights into the intersection of immersive technologies and SCM, forming the foundation for the systematic analysis presented in this review.

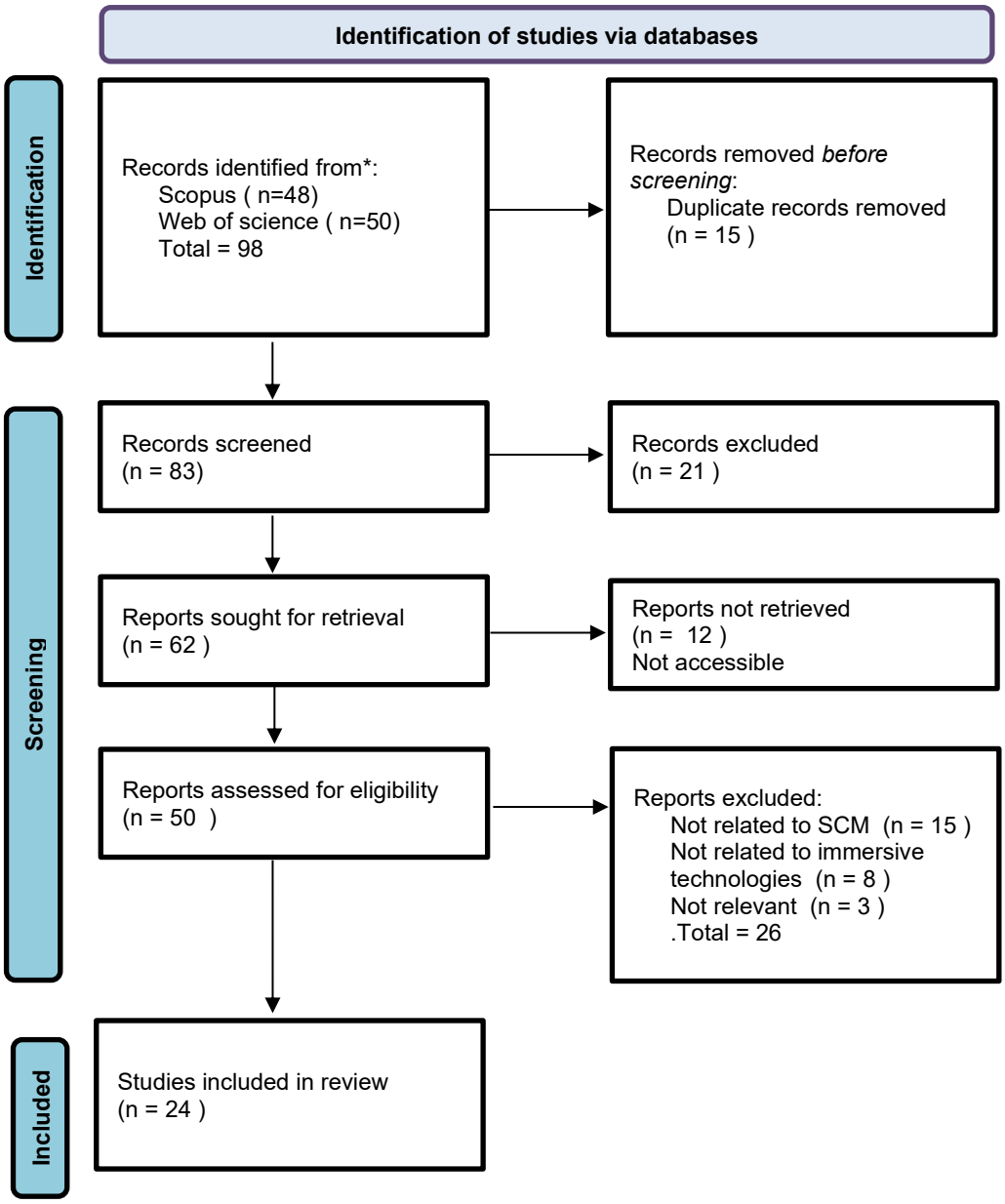

Fig -1: PRISMA flow diagram

3. FINDINGS AND DISCUSSION

After a comprehensive analysis of the literature review results, the relationship between immersive technologies and supply chain management (SCM) can be categorized into three main dimensions: Intelligent Manufacturing, Customer Experience, and Sustainability (see Table 2).

This study aims to discuss and explain each dimension in detail, providing a coherent representation of the intersection areas between SCM and immersive technologies. Furthermore, the discussion will include an exploration of the opportunities and challenges associated with to immersive technologies in Supply chain management, offering a comprehensive understanding of their potential impact and limitations.

References	Dimension	Protocol	Keywords	Number of articles	Key findings
Al-Issa & Thanasi (2024); Dal Forno et al. (2021); Ahmad Aburayya (2024); Domingos et al. (2024); Chidozie & Ramos (2024)	Intelligent manufacturing	- Systematic literature review - A research project - qualitative study of practical cases - Empirical study - Bibliometric analysis - Literature review	Industry 4.0; Supply chain management; Augmented reality; Smart manufacturing; Digital transformation; Industry 5.0; Metaverse; Virtual reality	16	AR/VR supports production and retail stages, improving collaboration, agility, and customer satisfaction; Digital supply chains enhance organizational performance; AR increases efficiency in logistics by providing real-time data and reducing costs and operating time;

Wei-Han Tan, et al. (2023) Oklander et al. (2024)	Customer experience	- Qualitative study of practical cases - Systematic literature review	Digital transformation; Customer interaction;	7	Immersive technology improves data management, offers insights into customer interests, and predicts demand, leading to better inventory management and reduced waste; Digital twins allow retailers to test new store layouts and optimize merchandising and product location, enhancing the shopping experience. Augmented navigation helps customers find product locations in-store, optimizing their shopping journey; AR/VR tours in agriculture provide transparency and create emotional connections with customers by showcasing production processes

Bag et al. (2023) Asokan et al. (2024) Liu et al. (2024)	Sustainability	- Bibliometric analysis	Humanitarian supply chain Humanitarian logistics	3	Immersive technologies support responsible sourcing, fair labor practices, and environmental guidelines, enhancing brand integrity, trust, and image; Immersive technologies optimize human resource management by reducing time and costs, increasing available working capital for brand-building and employee benefits; Immersive technologies improve resource and energy utilization, reduce waste and paper consumption, facilitating green manufacturing and sustainable supply chains;

Table -2: Summary of prior review articles on immersive technologies in supply chain management

3.1. INTELLIGENT MANUFACTURING: INDUSTRY 4.0, INDUSTRY 5.0 AND SMART LOGISTICS

Every company recognizes the role of digital supply chain in enhancing the organizational performance (Ahmad Aburayya,2024), advanced technologies support the development of resilience in supply chain operations by enhancing the ability to identify, visualize, and analyze data across the supply chain (Domingos et al., 2024).

The transition into the era of Industry 4.0 and then Industry 5.0 has revolutionized businesses models, marking a significant transformation towards automation and data exchange. Incorporating immersive technologies specifically Augmented Reality (AR) and Virtual Reality (VR) within the digital supply chain transformation is enhancing operational productivity particularly in logistics, training and maintenance (Chidozie, Ramos,2024).

Immersive technologies are mostly used in production and retail stages of the supply chain (Al-Issa, Thanasi, 2024), from product development to the after sales service, these innovative Technologies assists multiple participants in supply chain, enhance collaboration among stakeholders, and ultimately enable to achieve greater customer satisfaction. Augmented reality for example, enables

production and development team to stimulate the production process and the product utilization allowing quick adjustments and reviews in the initial phase of the project which enhance agility and customer satisfaction. (Dal forno et al.,2021).

Augmented reality is also proving promising for logistics and warehouse operations, it significantly increases productivity and efficiency by reducing costs and operating time. The Augmented Reality provides real-time data and instructions to workers which increases performance and productivity, while Virtual Reality eases immersive training simulations, allowing employees to tackle complex scenarios without facing real-world repercussions. (Chidozie, Ramos,2024).

By incorporating smart glasses for instance, Order picking considered as one of the core activities of a warehousing operation has never been easier, also called picking by vision system, the smart glasses display in the field of vision of the user real time operational information without interrupting their work process to improve performance. It mainly, highlights the picking or storage location or show the optimal path throughout the warehouse. Thanks to this technology, the dead times are transformed into value creating times and the errors are minimized, thus the efficiency of logistics facilities is increased, the time to market is reduced and the organization´s competitiveness is strengthened. (Epe et al.,2024); (Rejeb et al.,2020).

In addition to AR and VR, other immersive technologies, Metaverse which is a virtual reality world in which characters could communicate with one another and with virtual objects (Sparkes, 2021) helps optimize inventory management via virtual warehousing real time stock visibility. It also enables performance monitoring and virtual testing of enhancements (Bag et al., 2023).

Furthermore, digital twin technologies, define by VanDerHorn and Mahadevan (2021) as a virtual representation of a physical system, environment or processes that is updated through the exchange of information between the physical and virtual system allow retailers to test new store merchandising and designing more appealing store layouts. they also enable to track a product location and performance along its lifecycle which facilitates decisions making regarding improvements and replacements. (Wei-Han Tan, et al.,2023)

3.2. CUSTOMER EXPERIENCE: RETAIL AND SHOPPING SERVICE IMPROVEMENT

The rise of immersive technologies has revolutionized companies marketing strategies, it enabled managers to understand customer behavior, customized their offer to customers preferences and provide a unique shopping experience.

By using Immersive Technologies like Augmented Reality, Virtual Reality, Digital twins and METAVERSE, Customers can virtually visit the store search and try on digital products before purchasing, in fashion for example, consumers can try a range of outfits and see how they fit together rather than try them individually in physical which facilitates the purchase decision and products evaluation.

Additionally, virtual mirrors enable to test products cosmetics and make-up products for instance to see (virtually) how the products will look on customers. The same way, retailers can use digital twins to test new store layouts and ensure an attractive merchandising (Wei-Han Tan, et al.,2023), they can also offer a physical store augmented navigation that helps customer identifies their products location in the store, following his research criteria and optimize their shopping experience.

When it comes to furniture and decoration, augmented reality allows customer to place selected furniture in their own home and see how it will fit before purchase (Heller et al.,2020).

Furthermore, certain premium companies, specifically in the agriculture sector, offers to their clients a virtual tour of their farm with AR and VR to demonstrate their production process and quality assurance in order to creates a deeper emotional connection with the brand and enhance transparency and customer engagement (Oklander et al.,2024).

In light of the above Immersive technologies, increase customer engagement and satisfaction through customization according to personal tastes. Thus, these innovative technologies enhance data management in Supply chain, it gives relevant and real insights about customers interests and helps predict demand which improves inventory management and reduce waist. Additionally, thanks to virtual try Ons and virtual mirrors, Immersive technologies helps reducing product returns (Hilken et al.,2017) and aftersales problems (Heller et al., 2020) by enabling customers to evaluate products before buying and be sure of their purchase choice.

Owing to their many benefits, immersive technologies enhance retail service performance, creating a more enjoyable shopping experience for customers.

3.3. SUSTAINABILITY: ENVIRONMENTAL AND SOCIAL RESPONSIBILITY

The expansion of industries 4.0, 5.0 and the digitalization of supply chains have significantly raised concerns about social and environment responsibility of companies. Nevertheless, advanced technologies particularly the immersive ones help companies move to sustainability in their supply chain.

Firstly, Immersive technologies through intelligent manufacturing enhance the positive impact to the environment. The innovative technologies improve resource and energy utilization efficiency, reduce waist and paper consumption facilitating the achievement of green manufacturing and green supply chain goals (Liu et al.,2024)

Secondly, Immersive technologies support companies social responsibility and their people oriented-approach. Encouraging, Human machine collaboration, Immersive technologies prioritize human wellbeing at work and enhance work conditions by safety, it stimulate operations scenarios and emergency situations to minimize risks and incidents

Through digital twin technologies, the factories and warehouses can be mapped, determining the shortest paths required to complete the task, this leads employees to focus on value adding tasks and improves their job satisfaction and productivity.

Same thing for the augmented reality smart glasses that capture and interact with the surrounding environment in real-time and that overlay the necessary information for the employee to facilitate warehousing tasks for him, logistics deliveries are then faster and time to market is optimized (Asokan et al.,2024).

Additionally, Immersive technologies through stimulation games and AR can assist in operational supply chain training as it features is incorporated in the same context in which the work task is performed which makes the activity more realistic, interactive and safe when compared to traditional training methods (Dal forno et al.,2021).

All this considered, enterprises are optimizing their human resources management, reducing time and costs which give them more working capital available to strengthen their brand building and improve even more employee benefits.

Lastly, Businesses can monitor product's location, condition and performance by creating a digital twin of it. Thanks to metaverse, Companies has the ability to follow products through every stage of

the supply chain supporting Traceability and transparence of SC, one of the major concerns of customers specifically when it comes to healthcare and safety critical products.

Companies can ensure the visibility of the supply chain to all the stakeholders and traceability of sustainably sourced materials and green practices (Hajian et al.,2023).

Moreover, the metaverse through immersive NFTs which are tokens used to provide digital ownership over items, are offering detail records of product´s origin by creating unique digital certificates of authenticity that ensure transparency and traceability especially for authentic products considered as ancestral heritage mainly in luxury sector (Al-Issa, Thanasi, 2024).

All in all, this approach fosters trust and integrity and improve brand image of companies, it support ethical standards by ensuring responsible sourcing and production, guaranteeing that all the participants of the supply chain adhere to fair labor practices and environmental guidelines across the supply chain (Bag et al., 2023).

4. OPPORTUNITIES AND CHALLENGES

4.1. OPPORTUNITIES OF IMMERSIVE TECHNOLOGIES IN SCM

Immersive technologies including Augmented reality (AR) and Metaverse present a range of opportunities for improving supply chain management by enhancing operational efficiency, workforce capabilities, and customer engagement. These potentials, as highlighted in the literature (Rejeb et al., 2021; Keogh et al., 2020; Deveci et al. 2022), emphasize the role of AR as a transformative tool in logistics and supply chain environments.

1. **Enhanced Visualization**

   Immersive technologies provide real-time visual information, improving process transparency and aiding workers in understanding complex data and material flows. This is critical for effective logistics operations and decision-making (Rejeb et al., 2021; Keogh et al., 2020).

2. **Improved Training and Maintenance**

   AR facilitates immersive training environments, enabling employees to learn in simulated scenarios that mirror real-world processes. Additionally, AR offers step-by-step instructions for maintenance and repair, reducing downtime and errors (Keogh et al., 2020).

3. **Operational Efficiency**:

   By overlaying digital information onto physical environments, AR and metaverse technologies streamline processes, minimize operational errors, and enhance decision-making (Rejeb et al., 2021; Keogh et al., 2020).

4. **Better Collaboration**

   Immersive technologies enable real-time sharing of visual data, fostering seamless collaboration across global teams, regardless of their physical location (Keogh et al., 2020).

5. **Customer Engagement**

AR improves customer interactions through interactive product demonstrations, enhanced product information, and virtual experiences that increase satisfaction and loyalty (Keogh et al., 2020).

6. **Predictive Capabilities and Risk Management**

The metaverse allows businesses to predict market changes, manage risks, and anticipate challenges through comprehensive data analysis and virtual simulations (Rejeb et al., 2021).

4.2. CHALLENGES OF IMMERSIVE TECHNOLOGIES IN SCM

While Immersive technologies offer significant opportunities, its implementation in supply chain management is not without challenges. Technical, organizational, and human-centric barriers, as discussed in the literature (Rejeb et al., 2021).

1. **Technological Constraints**

The high demands of immersive technologies, such as 3D animations, high-definition video, and robust hardware components, can strain existing technological infrastructure

2. **Data Security and Privacy Issues**

The integration of immersive technologies raises significant concerns about data security and privacy, particularly in the face of increasing cybersecurity threats

3. **Complexity of Implementation**

Capturing the physical properties and real-time data necessary for Digital Twins is challenging due to the complexity of global supply chains and the reliance on reliable sensor networks

4. **Organizational Barriers**

Resistance to adopting immersive technologies stems from perceived risks, uncertainty about their effectiveness, and the immaturity of the technology in some contexts

5. **Ergonomic and Health Concerns**

Prolonged use of immersive devices, such as AR smart glasses, can lead to ergonomic issues and health-related challenges, limiting user acceptance

6. **Need for Skilled Workforce**

The successful implementation of immersive technologies depends on a skilled workforce capable of navigating and utilizing these advanced systems effectively (Nguyen et al., 2022)

5. CONCLUSION

Immersive technologies such Augmented Reality (AR), Virtual Reality (VR), and the Metaverse, are transforming supply chain management (SCM). These new technologies offer revolutionizing opportunities across various dimensions of the supply chain, by improving operational efficiency, enhancing customer shopping experience, and promoting sustainability across the supply chain.

Today, Businesses can simulate production and distribution processes, identify bottlenecks and test various scenarios to improve their operations by creating virtual representations of physical products and stores.

In other words, by replicating physical assets in the virtual word, enterprises can from one hand optimize inventory management and resources use, minimize waste, ensure sustainable operations and in the other hand better understand customer behavior and therefore offer a unique shopping experience.

This paper has presented a comprehensive analysis of the areas of intersection of immersive technologies and supply chain management. We meticulously explored and synthesized existing literature through a rigorous systematic review methodology following the PRISMA design and presented some relevant insights about the link existing between the new immersive technologies and supply chain management.

By addressing existing gaps and identifying future research directions, this research contributes to scholarly and professionally understand in what extend does the different immersive technologies affect supply chain management and explore the various opportunities and challenges of these innovative technologies.

Despite the contributions of this Systematic review, we can acknowledge one main limitation which is the need of an empirical support. We propose a theorical foundation of the relation between Immersive technologies and SCM through three dimensions and recommend for further investigations an empirical study to fully capture the practical implementation of immersive technologies in supply chain management of different sectors, we also recommend a contextualization of this relationship by countries, sectors and industries to extend the perspectives of the impact of Immersive technologies on supply chain management.

Finally, with globalization intensifying competition, particularly for producers in emerging markets,there is an increasing demand to optimize supply chains, reduce costs, and enhance agility to remain competitive. In this evolving landscape, immersive technologies emerge as a powerful enabler. Parts of the MENA region, for instance, are already embracing the new digital era. According to a study by the International Data Corporation (IDC), spending on cognitive and artificial intelligence (AI) systems in the Middle East and Africa (MEA) region is projected to grow significantly by 2030, with annual growth rates ranging from 20% to 34%. However, while immersive technologies offer considerable promise for transforming SCM in developing economies, their successful adoption hinges on overcoming key challenges. Strategic investments in digital infrastructure, workforce training, and supportive policy frameworks will be essential to unlocking the full potential of immersive technologies and ensuring sustainable, inclusive growth.

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