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The use of blockchain technology for managing digital assets in marketing management

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ABSTRACT

This study explores blockchain technologies' contemporary and promising phenomenon, among the most effective and operational digital assets in marketing management. Using data from global industry giants such as Coca-Cola, H&M, and Nike, it demonstrates how blockchain technologies are employed to manage digital assets (e.g., customer data, advertising campaigns, and software) within marketing management. The study compares the effectiveness of solutions before and after blockchain implementation and identifies key success factors, challenges, and drawbacks. Blockchain technology is one of the most reliable data transmission and storage methods. It enables recording time, date, and individual or company details in distinct blocks sequentially linked into a continuous chain. This system employs a highly complex mathematical and technical mechanism, which ensures a high level of security for users while allowing precise tracking and verification of all transactions. Blockchain technologies are crucial in enhancing transparency in advertising campaigns and marketing management. These technologies provide a reliable and immutable digital record of every transaction and data modification within the advertising sector. All actions, such as ad placements, impressions, and clicks, are recorded on the blockchain and remain accessible to all system participants. This transparency allows advertisers, publishers, and marketing agencies to track each stage of their campaigns effortlessly. The transparency blockchain ensures helps combat fraud – one of the most significant challenges in the advertising industry. All participants can review the history of data modifications and verify their authenticity, thereby reducing risks for advertisers and increasing trust in advertising platforms. Furthermore, blockchain improves verification and user identification processes, reducing the number of fraudulent views and unwanted clicks. As a result, advertising campaigns become more effective and transparent, benefiting both advertisers and end consumers.

Keywords: Blockchain technologies, Digital assets, Marketing management, Asset management

1. Introduction

In the modern landscape of business digitalization and everyday life, many users are shifting towards so-called digital assets or cryptocurrencies.

An analysis of the development of the global cryptocurrency market within the context of digitalization has led to the following conclusions: the cryptocurrency market continues to grow steadily. Humanity is witnessing a Bitcoin revolution. All cryptocurrencies are based on blockchain technology, which consists of continuously expanding data blocks [1].

Blockchain can have different designs or structural modifications depending on its application and requirements. Still, any blockchain must include blocks (a set of data containing a collection of transactions and a unique hash), transactions (records of value exchanges between two or more parties), nodes (computers running the software), consensus algorithms (data agreement mechanisms among nodes), hash functions (cryptographic algorithms that convert data into fixed-length character strings), and cryptographic signatures (mathematical functions used to verify transaction authenticity).

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Since its inception, blockchain technology has become increasingly sophisticated, its applications have expanded, and user awareness has grown. While some governments are exploring the possibility of using blockchain in pilot projects, many have yet to consider its unique features and advantages compared to traditional database systems. Blockchain is typically associated with cryptocurrencies; however, its use has the potential to revolutionize processes in various sectors, including finance, trade, public services, humanitarian aid, and development assistance [2].

Blockchain technologies play an essential role in digital asset management, which forms the foundation for successful marketing management strategies across different regions of a country. To conduct a more comprehensive and practical evaluation of the socio-economic development of a territory from a marketing perspective, the following methods exist [3]:

1. Development of a set of indicators for assessing the quality of life in different regions – a quality-of-life map is created, incorporating key subjective and objective components, allowing for a detailed evaluation of the socio-economic condition of a given area.
2. Methodology for assessing the priority of regional cluster development – an approach for determining priority areas in regional cluster development, which enhances regional competitiveness and economic integration.
3. Development of an integrated indicator for assessing the efficiency of the territorial marketing system – a composite indicator that allows for evaluating the effectiveness of marketing initiatives within a region and their impact on socio-economic development.

These methods aim to ensure stable and balanced socio-economic development by analyzing processes, identifying problematic aspects and disparities, and subsequently improving the quality of life for the population.

1.1. Literature analysis

This study explores the understanding of the term “blockchain”, its applications in modern industries, and its key advantages and disadvantages. By analyzing the scientific works of researchers such as Korobtsova D., Fursa V., Dobrovinsky A., Pysarenko N., Petruha N., Pakhomov S., and others, it is possible to conclude that blockchain represents a modern approach to streamlining and automating various production processes. It enables the division of any process into interconnected blocks. A structured algorithm allows for identifying and rectifying errors or bugs at a granular level without compromising the entire system.

While blockchain technologies are relatively novel, they are already widely adopted by major enterprises. A precursor to blockchain technology can be found in the proprietary method for protecting critical information developed by mathematician David Chaum in 1984. However, the first conceptual framework of blockchain appeared in a scientific paper by Haber and Stornetta in 1991. The first working model was proposed in 1994 with the primary objective of verifying the authenticity of publications and safeguarding them against plagiarism. In today's era of rapid technological advancement and the widespread integration of artificial intelligence (AI), such methods for data verification have become highly relevant and practical.

Analyzing the study [4], it is important to note that the integration of AI into marketing strategies is crucial in the era of digital transformation, particularly in terms of automation, personalization, and forecasting. The study emphasizes that AI significantly optimizes marketing operations, facilitates the creation of highly personalized strategies, and improves the accuracy of forecasting market trends and consumer behavior. At the same time, the authors highlight the ethical and privacy aspects of using AI in marketing, stressing the need for responsible implementation of these technologies. They recommend a balanced approach to leveraging AI capabilities while adhering to ethical standards to ensure that technologies enhance marketing efforts without compromising ethical integrity.

Blockchain technology is now present across various industries, including manufacturing, finance, art, and computing. In simple terms, blockchain can be described as a chain of interconnected blocks or, in mathematical terms, a linked list. Each element within this list depends on the others, meaning that any alteration or removal of a single block disrupts the sequence and triggers a security mechanism. The primary purpose of blockchain technology is database authentication.

One of the earliest applications of blockchain technology was in the cryptocurrency market, where blockchain-based wallets provide a decentralized record of all transactions and related information accessible to all market participants. This system is considered one of the most secure against fraudulent attacks.

Based on research [5], the application of blockchain technology is substantiated by its effectiveness. The choice of a specific blockchain protocol (e.g., Bitcoin, Ethereum, Hyperledger Fabric) depends on the user's requirements and objectives. Each protocol has its strengths and limitations. Its resilience and status characterize Bitcoin as the original blockchain, but it suffers from limited transaction speed. Ethereum offers flexibility and innovative contract capabilities yet raises privacy concerns. Hyperledger Fabric stands out for its confidentiality and adaptability but may require more complex integrations.

According to studies [6], blockchain is an emerging technology with significant potential to address security vulnerabilities in existing networks and mitigate cyber threats. More importantly, blockchains enable the execution of smart contracts within peer-to-peer (P2P) networks, where data exchanges between participants – mathematically referred to as nodes – are updated via consensus mechanisms. A smart contract is defined as a set of code and data deployed via cryptographically signed transactions within the blockchain network and executed by nodes within the system. All nodes in the blockchain rely on consensus mechanisms (e.g., rule-based learning) to ensure consistency in data storage. The most commonly used consensus algorithms include Proof of Work (PoW), Proof of Stake (PoS), and Byzantine Fault Tolerance (BFT).

Blockchain technologies enhance marketing efficiency through data transparency, decentralized data management, and smart contract-based targeting, among other advantages. In the study [7], the authors argue that effective marketing strategies in e-commerce rely on personalized content, recommendation systems, and customer trust-building. They emphasize that the implementation of these tools increases consumer engagement, improves interaction, and encourages repeat purchases, ultimately contributing to business success.

2. Research method

This study aims to analyze and justify communication with clients and the tracking of advertising campaigns across different regions, as well as to review methods for transparent informing customers about product origins to develop a successful marketing strategy. Three case studies of major corporations – Coca-Cola, H&M, and Nike – were selected for comparison.

2.1. Coca-Cola

Analyzing official sources and research, an assessment was conducted on the most effective implementations of blockchain technology to enhance brand trust and recognition.

Coca-Cola (The Coca-Cola Company and Coca-Cola HBC for Eastern European countries) was one of the first companies to launch a blockchain-based employee registry project in collaboration with the U.S. Department of State in 2018. This pilot project had a social focus aimed at combating forced labor. By contributing labor contract data to the registry, the company increased transparency and improved workforce organization. To develop the blockchain platform, Coca-Cola partnered with Bitfury Group, a leading global blockchain technology company offering a full range of services.

In November 2019, Coca-Cola turned to another significant business process management software provider – SAP – the new project aimed to create a blockchain-based system for product supply chain control. Implementing this blockchain platform strengthened collaboration among trade process participants while enhancing transparency and efficiency in supply chain management. Manufacturers could promptly receive information about partners' needs, capabilities, and orders through this platform.

For example, if a bottle manufacturing company faced a raw material shortage affecting order fulfillment, the system would quickly suggest possible replenishment options. The introduction of this technology reduced the order verification process from several weeks to just a few days. The blockchain system accelerated many processes and eliminated intermediaries, significantly reducing costs. Notably, in the same year, Coca-Cola's primary competitor, PepsiCo, also implemented a blockchain pilot project, increasing efficiency by 28%.

Coca-Cola implemented an enterprise resource planning system incorporating advanced technologies such as machine learning, enhanced analytics, and artificial intelligence. This initiative, SAP S/4HANA, was integrated with the real-time transportation visibility platform Shippeo via SAP Integration Suite. This innovation contributed to logistics optimization and improved interactions with carriers. The project involved more than 100 carriers across 12 business units, enabling more efficient shipment management and resource planning.

The benefits that Coca-Cola received from implementing this system are shown in Table 1 [8]:

Table 1. Coca-Cola benefits

To: challenges and opportunities	Why SAP and Shippeo SAS	After: results focused on value
Complexity and administrative burden of transporting over 200,000 full truckloads to customers across 12 business units annually, along with coordination with transport carriers	Shippeo's real-time prediction and visibility platform, an industry-specific cloud solution that provides full functionality and flexibility to meet Coca-Cola HBC's needs	Optimized logistics operations through real-time visibility, improving collaboration with carriers
Lack of delivery visibility for recipients and customers, affecting the ability to enhance operational efficiency and customer satisfaction	Seamless integration with SAP S/4HANA®, transport management systems, and carrier booking platforms via SAP® Integration Suite to minimize manual tasks	Improved on-time delivery and increased customer satisfaction through order and route tracking from creation to delivery, with proactive notifications about delays
Potential to transform a 24/7 supply chain into an integrated software landscape to identify and resolve performance issues before they impact customers		Optimized processes with automatic confirmation of delivery and delivery time in SAP S/4HANA in real-time, allowing back-office teams to start route calculations
		Increased productivity and reduced workload through paperless processes, fewer calls, and emails

Having achieved primary goals in delivery tracking, Coca-Cola is now implementing the Shippeo industry cloud solution across new markets. This will increase the delivery visibility rate from 50% to over 70%. Furthermore, the company is leveraging data analytics to enhance service quality and optimize performance. Based on official sources [3], it has been analyzed that the key to ensuring long-term business viability lies in investing in advanced technologies. This involves creating a seamless and efficient supply chain capable of rapidly integrating innovative solutions to enhance technical capabilities, improve productivity, and achieve cost, energy, and water savings. This strategy includes optimizing infrastructure and modernizing existing plants to operate more efficiently at the national or regional level. In manufacturing, automatic line switching has significantly reduced production downtime, increasing output by nearly 1% annually. This innovation allows smaller batches of new products to be produced and enables rapid adaptation to changing consumer demands.

During the COVID-19 pandemic and the imposed quarantine, innovations in remote management became essential, particularly for quality control inspections, safety, and health monitoring. During this period, Coca-Cola integrated smart augmented reality (AR) glasses into its operations, enabling more efficient remote supervision and real-time decision-making. The Digital Twin technology represents a significant advance, providing an accurate virtual model of production lines. This digital replica offers real-time statistics and predictive analytics, revolutionizing decision-making by enhancing data-driven efficiency and reducing costs.

Coca-Cola has implemented 3D printing for spare parts to reduce reliance on suppliers, creating 386 designs across 11 plants. This initiative has delivered significant savings, reduced order fulfillment times, and improved line availability. At the Schimatari plant, Coca-Cola's digital production platform is in the pilot phase, enabling real-time control of production lines. This platform provides operators with precise online indicators for dynamic performance management. Moving away from paper-based processes, the Connected Worker initiative marks a decisive shift in digital transformation. This platform optimizes day-to-day operations, enhances manufacturing efficiency, more effectively engages employees, and significantly reduces environmental impact [9]. Regarding Coca-Cola's blockchain testing for digital asset management and tracking advertising campaigns in various regions, it is worth noting that in 2020, the company, in collaboration with Centrapay (a growing payment platform designed to enhance the connection between companies and customers, improved interaction and payments), launched an initiative allowing customers to pay for drinks with cryptocurrency through the Sylo Smart Wallet app. This was made possible in 2000 by Coca-Cola vending machines in Australia and New Zealand, equipped with QR codes for scanning and payment [10].

Centrapay CEO Jerome Fori notes that the complexity of integration and unsatisfactory user experience are key barriers to adopting Web 3.0 technologies, particularly in digital identity and assets. “We have successfully addressed these issues. He says that Centrapay is a pioneer in creating the Internet of Value, providing benefits to consumers and merchants”. “Additionally, our technology helps reduce physical contact, which is especially important in the context of heightened hygiene concerns following COVID-19”. According to Fori, the company is working to enable individuals to manage their own data and digital identity. In turn, brands can interact ethically with consumers, helping them make informed purchasing decisions while supporting retail partners and distributors. "We have already demonstrated the effectiveness of our model in Australia and New Zealand and are planning to scale our business globally. We are currently establishing a foothold in North America, and our next step will be to enter the US market with unique innovative solutions", he concludes [10].

Coke One North America (CONA), the partner of Coca-Cola's largest bottling company in the US, has announced that it will use the corporate blockchain platform Ethereum Baseline Protocol to enhance transparency and minimize friction in supply chain transactions. After recognizing the advantages of blockchain, CONA now intends to expand its use case to a broader audience. The goal of utilizing the baseline protocol to create Coca-Cola Bottling Harbor is to enable a seamless process for joining the network for Coca-Cola Bottling suppliers. Ultimately, this process improves the ability of internal bottling suppliers to deliver products to the bottling network while benefiting external raw material suppliers from the integrated, private, distributed integration network [6]. The use of blockchain in marketing allows for increased transparency of advertising campaigns, enhanced customer loyalty, and secured transactions. With the decentralized nature of blockchain, companies can engage directly with consumers, minimizing intermediaries and reducing costs [11].

Beyond logistics, data protection, and sustainability efforts enabled by blockchain technologies, Coca-Cola actively explores the metaverse. Based on research [12], the marketing platform of the future, known as the metaverse, is expected to serve as a space for presenting and bringing brands to life within an interactive 3D digital environment. The metaverse is a virtual representation of real-world interactions, where users can engage with one another through avatars resembling their real-life counterparts.

Coca-Cola actively integrates blockchain technology into its marketing strategies, including creating non-fungible tokens (NFTs) to increase consumer engagement. Below are some of the most compelling cases:

1. NFT collection of the 2022 FIFA World Cup.

In December 2022, Coca-Cola partnered with Crypto.com and digital artist GMUNK to launch a series of 10,000 unique NFTs in honor of the 2022 FIFA World Cup in Qatar. These NFTs were created using “heat maps” that tracked player movements during the games, creating abstract visual representations of the matches. Fans could acquire these NFTs by registering on the Coca-Cola Fan Zone page and accessing Crypto.com NFT platform [13].

2. International Friendship Day and NFT auction.

On International Friendship Day in July 2021, Coca-Cola released its first NFT collection in collaboration with Tafi and the metaverse Decentraland. The collection included the “Friendship Box”, which contained unique digital items such as a signature bubble jacket for avatars in Decentraland, a sound visualizer, and a friendship postcard inspired by Coca-Cola's 1940s artwork. The auction raised over $575,000, with proceeds going to Special Olympics International [14].

3. Masterpiece NFT collection on the base blockchain.

In August 2023, Coca-Cola unveiled the “Masterpiece” NFT collection on the Coinbase Layer 2 network Base. This collection was part of Coca-Cola's global “Masterpiece” campaign and included classic artworks such as Andy Warhol’s 1962 Coca-Cola painting and contemporary works by emerging artists. The NFTs were available for a limited time during the Coinbase “Onchain Summer” festival [15]. These cases highlight Coca-Cola’s commitment to leveraging blockchain technology to create innovative marketing solutions that resonate with digital audiences. In conclusion, it can be stated that Coca-Cola is actively exploring blockchain technology to enhance various aspects of its operations, including marketing, supply chain management, and customer engagement. Here are some notable changes following the implementation of blockchain technologies:

- supply chain optimization;
- employee training and certification;
- blockchain in marketing and customer engagement;

These cases reflect Coca-Cola's determination to use blockchain technology to improve operational efficiency, ensure ethical practices, and strengthen consumer relationships.

2.2. H&M

H&M (Hennes & Mauritz AB) is an international company headquartered in Stockholm, Sweden, specializing in clothing, footwear, accessories, and home goods retail. Research and official sources indicate that the company actively employs blockchain technology to track the quality of fabrics and materials used in its branded products [16, 17]. This led to the creation of a unique digital token, “fiber-coin”, which functions as a digital fingerprint, ensuring transparency and reliability throughout the production and distribution. In collaboration with TextileGenesis, H&M utilizes a blockchain-powered platform to track sustainable fibers across the entire supply chain, such as artificial cellulose and recycled polyester. This technology enables customers to access detailed information about product origins, promoting ethical consumption and enhancing environmental sustainability. It is important to note that the trend toward environmental sustainability and conservation is gaining widespread adoption. The concept of "zero waste" serves as a foundation for responsible green production. In the study [18], environmental responsibility is identified as the cornerstone of socially responsible green entrepreneurship, whose mission is to improve environmental conditions based on sustainable development principles. The authors outline key directions for the development of green entrepreneurship, emphasizing the significance of environmental responsibility at the state, corporate, and community levels. Additionally, the study analyzes tools for promoting green entrepreneurship, such as environmental taxes and "green" investments, highlighting the need for improving the regulatory framework and monitoring systems to effectively address environmental challenges.

According to publications, key trends in blockchain-based tracking projects include assigning unique QR codes to products, containing information about manufacturing location and date, product composition, and environmental certifications [19]. Thanks to blockchain technology, this data can be accessible to every consumer. All supply chain processes are digitized, creating a shared data system stored in IBM Cloud, which also leverages artificial intelligence to optimize operations and detect and respond to supply chain disruptions.

2.3. Nike

Nike, Inc. is one of the world's largest and most well-known sports companies, manufacturing and selling footwear, apparel, and accessories for sports and active lifestyles. Like Coca-Cola, Nike is also an active trendsetter in the metaverse. By merging sneakers with blockchain technology, Nike launched CryptoKicks, transforming popular sneakers into digital assets that people can buy, collect, and trade online. This new approach to sneaker ownership reshapes how enthusiasts perceive their collections and unlocks new footwear opportunities [20]. Analyzing research, a new trend in the metaverse and digital marketing has emerged – non-fungible tokens (NFTs), particularly CryptoKicks, which provide proof of ownership for exclusive sneakers [21]. The CryptoKicks concept was first introduced when Nike filed a patent in 2019, outlining a system in which blockchain could attach cryptographically secured digital assets to physical products. This system verifies sneaker authenticity and ownership through a blockchain-based approach. One of CryptoKicks' unique features is the ability to generate new designs [22, 23]. Owners can combine elements from different digital models, creating unique NFT sneakers. This feature, unavailable in the physical world, offers collectors greater creative freedom. CryptoKicks provide several advantages for fashion and technology enthusiasts: digital sneakers require no storage space, do not degrade over time, and can be easily authenticated through blockchain, minimizing the risks of counterfeiting and complex verification procedures. However, the fashion NFT market experienced fluctuations in 2024, with consumer interest declining and cryptocurrency values falling. Notably, RTFKT, the Web3 streetwear brand acquired by Nike, suspended its operations until January 2025, highlighting the challenges of sustaining digital goods and hype-driven narratives in the long term.

Thus, Nike's use of blockchain technology and tokenization through initiatives like CryptoKicks was a strategic move to enhance product authenticity, attract customers, and strengthen its brand as an innovator. Despite the challenges in the evolution of digital assets, these efforts strengthen Nike's brand recognition and positioning in the market. In addition to CryptoKicks, Nike uses blockchain technology to enhance brand recognition and engage consumers through several other innovative cases:

1. SWOOSH, a new digital community

In November 2022, Nike introduced SWOOSH, a blockchain-based platform to develop a digital community where participants can collect, create, and trade virtual Nike products such as shoes and t-shirts. This initiative

aims to create an inclusive space, a marketplace for athletes, creators, and consumers to build and own the future of sport. To ensure a secure and reliable space, SWOOSH has its domain: welcome.swoosh.nike. There, Nike participants can discover and collect virtual creations; in the future, community members can wear these items in digital games. “This approach resonates with consumers wherever they play and shop for sports products, offering access to a new digital arena”, says Ron Faris, CEO of Nike Virtual Studios. “We are creating a marketplace of the future with an accessible platform”, Faris adds [24].

2. AntChain for product tracking

Nike has partnered with AntChain to implement blockchain technology for product tracking. By embedding encrypted NFC chips into products, consumers can access authenticated data about the product’s origin, style, and production timestamp simply by tapping their smartphones against the chip. This approach increases transparency and builds consumer trust by ensuring product authenticity. Nike became the first sports brand to integrate NFC technology and blockchain into tracking its products in collaboration with AntChain. This is the first partnership between the two companies, and they plan to explore additional applications and services across various scenarios [25].

3. Nike's patent for anti-counterfeit blockchain

Nike has patented a blockchain technology system to combat counterfeiting and link cryptographically secured digital assets to physical products. This framework allows for the authentication and tracking of ownership of Nike footwear, thereby protecting the brand’s integrity and consumer trust. Nike participated in the Chain Integration Project (CHIP) and Cryptokicks project. CHIP is a project run by the RFID Lab at Auburn University in collaboration with six apparel and retail companies, including Nike, to test the use of blockchain in their supply chains. Counterfeiting is a significant problem for Nike and other large retailers. According to CHIP, counterfeiting and the “grey market” cost retail networks $98 billion. Consumers want to purchase similar products but find them unaffordable, which leads some to turn to "counterfeit” footwear to save money. In the patent, Nike describes an invention whereby a physical pair of Nike shoes is assigned a unique identification code, which is also linked to a digital version of the same shoes. This identifier and the digital shoes use technology to cryptographically store information about the owner of each asset, any transaction history, and authenticity verification. The digital version can be stored in an online Nike shoe locker for resale or collection and even used to customize virtual game characters [26]. Through such cases, Nike increases brand recognition and sets new standards for consumer engagement and product authenticity in the digital age.

3. Results and discussion

Based on the research conducted on industry giants such as Coca-Cola, H&M, and Nike, it can be concluded that blockchain technologies have contributed to greater brand recognition and consumer interest. For H&M, the primary goal of using this innovation is the contemporary trend of sustainability and environmental protection, tolerance, and worker rights. This approach has increased the consumer base, with the company gradually transitioning from a more affordable and relatively inexpensive clothing segment to a higher-priced segment. So far, H&M has not implemented significant changes through blockchain technology, but it would be beneficial to analyze competitors within the same industry and continue innovating in technology.

On the contrary, Coca-Cola, unlike H&M, actively embraces innovation. In addition to using blockchain technology for employee protection and adhering to contemporary trends in sustainability, Coca-Cola has also focused on the rapidly growing and increasingly popular market of NFTs. This is entirely new and modern, transforming the physical world into the digital realm. Thanks to the company's active involvement in NFT collaborations, brand recognition has skyrocketed, gaining value among collectors, as NFT assets could appreciate in the future. Like Coca-Cola, Nike has also embraced NFTs and blockchain, creating something unique and ground-breaking – digital sneakers. This presents a massive market for collectors, transforming Nike from just a sportswear brand into a distinct digital world with intangible assets, which will likely gain even more value. Based on the research, no significant drawbacks were identified following the implementation and use of blockchain technologies.

However, it should be noted that the international community must take responsibility for establishing standards and regulations to ensure the effective interaction and development of blockchain technologies in line with modern requirements. It is crucial to emphasize that these technologies have significant potential to protect digital assets. However, their success depends on selecting the proper protocols, implementing clear standards and regulations, and continuously adapting to changes in cyberspace. Cooperation between the global

community, regulators, and technology companies is key to creating a safe and effective digital environment where blockchain will play a critical role [6]. Analyzing all the studies, a comparative table can be created to summarize the analysis and key results achieved through the implementation of blockchain technologies (Table 2).

Table 2. Comparative analysis and key results

Year	Study	Results
	Coca-Cola	
2018	Joint project with the U.S. State Department to create a secure worker registry using blockchain	Increased transparency and efficiency in labor contract verification, combating forced labor.
2019	Adoption of a blockchain solution from SAP for supply chain management	Reduced order approval time from 50 days to a few days, improved interaction efficiency among 70 franchise companies supplying $21 billion worth of products annually.
2020	Pilot project using blockchain for supply chain tracking	Accelerated order processing, improved quality control, and enhanced operational transparency among supply chain participants.
Conclusion: These studies demonstrate Coca-Cola's commitment to innovation and the use of advanced technologies to optimize business processes and enhance corporate social responsibility through blockchain technology.		
	Nike	
2021	Acquisition of RTFKT Studio	Nike acquired RTFKT, a studio specializing in virtual sneakers and collectible items using blockchain technology, strengthening its presence in digital fashion and the metaverse.
2022	Launch of NFT collections	Nike generated $185 million from NFT sales, earning $93 million from primary sales and $92 million in royalties from secondary transactions. The total trading volume of Nike's NFTs exceeded $1.29 billion.
2023	Launch of the SWOOSH platform	Nike's SWOOSH platform generated over $1.4 million from its first NFT sneaker collection, selling more than 71,000 tokens at $19.82 each.
Conclusion: These studies highlight Nike's successful integration of blockchain technology into its business strategy, contributing to revenue growth and strengthening the company's position in the digital space.		
	H&M	
2018	Blockchain testing for clothing supply chain tracking	H&M Group's Arket brand conducted an experimental test with VeChain to track product data in the supply chain, starting with a collection of wool hats in Fall 2018.
2020	Supply chain tracking using VeChain's MyStory blockchain platform	H&M Group's COS brand began using MyStory to track over 4,000 products manufactured with social and environmental responsibility.
2022	Creation of the unique digital token "fiber-coin"	This technology allows customers to access detailed product origin information, promoting ethical consumption and environmental sustainability.
Conclusion: These studies highlight H&M's commitment to sustainability and consumer transparency through blockchain technology.		

This study examined the most influential variations of blockchain technology applications for managing digital assets in marketing management, which have led to increased efficiency and brand recognition.

3.1. Limitations and future research

Notably, companies such as Coca-Cola and Nike focus on creating virtual environments or the metaverse, making their brands appealing not only to regular consumers but also to collectors. Meanwhile, H&M

emphasizes product quality, sustainability, and transparency in production for consumers. The analysis demonstrated that blockchain technologies are evolving rapidly and effectively.

Therefore, future research should explore in greater depth issues such as data protection in blockchain technologies and methods for combating fraud.

4. Conclusions

Blockchain technologies have become an integral part of modern life and the development of marketing management, offering increased operational efficiency, transparency, and data security for both consumers and manufacturers. These technologies are decentralized, ensuring the integrity of marketing assets while reducing risks such as counterfeiting, fraud, data manipulation, or unauthorized access to data. With blockchain technologies, production processes become more automated, and transactions are simplified, while tokenization provides new opportunities for customer engagement and monetization strategy development.

By integrating blockchain technologies into marketing management strategies, companies gain a competitive advantage through improved data accuracy, enhanced trust, and optimization of digital assets. However, since these developments are still relatively new, they require continuous refinement and enhancement, particularly in compliance with regulatory requirements, scalability, and implementation barriers. Blockchain technologies are constantly evolving, integrating into various aspects of life and industries alongside advancements in artificial intelligence and scientific progress. Therefore, companies should adopt and utilize these innovations for further practical and sustainable growth in the digital marketing ecosystem.

Declaration of competing interest

The authors declare that they have no known financial or non-financial competing interests in any material discussed in this paper.

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Author contribution

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