The Impact of Blockchain Technology on E-Commerce and Supply Chain: Case Studies of Walmart, Sephora, and Blockbuster

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Keywords: Blockchain Technology, E-commerce, Supply Chain Management, Digital Transformation.

Abstract: This study examines the application of blockchain technology in e-commerce and supply chain management and its impact and analyzes how blockchain can enhance supply chain transparency, optimize operational efficiency, and increase consumer trust in the context of Walmart's and Sephora's successful cases. Walmart utilizes blockchain technology to achieve efficient supply chain management and product traceability, thus enhancing market competitiveness. Through digital transformation and blockchain technology, Sephora has improved user experience and market responsiveness. In sharp contrast, Blockbuster, which failed to adapt to the digital change in time, eventually lost in the fierce market competition. The study results show that blockchain technology has significant advantages in supply chain management and supports the overall digital transformation of enterprises. Through in-depth case studies, this study provides an empirical basis for applying blockchain technology. It offers suggestions and strategies for other enterprises on effectively utilizing blockchain technology in digital transformation to help them enhance their market competitiveness and achieve sustainable development.

1 INTRODUCTION

In recent years, the development of blockchain technology has sparked widespread interest, particularly in e-commerce and supply chain management. Blockchain technology offers new solutions to increase data transparency, enhance trust and improve operational efficiency through its decentralized and tamper-proof nature (Kshetri, 2021; Rijal & Saranani, 2023). These characteristics make blockchain an important technology for many businesses to explore and apply. In the retail industry, blockchain technology is changing enterprises' operation models and promoting cooperation and trust-building among enterprises (Pan et al., 2020; Javaid et al., 2021). For example, globally renowned companies such as Walmart and LVMH have begun to utilize blockchain technology to improve their supply chain management and ensure product authenticity and traceability, thereby increasing consumer trust and satisfaction. These case studies provide a better understanding of the effectiveness of the practical application of blockchain technology in e-commerce and supply chain management.

By analyzing two successful cases, Walmart and Sephora, in detail, this study will explore how blockchain technology can help companies stay ahead of fierce market competition while improving the transparency and efficiency of their supply chains. This study will also conduct a case study of Blockbuster to demonstrate the challenges and consequences faced by companies that fail to make timely digital transformations. Through these cases, this study provides lessons for other enterprises to understand better and apply blockchain technology to achieve a more efficient and transparent operating model.

The next sections will introduce these cases in detail and analyze the specific applications and effects of blockchain technology in these enterprises. At the same time, this study will also recommend corresponding recommendations to help other enterprises effectively utilize blockchain technology in digital transformation to enhance their market competitiveness.

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Deng, S.
The Impact of Blockchain Technology on E-Commerce and Supply Chain: Case Studies of Walmart, Sephora, and Blockbuster.
DOI: 10.5220/0013329000004558

In *Proceedings of the 1st International Conference on Modern Logistics and Supply Chain Management (MLSCM 2024)*, pages 269-275
ISBN: 978-989-758-738-2

2 CASE STUDY 1: WALMART

2.1 Case Description

Walmart, founded in 1962 in the US, is a global retailer with over 11,000 stores in 28 countries, making it one of the world's largest chain stores and private employers (Zhang, 2024). The company also manages a significant e-commerce business, offering various goods and services online. Wal-Mart's business model revolves around its mission to help people save money and live better. It is achieved by delivering low prices at scale, leveraging efficiencies and purchasing power, and consistently reducing costs.

On the financial front, Walmart is a strong player in the retail industry. In fiscal year 2023, Walmart's revenue was up 7.3% globally, with broad-based strength across segments. Walmart U.S. grew comp sales by 8.3%, with e-commerce growth of 17% (Walmart, 2023). This reflects efficient operational management and strategic capital investments. Despite its operations and expansion's highly capital-intensive nature, Walmart maintains a solid credit rating, illustrating its strong financial health and risk management strategies.

Wal-Mart has a hierarchical and flexible management structure that supports its large and diverse global operations. The senior management team, led by the CEO, oversees various segments such as Walmart U.S., Walmart International, and Sam's Club. Each segment has its management team responsible for day-to-day operations to meet the diverse needs of their respective markets. Wal-Mart emphasizes strong local management teams with in-depth knowledge of their specific markets, allowing the company to respond to local consumer preferences and regulatory environments while benefiting from a focused strategy. Human resource management focuses on diversity, equity and inclusion and invests significant resources in training and development programs. With over 2.3 million employees worldwide, Walmart is one of the world's largest private employers. Its workforce strategy integrates advanced technology and employee engagement practices designed to increase productivity and job satisfaction. In terms of industry position, Walmart is the world's largest retailer and one of the most influential forces in the retail industry. In the digital space, Walmart has made significant investments to integrate the online and offline experience, thereby solidifying its industry position in the face of increasing competition from pure e-commerce players. By 2018, it is estimated that grocery delivery services will be provided to 40% of Americans at home (Hsu, 2023).

Through initiatives such as enhancing its mobile platform, expanding its online product assortment, and logistics and delivery service innovations, Walmart continues solidifying its position as a physical and digital retail leader.

2.2 Case Analyze

Wal-Mart's strength lies in its global scale and market leadership. It is the world's largest revenue retailer, operating various store formats, including supercenters, discount stores, and neighborhood markets on multiple continents. This immense scale allows Wal-Mart to utilize its size to achieve better buying conditions, distribute goods efficiently, and access a broad base of consumers. Wal-Mart excels in supply chain management, employing a sophisticated logistics system that includes warehousing, distribution centers, and an extensive transportation network that allows it to efficiently manage inventory, reduce operating costs, and ensure timely delivery of products. Walmart has been at the forefront of integrating technology into its operations. Walmart invests in AI, big data, and IoT to optimize supply chain management, personalize marketing, and enhance online shopping (Zhang, 2024). Walmart's use of blockchain technology to improve supply chain transparency and traceability is a notable example of its innovation efforts. With the help of its worldwide supply chain network, funny internal operating style, and massive procurement efforts, Walmart has developed an operating strategy that is both efficient and cost-effective (Zhang, 2024). Its improved distribution capabilities, streamlined inventory management, and cutting-edge logistics technologies allow it to provide faster and more dependable delivery services (Zhang, 2024). In addition, IoT devices in Walmart's warehouses and distribution centers help monitor inventory levels in real-time, ensuring timely replenishment and reducing waste due to excess inventory. Through these measures, Walmart has not only cut expenses but also improved the efficiency of its supply chain management. Walmart has effectively integrated its online and offline presence to improve customer shopping convenience. With features such as "Pickup Today" and the Walmart app, the company provides a seamless shopping experience that strengthens its position in the marketplace against its online-only competitors. Walmart has consistently demonstrated strong financial health, critical to sustaining the technology and infrastructure investments needed for digital transformation. The company's financial strength has enabled it to weather the recession better than many competitors. Despite Walmart's online business growth, most of its revenue relies heavily on brick-and-mortar stores. This dependence could become a burden in a world where digital engagement is more dominant than in-store traffic. In addition, Walmart faces criticism and negative publicity related to employee relations, product quality, and environmental practices, which can affect customer loyalty and brand perception, especially among socially conscious consumers. Managing global operations on Walmart's scale involves complex organizational structures, sometimes leading to slower decision-making processes and inefficiencies in adapting to local market needs. The retail industry's digital transformation has introduced more competitors, including tech giants such as Amazon, which compete directly with Walmart in multiple market segments, and the pressure to continually innovate and improve technological capabilities is higher than ever. As technology evolves, current investments may become obsolete, and new retail technologies such as augmented reality or highly advanced e-commerce platforms may disrupt existing business models. In addition, with the increasing use of digital platforms, Walmart faces the constant threat of cyberattacks, data breaches, and security challenges that pose a financial risk and damage the retailer's reputation among consumers.

2.3 Suggestion

Walmart should focus on the following strategic actions to expand its digital transformation journey.

Enhancing data analytics capabilities is key. Leveraging big data and advanced analytics can help Walmart understand consumer behavior, optimize its supply chain, and personalize the customer experience. Investing in predictive analytics tools will allow Walmart to anticipate market trends and consumer demand more effectively. Integrating blockchain technology to improve supply chain transparency ensures product authenticity and safety and reduces costs by streamlining operations and eliminating inefficiencies. Expanding omnichannel capabilities is also critical. Walmart should enhance mobile apps, integrate augmented reality (AR) to provide a more interactive shopping experience and utilize the Internet of Things to enable smarter store solutions. Investing in employee training and development is integral. As digital tools and platforms become increasingly important to the retail business, Walmart needs comprehensive employee training programs to ensure that employees can efficiently navigate these technologies to improve service quality while boosting employee satisfaction and retention. Partnering with tech startups can drive innovation. These partnerships can bring innovative solutions to Walmart, helping it stay ahead of technology trends and adapt faster to changes in the retail landscape. Walmart can also expand its digital services and e-commerce solutions into emerging markets. As Internet penetration in these regions grows rapidly, Walmart will have the opportunity to gain access to new customer segments and take advantage of digital retail innovation.

3 CASE STUDY 2: SEPHORA

3.1 Case Description

Sephora is a global beauty retail pioneer founded in France in 1970 by Dominique Mandonnaud, who changed the traditional service model of the beauty industry. Sephora has been a subsidiary of LVMH (Moët Hennessy Louis Vuitton) since its acquisition by LVMH in 1997. Financials Sephora maintains a strong financial position within the LVMH portfolio (Chen, 2023). Today, Sephora operates approximately 2,600 stores in 34 countries worldwide and expands its markets through a strong online shopping platform. Sephora's management strategy emphasizes innovation, customer experience and digital integration. The leadership team, led by the President/CEO, adapts global strategies to local market conditions and consumer preferences. Sephora champions diversity and inclusion, not only in its hiring practices but also in its products and marketing activities. The company employs thousands globally, and many focus on technology roles supporting its e-commerce operations and digital transformation programs.

In the highly competitive beauty retail industry, Sephora dominates with its wide variety of beauty products and private label Sephora line. Sephora's go-to-market strategy blends physical retail with a strong digital presence. Its stores feature an iconic black-and-white color scheme, encouraging customers to explore and experience the products freely. This experiential retail model is complemented by a strong digital strategy, particularly in using augmented reality and virtual try-on technology, which helps boost online sales. In addition, Sephora has implemented several beauty technology innovations, such as the "Color IQ" system, which uses computer vision to find a match for a customer's skin tone.

Sephora's Beauty Board is a social media platform for collaborative browsing, connecting with the community and creating. The community site allows make-up and skincare enthusiasts to take photos, share their make-up and beauty tips, and get inspired by other people's make-up tutorials (Mansouri, 2022)

3.2 Case Analyze

Sephora has multiple strengths in the beauty industry. Its innovative digital engagement strategy has given it a strong digital presence, particularly through mobile apps and a highly interactive website. These tools enhance the shopping experience and position Sephora at the forefront of digital innovation.

Its robust e-commerce platform contributes most of the company's revenue and is integrated with a loyalty program that provides personalized recommendations based on user behavior and purchase history. In addition, promotional codes and discounts offered on the official website entice customers to take advantage of unique deals, giveaways, and products. The official promo codes and discounts offered by Sephora on their website entice customers to take advantage of unique deals, freebies, and products (Sephora, 2022)

Sephora uses sophisticated data analytics to understand customer preferences and market trends to provide targeted marketing, optimize inventory, and develop products that meet customers' changing needs. Its Beauty Insider loyalty program is one of the most successful in the retail industry, with millions of active members. The program promotes customer loyalty and provides the company with valuable data to further improve customer engagement and satisfaction. Sephora can provide highly personalized product recommendations through apps, email marketing, and even in-store consultations by analyzing detailed customer data. Sephora operates in many countries worldwide and has a diverse global market presence. This international footprint has expanded its customer base and increased brand awareness, making it a leading brand in the beauty and cosmetics industry. However, Sephora also faces several threats. Sephora faces multiple threats during its digital transformation and market expansion. First, the beauty and personal care industry is highly competitive, with numerous established players and new entrants, such as Ulta Beauty and direct-to-consumer brands, constantly threatening Sephora's market share. Rapid technological change requires companies to invest to stay relevant continually. Sephora risks falling behind if it fails to keep up with technological advances in retail and consumer engagement.

Meanwhile, Sephora offers services on different digital platforms, including its website, mobile apps and social media channels. An inconsistent user experience between these platforms could lead to confusion and decreased satisfaction. For example, the mobile app may have different functionality than the website, and users may need help switching platforms. Sephora offers services on different digital platforms, including its website, mobile apps, and social media channels. An inconsistent user experience between these platforms could lead to confusion and decreased satisfaction. For example, the functionality of the mobile app may be different from the website, and users may experience problems when switching platforms

3.3 Suggestion

Sephora should further expand its use of augmented reality (AR) technology to create immersive and interactive shopping experiences. This includes virtual try-ons and personalized makeup tutorials, features that increase customer engagement and satisfaction. In addition, chatbots and virtual assistants enhance the customer experience by providing real-time assistance. These AI-powered tools can handle customer inquiries, provide product recommendations, and even assist with checkout.

Second, Sephora can offer customized beauty products and services using AI and machine learning technologies. Algorithms that analyze a customer's skin type, preferences, and behavior can tailor recommendations and solutions to improve customer loyalty and increase sales. Sephora should utilize digital platforms to build and strengthen its community. This can be done through interactive social media campaigns, loyalty programs and beauty seminars. Engaging customers in this way can help better understand their needs and preferences, leading to improved service offerings. Companies that showcase their community activities on social media improve their brand image and reputation. Sephora's public relations and marketing teams should vigorously promote its global community activities on Internet platforms to attract more customers and fulfill their social duties (Chen, 2023).

4 CASE STUDY 3: BLOCKBUSTER

4.1 Case Description

Founded in 1985, Blockbuster was the leading video and DVD rental company in the U.S., known for its large network of chains and extensive movie inventory. With its convenient rental service and "no late fee" policy, Blockbuster reached the peak of its business in the 1990s, with 2004 revenues reaching $6 billion. However, as consumer behavior and the technological environment changed, Blockbuster's revenues began to decline, with a net loss of $146 million in 2005 and liabilities exceeding $1 billion when it filed for bankruptcy protection in 2010. Blockbuster suffered from frequent management changes and a need for more consistency in strategic decision-making. After its acquisition by Viacom in 1994, the company needed to respond to the digital transformation by focusing more on financial operations than strategic innovation. While Blockbuster has attempted transformation strategies such as launching a DVD-by-mail service, these efforts have often been piecemeal and needed long-term planning. With the rise of streaming services, Blockbuster's industry position was rapidly eroding. Emerging competitors like Netflix quickly dominated the market through digital platforms and flexible service models. While Blockbuster has been defunct since January 2014, Netflix is today valued at around $70 billion, making it the world's 10th-largest (Rowe & Sam, 2017)

Blockbuster's slow response to digital transformation has gradually caused it to lose its edge in the fiercely competitive market. Blockbuster tried to introduce its own DVD-by-mail service in 2004, but there needed to be more time. Blockbuster tried to introduce its own DVD-by-mail service in 2004, but there needed to be more time. Netflix started offering that service in 1997 and kept looking ahead from there (Rowe & Sam, 2017). As the digital transformation accelerated, Blockbuster's heavy reliance on brick-and-mortar stores became a burden. The company was saddled with high operating costs due to its large network of retail outlets, which became increasingly unsustainable as customer traffic declined.

4.2 Case Analyze

Blockbuster has high brand recognition as the once-largest movie and game rental chain globally. This awareness can attract many initial users to its digital platform, providing a valuable market advantage. Rich content resources are another major advantage of Blockbuster. Its once-accumulated movie and game resources can be repackaged and distributed digitally, providing a solid content foundation for the digital platform. In addition, Blockbuster has accumulated a large amount of historical customer data, and through data analysis, it can accurately locate potential users and provide personalized services and recommendations. However, primarily a brick-and-mortar operation, Blockbuster's existing infrastructure and management experience can also support its digital transformation, especially in content management and customer service.

However, Blockbuster needs to accumulate more technology. In its past operations, it needed more investment and accumulation of digital technology and improved technology development, operation and maintenance. The high cost of transition is also a major challenge. Transitioning from a traditional physical leasing business to a digital platform requires a large capital investment and time, especially in constructing the technology platform and introducing talent. As a former offline rental giant, Blockbuster's brand image may not appeal to younger consumers accustomed to modern streaming services. In addition, Blockbuster is inexperienced in digital marketing, user experience design, and online service operation, and it needs to fill these shortcomings quickly.

The continued rapid growth of the global streaming media market provides a huge market opportunity for Blockchain to enter the space through digital transformation. Blockchain can provide personalized recommendations, enhanced content security, and more efficient user management by leveraging big data, artificial intelligence, and blockchain technologies. Partnering with existing streaming platforms, content production companies, or technology companies can quickly enhance their technical capabilities and content richness. In addition, with the rapidly growing demand for streaming services in emerging markets, Blockchain can quickly enter these markets through its digital platform and take the lead.

However, Blockbuster's entry into the streaming market will face stiff competition from strong streaming competitors such as Netflix, Amazon Prime, Disney+ and others who have already captured a major market share. The technology for streaming and digital content consumption is updating very fast, and Blockbuster will need to continue to invest to keep up with the changes in the market, or it may become obsolete. Consumer entertainment preferences constantly change, and Blockbuster risks losing customers if it quickly adapts and responds to these changes. Uncertainty in the global economy may also affect consumer spending on entertainment, which could hurt Blockbuster's digital business.

4.3 Suggestion

First, building a strong technical team is key. To this end, Blockbuster should bring in top technical talent and set up an internal development team to focus on platform development, data analysis and AI applications. At the same time, it can cooperate with technology companies and outsource part of the development tasks to improve the platform's technical capabilities rapidly. In terms of content, Blockbuster should carry out content reshaping and innovation. Specifically, it should digitize its existing movie and game inventory and cooperate with content production companies to acquire new exclusive content. In addition, it should use big data to analyze user behavior and provide personalized content recommendations, thereby increasing user stickiness.

Enhanced digital marketing is also an essential part of the equation. Through social media platforms such as Instagram, Twitter, and YouTube, Blockbuster can rebrand and attract younger users. By optimizing search engines and paid advertising (SEO and SEM), the platform's online visibility and traffic can be increased. Digital marketing often utilizes the internet platform to make it easy to deliver messages to target audiences, and through the Internet, companies can reach out to global customers and get their feedback (Akre et al., 2019)

In terms of partnerships and acquisitions, Blockbuster should actively establish strategic partnerships. For example, it has partnered with streaming platforms (e.g., Netflix, Hulu) and technology companies (e.g., Google, Amazon) to enhance its technological capabilities and content richness rapidly. Meanwhile, mergers and acquisitions of smaller technology companies or content production companies can acquire key technologies and exclusive content. Finally, optimizing user experience is the key to improving user satisfaction and loyalty. Blockbuster should optimize the platform's interface and interaction design to provide a seamless viewing and gaming experience. In addition, it should establish an efficient online customer support system to solve user problems promptly and improve user satisfaction.

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5 CONCLUSIONS

Combining online and physical channels is essential due to the growing dominance of digital platforms in the retail industry. In today's globalized, digitally-centric environment, comprehending customers demands innovative methods and ways of thinking.

An omnichannel strategy that unifies customer experiences across all channels is crucial for staying ahead of the competition. This approach enhances customer experience and gives merchants valuable insights into customer habits and preferences. Walmart’s transformation has shown other retailers the benefits of embracing digital technology. Blockbuster and Walmart's case studies highlight the critical importance of adaptability in the digital age. Traditional retailers face challenges such as decreasing foot traffic and evolving consumer expectations, necessitating strategic adjustments to thrive. Retailers should strategically integrate rapidly evolving technologies into their business structures to maintain competitiveness, optimize customer experience, and streamline operations. Effectively adopting and utilizing these digital innovations will be increasingly important. Conventional stores can prosper in the new digital era by staying ahead. Traditional stores should monitor new technological developments and frequently evaluate their impact on business. Retailers ought to be agile enough to anticipate and respond to changes in customer behavior and technological trends. Adaptability and readiness to revise strategies are key to keeping pace with these changes. Conventional stores can weather the digital revolution by making swift decisions, aggressively adopting new technologies, and thriving.

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