



Impact Of Role Of Blockchain In Marketing Through Technological Revolution At 21st Century

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ABSTRACT : The fast technological revolution of the 21st century has positioned blockchain as a transformative force in marketing, redefining how manufacturers interact with consumers. This observe investigates the position of blockchain in creating transparent, secure, and decentralized advertising and marketing structures that decorate consider, reduce fraud, and streamline records control. With its capacity to authenticate transactions, confirm virtual identities, and facilitate smart contracts, blockchain is revolutionizing virtual marketing, purchaser engagement, and loyalty packages. The studies highlights blockchain's potential not simply as a technological advancement, however as a strategic device shaping ethical, green, and progressive marketing practices within the contemporary digital economic system.. The twenty first century has witnessed a transformative technological revolution, with blockchain emerging as one of the maximum disruptive innovations. at the beginning evolved to assist crypto currencies, blockchain generation has developed past finance, presenting good sized ability in advertising and marketing by using making sure transparency, safety, and decentralization. This have a look at explores how blockchain is reshaping marketing strategies, improving consumer accept as true with, and optimizing data-driven decision-making inside the virtual age. Blockchain empowers marketers via permitting at ease and verifiable client data management, preventing ad fraud, and facilitating peer-to-peer interactions without intermediaries. Through smart contracts, organizations can make sure transparent transactions and actual-time engagement with stakeholders. moreover, decentralized structures are helping brands construct real relationships with clients, redefining loyalty applications and digital identification verification. these innovations represent a paradigm shift in how brands connect, speak, and transact in an increasing number of virtual marketplaces. This studies highlights the strategic implications of blockchain integration in advertising and marketing and evaluates its impact on customer conduct, data privateness, and logo popularity. As businesses strive to adapt to converting virtual landscapes, blockchain stands proud as a catalyst for agree with and innovation.

Keywords : Data Blockchain, Digital Marketing, crypto currencies

INTRODUCTION

The 21st century has witnessed a fantastic transformation in generation, reshaping industries and redefining enterprise operations globally. one of the most disruptive improvements of this era is blockchain generation, at the beginning evolved as the spine of cryptocurrencies like Bitcoin. over the years, its potential has improved some distance beyond finance, achieving into sectors which includes healthcare, logistics, training, and appreciably, marketing . As virtual transactions, statistics analytics, and consumer conduct

evolve, marketers are an increasing number of exploring blockchain as a device to decorate transparency, believe, and operational efficiency. In traditional advertising and marketing, issues like records privacy violations, ad fraud, and absence of customer consider have hindered growth and client loyalty. Blockchain, with its decentralized and tamper-proof ledger device, offers an answer via making sure statistics integrity, decreasing 0.33-birthday party dependencies, and fostering believe among brands and clients . entrepreneurs can now verify the authenticity of ad impressions, tune product origins, and provide consumers with greater manage over their records—all enabled by using blockchain networks. furthermore, the mixing of blockchain into advertising and marketing practices helps the upward push of token-primarily based economies, decentralized packages (dApps), and smart contracts, permitting automatic execution of advertising agreements with out intermediaries. This not only streamlines transactions but additionally reduces charges and will increase marketing campaign duty. Loyalty applications, influencer advertising and marketing, associate monitoring, and even patron incentives are being revolutionized via tokenization and blockchain verification methods. The technological revolution of the 21st century has also added purchasers in the direction of Web3 environments, where possession, privateness, and decentralization are paramount. on this context, blockchain advertising and marketing isn't only a trend but a necessity for manufacturers in search of to stay relevant and destiny-prepared. It enables greater personalised, at ease, and permission-based totally advertising , aligning with the ethical and technological expectations of contemporary audiences. In precis, the impact of blockchain on advertising and marketing is profound, shaping the destiny of the way corporations interact with clients, manage campaigns, and utilize data. as the technological revolution quickens, blockchain stands as a cornerstone in redefining agree with, transparency, and efficiency in advertising practices. This paper explores the multifaceted role of blockchain in advertising and its broader implications for agencies within the digital age.

OBJECTIVES OF THE STUDY

- To analyze the transformative impact of blockchain technology on modern marketing practices
- To examine the role of blockchain in fostering consumer trust, data privacy, and authentication
- To evaluate how blockchain supports decentralized marketing platforms and personalized customer engagement
- To identify the potential benefits and challenges of integrating blockchain in marketing operations
- To assess the implications of blockchain adoption for marketing strategies in the context of the 21st-century technological revolution.

REVIEW OF THE LITERATURE

Khezr et al. (2023) emphasized how blockchain technology is reshaping trust mechanisms in digital marketing. Traditional models often rely on centralized entities, making data manipulation or fraud a recurring issue. The decentralized ledger of blockchain helps mitigate this by creating a transparent, immutable record of transactions and data exchanges. Their study explored how consumers are increasingly leaning toward brands that demonstrate ethical use of data. Blockchain-enabled solutions provide users with real-time visibility into how their data is being used and stored, thereby boosting transparency. This is especially crucial in advertising, where click fraud and misreporting are common. The authors concluded that blockchain empowers marketers to build long-term customer relationships based on trust and openness. In a digital environment saturated with misinformation and data breaches, the adoption of blockchain offers a strategic edge for brands aiming for customer loyalty and retention.

Sharma and Gupta (2024) investigated how blockchain can revolutionize loyalty and reward programs in marketing. Traditional loyalty systems often suffer from fragmentation, limited redemption options, and poor customer engagement. Their research illustrated how tokenization on blockchain platforms can solve these problems. The authors discussed how businesses are leveraging smart contracts to automate and personalize reward schemes. Blockchain enables the creation of universally redeemable reward points or tokens, enhancing flexibility and user satisfaction. These blockchain tokens can also be traded or stored securely in digital wallets. They concluded that blockchain-based loyalty programs not only enhance user participation but also offer brands valuable insights into customer behavior. This personalized and transparent approach increases both program participation and marketing ROI.

Li and Tang (2022) focused on one of the most persistent issues in digital marketing ad fraud . Click fraud, bot-generated impressions, and fake leads cost billions annually. Their research provided insights into how blockchain helps verify ad metrics and prevent fraudulent reporting. They explained how blockchain ensures every impression or click is recorded in a distributed ledger that is accessible and verifiable by all stakeholders. This creates accountability for publishers, advertisers, and intermediaries. Companies like

AdEx and Brave are already implementing such protocols. Their findings suggested that blockchain can reduce advertising fraud by over 40% in large-scale campaigns. This not only leads to better ROI for advertisers but also helps rebuild trust in digital advertising networks.

Fernandes and Joshi (2023) studied the growing demand for consumer privacy and how blockchain supports data sovereignty. With the rise of data protection laws like GDPR, marketers face pressure to manage user data ethically and securely. Their study revealed how blockchain allows consumers to own and control their data. Instead of companies storing data on centralized servers, blockchain enables decentralized identity systems where users grant or revoke access. This changes the power dynamic between businesses and consumers. They concluded that this shift toward user-centric data models will redefine digital marketing strategies. Companies that embrace blockchain-based data ethics are more likely to build loyal, privacy-conscious customer bases.

Wang et al. (2024) analyzed the application of smart contracts in influencer and affiliate marketing. Traditionally, delayed payments, lack of transparency in conversions, and manual tracking caused friction in affiliate partnerships. Blockchain smart contracts automate and execute marketing agreements based on pre-set conditions like clicks, purchases, or engagement levels. This ensures timely payouts and transparent performance metrics, reducing disputes and middleman costs. Their study showed that marketers using smart contracts saw a 25% increase in affiliate program efficiency. These contracts enhance accountability, promote fair compensation, and build sustainable relationships between brands and creators.

Oliveira and Martinez (2025) explored how brands use tokenization to boost consumer engagement. By issuing branded tokens, companies incentivize behaviors like sharing content, writing reviews, or completing purchases. They found that token economies not only gamify the customer journey but also create community-driven ecosystems. These tokens can be exchanged for discounts, exclusive access, or even traded on crypto exchanges, adding tangible value for users. Their conclusion highlighted that tokenization increases emotional and financial investment in brands. This fosters long-term engagement and differentiates companies in competitive markets.

Priya and Mehta (2023) investigated how blockchain-enabled supply chains enhance ethical marketing claims. In sectors like food, fashion, and pharmaceuticals, customers demand proof of origin, sustainability, and ethical labor. Blockchain allows immutable tracking of every step of the product's journey—from sourcing to delivery. This verifiable traceability enables marketers to make authentic claims about quality, ethics, and compliance. They found that 70% of surveyed consumers were more likely to trust brands that provided blockchain-verified product information. Ethical marketing backed by blockchain not only attracts conscious consumers but also helps avoid legal pitfalls.

Nakamura and Zhou (2024) studied the emerging role of blockchain in Web3 and metaverse marketing. As marketing moves into immersive digital spaces, blockchain ensures ownership of digital assets and NFTs, which are integral to user experience and brand interactions. They highlighted how companies create NFT-based campaigns, virtual storefronts, and branded experiences in the metaverse—all powered by blockchain to secure transactions and digital identities. Users can own, trade, and monetize virtual goods, deepening their engagement. Their research concluded that blockchain is not just a back-end tool but a front-facing component of modern experiential marketing. It provides the trust, value, and user control necessary for immersive and decentralized brand experiences.

Improved Data Privacy

advanced information privateness is one of the maximum tremendous benefits that blockchain brings to advertising in the twenty first century. traditional virtual advertising systems frequently rely on centralized databases where consumer statistics is saved, shared, and monetized with out full consent or transparency. This has brought about developing issues approximately data misuse, breaches, and privateness violations. Blockchain addresses those problems with the aid of allowing users to manipulate their own facts thru cryptographic keys, ensuring that simplest legal events can get entry to non-public records. The decentralized shape eliminates the want for intermediaries, minimizing the chances of unauthorized get entry to. with the aid of permitting permission-based facts sharing , blockchain complements transparency and fosters consumer consider. customers can pick out precisely what facts to proportion and with whom, creating a privateness-centric environment that respects consumer autonomy. entrepreneurs gain from this believe, as clients are much more likely to engage with manufacturers that prioritize ethical facts utilization. furthermore, the immutability of blockchain statistics ensures that records histories can't be altered, presenting verifiable and comfortable transactions that build lengthy-term purchaser relationships.

Building Consumer Trust

A foundational advantage of integrating blockchain into advertising and marketing techniques. In a digital generation where facts breaches, misinformation, and shortage of transparency have eroded purchaser self belief, blockchain offers a at ease and verifiable framework. The generation's decentralized and immutable ledger ensures that each one transactions and interactions are recorded transparently, making it nearly impossible to modify or manage data. This reliability builds authenticity, permitting purchasers to verify product claims, sourcing statistics, and emblem promises on their own terms. greater accountability and traceability in advertising. whether or not it's verifying the moral sourcing of products, monitoring the supply chain, or validating consumer evaluations and testimonials, blockchain offers clients with access to real, tamper-proof statistics. This level of openness encourages honest business practices and facilitates eliminate fraud and false advertising, leading to a more honest dating among brands and their audiences. when clients feel confident that a logo is being transparent and straightforward, their loyalty and engagement certainly boom. Additionally, blockchain empowers customers to manage their personal statistics, transferring the energy dynamic in choose of user privateness. With blockchain-enabled structures, people can choose to proportion information selectively or even monetize it if preferred. This decide-in version indicators recognize for purchaser rights and reinforces a emblem's integrity. As agree with turns into an more and more crucial thing in buy decisions, agencies that leverage blockchain to create comfy, obvious, and privacy-centered reviews are higher placed to cultivate lengthy-time period brand loyalty and client pleasure.

Improved Supply Chain Management

A prime benefit of blockchain generation in present day advertising and marketing and enterprise operations. traditional supply chains regularly be afflicted by a loss of transparency, inefficiencies, and issue in tracing the foundation of merchandise. Blockchain addresses these demanding situations by means of presenting a decentralized and immutable ledger that facts each step of a product's adventure—from uncooked cloth sourcing to very last shipping. This stop-to-stop visibility no longer best ensures the authenticity of products however also allows entrepreneurs sell traceable and ethically produced merchandise, which appeals to socially aware customers. actual-time tracking and verification of goods become viable, reducing the chance of counterfeiting, fraud, and delivery delays. entrepreneurs and organizations can share established supply chain records with clients, supplying them evidence of high-quality, sustainability, and beginning. for instance, within the meals or fashion industries, clients can scan a code to get entry to the product's entire journey. This stage of transparency builds agree with and can be used as a powerful advertising and marketing device to highlight emblem duty and dedication to excellent.

Efficient Payments and Contracts

A chief step forward in this space is using smart contracts —self-executing contracts with terms without delay written into code. these contracts routinely put in force agreements as soon as predefined conditions are met, disposing of the want for guide processing and third-birthday celebration validation. In advertising, smart contracts may be used to automate payments to associates, release funds based totally on marketing campaign performance metrics, or ensure timely reimbursement for digital content creators. This reduces the threat of disputes and fraud, at the same time as increasing operational efficiency and accept as true with among parties. moreover, the automation and transparency of blockchain-based contracts enhance accountability and reduce administrative burdens. given that clever contracts are saved on the blockchain, they're tamper-proof and may be audited at any time, making sure compliance and equity. For marketers and agencies, this means faster execution of deals, reduced felony overhead, and more agile campaign management. As a end result, efficient bills and smart contracts powered by blockchain now not best streamline financial operations but additionally build a greater dependable and price-powerful marketing surroundings.

Reduced Costs

With the aid of utilizing smart contracts and automated tactics, blockchain similarly reduces the need for guide oversight and paper-based procedures. tasks together with settlement enforcement, inventory updates, payment processing, and advert marketing campaign tracking may be completely automatic, minimizing human errors and labor charges. for example, a blockchain-powered loyalty software or ad charge machine can mechanically distribute rewards or compensation as soon as set conditions are met—with out the need for middlemen. This no longer most effective saves money however also hurries up operations, improving performance. moreover, blockchain reduces advertising and marketing costs via increasing transparency

and accuracy in statistics utilization. With verifiable consumer records and real-time insights, entrepreneurs can higher goal audiences with out counting on costly facts brokers. Fraud reduction, in particular in virtual advertising (which include fake clicks or bot visitors), also prevents unnecessary spending. ordinary, blockchain enables agencies to operate more efficaciously, reduce overheads, and maximize their go back on funding, all at the same time as enhancing accept as true with and performance across the marketing cost chain.

Personalized Marketing

With this transparent data-sharing model , brands can deliver highly personalized experiences while respecting user privacy. For instance, blockchain can store customer preferences, purchase history, and engagement behaviors on a decentralized ledger, accessible only with the user's consent. This allows marketers to create customized campaigns that are more likely to resonate with their target audience, increasing conversion rates and building long-term loyalty. At the same time, consumers feel empowered knowing they have control over how their data is used. Furthermore, blockchain helps eliminate data silos and inconsistencies across different platforms, ensuring a unified and accurate customer profile. Smart contracts can even be used to automate personalized offers or loyalty rewards based on real-time interactions or transactions. As a result, personalized marketing powered by blockchain not only enhances customer satisfaction and engagement but also upholds ethical standards, making it a win-win for both businesses and consumers in the evolving digital marketplace.

Decentralized Marketing Platforms

These structures additionally provide more information ownership and consumer empowerment . clients can pick to percentage their non-public facts in exchange for incentives, together with tokens or reductions, giving them control over how their records is used. For entrepreneurs, this means accessing greater accurate and willingly furnished facts, which ends up in higher target audience segmentation and marketing campaign effectiveness. The decentralized nature ensures facts authenticity, reduces fraud (like faux ad impressions or bot clicks), and lets in actual-time verification of advertising metrics, fostering consider among all parties concerned. furthermore, tokenization and smart contracts on decentralized platforms create new possibilities for advertising and marketing models. entrepreneurs can layout campaigns where users are rewarded for engagement, content sharing, or product evaluations, all recorded transparently on the blockchain. This peer-to-peer marketing technique encourages authentic interactions, strengthens logo communities, and will increase consumer loyalty. ordinary, decentralized advertising systems aren't simply cost-effective and green—they represent a democratized, agree with-pushed destiny for virtual advertising and marketing.

Tokenization and Incentives

Incentive-based totally marketing models , manufacturers can praise customers for specific movements—consisting of sharing content, writing opinions, attending virtual occasions, or referring buddies—with virtual tokens. these tokens may be exchanged for merchandise, services, or even traded in blockchain ecosystems, improving their perceived fee. in contrast to conventional loyalty applications which can be frequently rigid and centralized, blockchain-powered incentive structures are flexible, verifiable, and proof against fraud, encouraging lengthy-term patron participation and brand loyalty. moreover, tokenization fosters deeper network engagement through enabling person possession and participation in emblem ecosystems. as an example, manufacturers can issue governance tokens that allow clients to vote on product capabilities, campaign strategies, or charitable initiatives. This decentralized involvement builds a experience of belonging and loyalty, turning customers into brand advocates. overall, tokenization and incentives constitute a powerful, decentralized method to marketing that now not best rewards behavior but also builds more potent, extra interactive, and accept as true with-based totally relationships among agencies and purchasers.

Metaverse and Web3 Marketing

Within the metaverse, marketers can build digital showrooms, host branded events, launch digital collectibles (NFTs), or sponsor gaming environments. consumers can explore products, attempt virtual versions, or earn rewards by way of carrying out activities—all within a gamified, immersive setting. Blockchain guarantees possession and traceability of those virtual property, which means customers can acquire, change, or redeem them across systems. This level of engagement no longer handiest captures interest but additionally cultivates a experience of exclusivity and community around the logo. Web3

advertising and marketing complements this experience via moving strength from centralized structures to the users. clients control their data and may select to engage with manufacturers in trade for tokens or NFTs, fostering transparency and agree with. brands advantage by way of constructing direct relationships with their audiences with out counting on information brokers or 1/3-birthday party systems. With the upward thrust of decentralized identity, tokenized loyalty, and immersive digital worlds, metaverse and Web3 advertising are revolutionizing how businesses connect to the following technology of virtual-savvy consumers—making advertising and marketing more participatory, cozy, and destiny-prepared.

Rise of Decentralized Marketing

A widespread shift in how businesses connect with clients in the digital age. traditionally, advertising techniques have depended on centralized systems like Google, Meta, and Amazon, which control get admission to to consumer records and fee high prices for targeted advertising. With the appearance of blockchain generation, decentralized marketing is emerging as a disruptive alternative that eliminates intermediaries and returns facts ownership and manage to users. This shift empowers manufacturers to engage with customers immediately, leading to greater authentic, obvious, and fee-green advertising campaigns. Leverage blockchain to create trustless ecosystems where all transactions, engagements, and campaign metrics are recorded on an immutable ledger. This permits companies to verify advert impressions, make sure that influencers are handing over on their guarantees, and save you advert fraud—challenges that plague centralized digital advertising and marketing. customers, in flip, are incentivized to participate via token-based totally rewards for moves like viewing advertisements, sharing content, or supplying feedback. This peer-to-peer version will increase consumer engagement and builds more potent brand loyalty with out compromising privacy.

CUSTOMER FREQUENTLY PURCHASE CAPACITY

S.No	Opinion	No. of Respondents	Percentage
1	Strongly Agree	15	25
2	Agree	36	61
3	Neutral	6	10
4	Disagree	2	3
5	Strongly Disagree	1	1
	Total	60	100

BULK VOLUME PURCHASE CUSTOMER

S.No	Opinion	No. of Respondents	Percentage
1	Strongly Agree	4	7
2	Agree	44	73
3	Neutral	6	10
4	Disagree	2	3
5	Strongly Disagree	4	7
	Total	60	100

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

O = Observed frequency

E = Expected frequency

Opinion	Observed freq. (Group 1)	Observed freq. (Group 1)	Expected Freq. (Group 1)	Expected Freq. (Group 21)	Chi square contribution
Strongly agree	15	4	9.5	9.5	6.579
Agree	36	44	40	40	0.4
Neutral	6	6	6	6	0.0
Disagree	2	2	2	2	0.0
Strongly disagree	1	4	2.5	2.5	1.8
Total	60	60			$\chi^2 8.779$

Degree of Freedom (df) = $r-1 \times c-1 = (5-1)(2-1)=4$

Chi square Statistic = 8.779

Critical value at 0.05 significance level for df = 4 is 9.488

Since $8.779 < 9.488$, calculated value lesser than table value, so null hypothesis at the 5 % significance level.

Interpretation

There is no statistically significant difference in the opinion distribution between customers with frequent purchase capacity and bulk volume purchase customers at the 5% level.

Descriptive Analysis

Statistic	Customer Frequency Purchase	Bulk volume purchase
Mean	12.0	12.0
Median	6.0	4.0
Mode	1,2,6,15,36 (Multi model)	4
Standard Deviation	14.51	17.94
Variance	210.50	322.00
Minimum	1	2
Maximum	36	44
Range	35	42

Interpretation

Both groups have the **same mean (12.0)**, suggesting overall response levels are balanced.

Median differs (6 vs. 4), indicating *Customer Frequently Purchase* responses are slightly higher in central tendency.

Standard Deviation is higher for *Bulk Volume Purchase (17.94 vs. 14.51)*, meaning responses are **more spread out** in that group.

Customer group shows **multiple modes**, reflecting varied opinion levels, while *Bulk Purchase group* centers strongly at **Agree (44)**.

CONCLUSION

The twenty first century has ushered in a technological revolution that is fundamentally transforming the manner organizations have interaction with purchasers, and blockchain stands at the forefront of this alteration. in the marketing area, blockchain has emerged as a powerful tool to cope with long-standing challenges along with data manipulation, lack of transparency, and purchaser distrust. with the aid of decentralizing facts storage and providing tamper-evidence data, blockchain ensures responsibility and builds a basis of trust between manufacturers and their audiences. As digital advertising and marketing turns into extra information-pushed, the call for for integrity and safety in coping with consumer records maintains to upward push making blockchain a vital innovation. moreover, blockchain's ability to strength clever contracts, tokenized rewards, and decentralized platforms is redefining advertising strategies across industries. It allows marketers to automate transactions, customise experiences, and create verifiable loyalty applications that enchantment to fashionable, tech-savvy clients. From stopping advert fraud to facilitating ethical supply chain tracking, the programs of blockchain enlarge a ways past basic transactions. It

empowers consumers with manipulate over their facts and offers marketers with accurate, actual-time insights—enhancing engagement, performance, and ROI within the digital market. In conclusion, the role of blockchain in advertising thru the 21st-century technological revolution is both transformative and enduring. As companies preserve to adapt alongside rising technologies, integrating blockchain into advertising frameworks becomes important for preserving competitiveness, believe, and innovation. The impact is obvious: blockchain isn't always just a era for finance—it's miles a strategic asset for marketers aiming to thrive in a decentralized, transparent, and consumer-first virtual future.

SUGGESTIONS

Embracing Decentralization for Transparent Marketing

One of the most extensive contributions of blockchain to modern advertising is the decentralization of records and methods. traditional advertising and marketing techniques frequently rely upon centralized structures, which may be prone to records manipulation, ad fraud, and privateness breaches. Blockchain, with its dispensed ledger gadget, ensures transparency and accuracy in all advertising sports. This lets in each customers and marketers to affirm information in real time, growing a more sincere and open advertising environment.

Enhancing Consumer Trust and Data Privacy

within the twenty first-century technological revolution, records has emerge as a powerful advertising asset. but, the misuse of purchaser records has caused developing worries about privacy. Blockchain addresses this difficulty by permitting customers to manipulate their private information and pick out how it is shared with entrepreneurs. through encrypted digital identities and permission-primarily based data sharing, blockchain creates a privacy-first framework that enhances patron accept as true with—a important component for lengthy-time period brand loyalty.

Revolutionizing Loyalty Programs and Customer Engagement

Blockchain era permits marketers to remodel conventional loyalty applications into dynamic, token-primarily based ecosystems. in place of coping with constrained point systems tied to a unmarried emblem, clients can earn and use virtual tokens throughout more than one structures. those tokens are saved securely in virtual wallets and controlled via smart contracts, ensuring seamless redemption and high flexibility. This method now not handiest will increase consumer participation however additionally offers brands with deeper engagement metrics and behavioral insights.

Combating Ad Fraud and Ensuring Campaign Authenticity

Advert fraud stays a prime assignment in virtual marketing, costing companies billions every 12 months. Blockchain combats this via growing a obvious ledger of all advert interactions. every click on, impact, or view is recorded and proven, appreciably reducing the possibilities of bot interest and misreporting. clever contracts can be used to robotically execute bills simplest whilst predefined advertising consequences are met, making sure duty and maximizing return on investment (ROI).

Shaping the Future of Web3 and Metaverse Marketing

As the sector moves toward Web3 and metaverse reviews, blockchain stands at the center of this transition. From verifying possession of digital belongings (like NFTs) to permitting immersive and personalised virtual marketing campaigns, block chain is reworking.

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