



Blockchain-enabled advances (BEAs): Implications for consumers and brands

Tuuli Hakkarainen^a, Anatoli Colicev^{b,*}

^a Lecturer (Assistant Professor) in Human Resource Management and Organisational Behavior, University of Liverpool Management School, Chatham Street, Liverpool L69 7ZH, UK

^b Chair (Full Professor) in Marketing, Strategy and Analytics, University of Liverpool Management School, Chatham Street, Liverpool L69 7ZH, UK

ARTICLE INFO

Keywords:

Blockchain
Smart contracts
Cryptocurrencies
Non-fungible tokens
Play-to-earn games
Brand

ABSTRACT

Blockchain-enabled advances (BEAs) are state-of-the-art innovations based on blockchain technology. Recent years have witnessed the proliferation of the four BEAs: smart contracts, cryptocurrencies, play-to-earn games, and non-fungible tokens. These BEAs have implications for the marketing field as they affect consumers and brands. We propose a novel theoretical framework that articulates how the principles that underpin BEAs can impact consumers and then explains how brands can use BEAs to innovate their products and services. The core principles of blockchain technology, as well as enhanced digital connectivity, imply that consumers can become more in control of their data and privacy rights, responsible for their choices, and digitally connected. To cater to consumers, brands can use BEAs to roll out technology-focused service innovations, customer-focused service innovations, and product innovations. Based on this perspective, we then advance ten future research questions. This article aims to advance the nascent field of blockchain in marketing.

1. Introduction

The global blockchain technology market hit \$5.92 billion in 2021 and is expected to grow dramatically over the next decade (Grand View Research, 2022). Blockchain is a cryptography-based decentralized system consisting of an ongoing list of digital records shared within a peer-to-peer network (Peres et al., 2022). Blockchain builds upon distributed ledger technology that is decentralized, transparent, immutable, and secure (Dwivedi et al., 2023; Tapscott and Tapscott, 2016; Treiblmaier and Garaus, 2023; Vergne, 2020; Wang, Lumineau, and Schilke, 2022). This technology has led to the development of blockchain-enabled advances (BEAs), which we define as “state-of-the-art innovations (e.g., ideas, products, or services) based on blockchain technology” (see Garcia and Calantone, 2002; Wind and Mahajan, 1997; Zhou et al., 2005). Recent years have witnessed the proliferation and establishment of the four most prominent BEAs smart contracts, cryptocurrencies, play-to-earn games, and non-fungible tokens. Smart contracts underpin the blockchain ecosystem and hold the promise to simplify and automatize core processes in organizations, while cryptocurrencies are deemed to be used as a payment method due to their low transaction fees and high speed (McKinsey, 2021). In turn, play-to-earn (P2E) games are becoming popular among users due to their novel

gaming mechanics (Glimpse, 2022), and NFTs are revolutionizing the digital goods and collectibles space registering a massive 17 billion overall volume traded in 2021 (NonFungible, 2021).

This paper aims to provide a holistic perspective on how these BEAs can have important implications for consumers and brands. While in the practitioner literature the benefits of BEAs are indisputable (Campbell, Moorman, and Toledo, 2018; EY, 2022; Ghose, 2018; Tapscott and Vargas, 2021), marketing scholars have started to unpack the phenomenon only recently (Colicev, 2022; Gleim and Stevens, 2021; Hofstetter et al., 2022; Joo et al., 2022; Peres et al., 2022; Tan and Salo, 2021; Tan and Saraniemi, 2022; Zhang, 2022). For example, Tan and Saraniemi (2022) study the role of trust in blockchain applications providing important implications for online advertising, privacy, and digital rights (see, e.g., Gleim and Stevens, 2021). Tan and Salo (2021) conducted a systematic literature review to identify the key elements of blockchain capabilities and attributes in the sharing economy and formulate predictions based on stakeholder theory.

In turn, we advance a novel theoretical framework that provides a unifying perspective on how the principles that underpin BEAs can impact consumers and then articulates how brands can use BEAs across three major innovation types. We argue that the technological principles of decentralization, transparency, and immutability (Tapscott and

* Corresponding author.

E-mail addresses: tuuli.hakkarainen@liverpool.ac.uk (T. Hakkarainen), anatoli.colicev@liverpool.ac.uk (A. Colicev).

Tapscott, 2016), as well as the enhanced digital connectivity (Tan and Salo, 2021) that underpin the BEAs, can have an impact on consumers in three ways. The decentralization of decisions and information, as well as the transparency of transactions, can suggest that consumers are more likely to have better control over their data and privacy rights (e.g., with a smart contract that ensures this) (Mathews and Tucker, 2022; Tapscott and Tapscott, 2016). At the other edge of the sword, these principles imply that transactions are irreversible and visible to anyone. This implies that consumers might have to be more responsible for their choices. Finally, consumers are deemed to spend more time online and become more connected to their digital lives, potentially forming a new “digitalized consumer mindset” (Tan and Salo, 2021: 30). Thus, the enhanced digital connectivity of BEAs such as P2Es and NFTs may lead to a more digitally connected consumer.

For brands, BEAs present several opportunities to innovate their products and services. We rely on the marketing literature on innovation to advance a theoretical framework for how brands can utilize BEAs. Specifically, we map the innovation types from Dotzel and Shankar (2019) to four BEAs discussed in this paper (i.e., smart contracts, cryptocurrencies, P2Es, and NFTs). We foresee that brands might be able to deploy a wide range of innovations with BEAs. We focus on the most promising ones which we believe have the best applicability. We argue that brands can implement two technology-focused service innovations (TFSI), including rolling out smart contracts that protect consumer rights and privacy and offering payments in cryptocurrencies. For example, B2B firms are using smart contracts for their sales enterprise solutions, while Microsoft, Home Depot, and Whole Foods accept payments in Bitcoin (Buy Bitcoin Worldwide, 2022). We also propose two customer-focused service innovations (CFSI): innovative loyalty programs with cryptocurrencies and gamified experiences with play-to-earn games (P2Es). Industry examples include Walmart’s and Starbucks’ recent cryptocurrency-based loyalty programs (CoinDesk, 2022; Starbucks, 2022; Yahoo Finance, 2022) and the partnership between Adidas and Sandbox to create gamified worlds with P2E games. Finally, brands can deploy product innovations (PI) with NFTs. Due to their intangible nature, launching an NFT can be an attractive and cost-effective way for brands to deploy product innovation. The uniqueness (i.e., non-fungibility) of NFTs, which is engraved in their metadata (e.g., list of features) (Hofstetter et al., 2022), can provide attractive features for consumers, including status enhancement, the possibility to express their opinion or preference for social causes, and access to interactive social media platforms. Examples include the launch of digital shoes by Nike (McKinsey, 2022) and the NFT created in a collaboration between Marvel and Boss Beauties to support young women’s entrepreneurship (NFT Evening, 2021).

Against this background, we provide a research agenda that emerges from combining the discussion on brands and consumers. The ten future research questions are subdivided into four topic areas: innovation types and BEAs, implications for the more empowered, responsible, and digitally connected consumers, the effect of innovation with BEAs on customer performance metrics, and the effect of innovation with BEAs on firm performance metrics. Answering these questions can further advance the marketing literature on innovation (e.g., Chandy and Tellis, 1998, 2000; Dotzel and Shankar, 2019; Dotzel, Shankar, and Berry, 2013; Rubera and Kirca, 2012), sharing and new digital economy (Eckhardt et al., 2019; Hawlitschek, Notheisen, and Teubner, 2018; Pazaitis, De Filippi, and Kostakis, 2017; Tan and Salo, 2021) and the nascent literature of blockchain in marketing (Colicev, 2022; Gleim and Stevens, 2021; Hofstetter et al., 2022; Joo et al., 2022; Peres et al., 2022; Tan and Salo, 2021; Tan and Saraniemi, 2022; Zhang, 2022).

We outline our theoretical framework in the next section and then focus on its details in sections 3 and 4. Then in section 5, we generate ten research questions and conclude in section 6.

2. Theoretical framework

We present our theoretical framework in Fig. 1. We elaborate on the main points in Table 1 by providing definitions of each BEA, their connection to consumers and brands, and their potential use cases and industry examples.

First, we argue that the technological principles of decentralization, transparency, and immutability (Dwivedi et al., 2023; Tapscott and Tapscott, 2016; Treiblmaier and Garaus, 2023; Vergne, 2020; Wang et al., 2022), as well as enhanced digital connectivity of BEAs (Tan and Salo, 2021), can have an impact on consumers in three ways (bottom-left part of Fig. 1). Second, we argue that brands can deploy their service innovations with BEAs (bottom-right part of Fig. 1). Specifically, we build upon the eight innovation types discussed by Dotzel and Shankar (2019) and assess the fit between these innovation types and the BEAs. We focus on technology-focused service innovations (TFSI), customer-focused service innovations (CFSI), and product innovations (PI)¹. Then, we discuss how brands can roll out such innovations to align themselves with the more empowered, responsible, and digitally connected consumers.

3. More empowered, responsible, and digitally connected consumers

We propose that blockchain technology can empower consumers to take control of their data and privacy rights, make them responsible for their choices, and be more connected to their digital lives. Blockchain technology builds upon the principles of distribution rather than centralization of decisions, as well as immutability and transparency of transactions, which means that any transaction executed on the blockchain cannot be reversed and is publicly accessible at any time. This suggests that the users of this technology are more likely to have better control over their information and privacy rights (e.g., with a smart contract that ensures this). However, the same principles mean that users will face higher responsibility, as any mistake in a transaction or interaction (e.g., a cryptocurrency wallet transaction) is, by design, irreversible. In addition, such transactions remain public forever, which means that users should be more careful and responsible in their choices. Finally, as users are deemed to not only spend more time online but also become more connected to their digital lives (e.g., by using NFTs), we propose that consumers can become more digitally connected.

3.1. Consumers become more empowered by gaining control over data and privacy rights

Blockchain-enabled advances (BEAs) can enable consumers to take control of their data and privacy rights (Mathews and Tucker, 2022; Tapscott and Tapscott, 2016). Data management and privacy protection have become pressing matters for policymakers (OECD, 2013). Recent scandals featuring data hacks from prominent internet companies have made the public aware of their data rights and risks (Termly, 2022). The current data-sharing and ownership model presumes that the data is transferred to the service provider once a user has agreed to a service license contract. In contrast, the principles of decentralization, immutability, and transparency of blockchain technology can help users regain control over their information and privacy rights.

We argue that smart contracts can help design and enforce such agreements. For instance, smart contracts can have a rule that allows users to decide what to do with their data. The automated rules can then ensure that once validated, data-sharing agreements cannot be altered in the future, thus giving the consumer the ultimate power over their data

¹ This is a non-exhaustive list of innovations. We thank the anonymous reviewer for this point and we direct the reader to the research directions in Section 5.

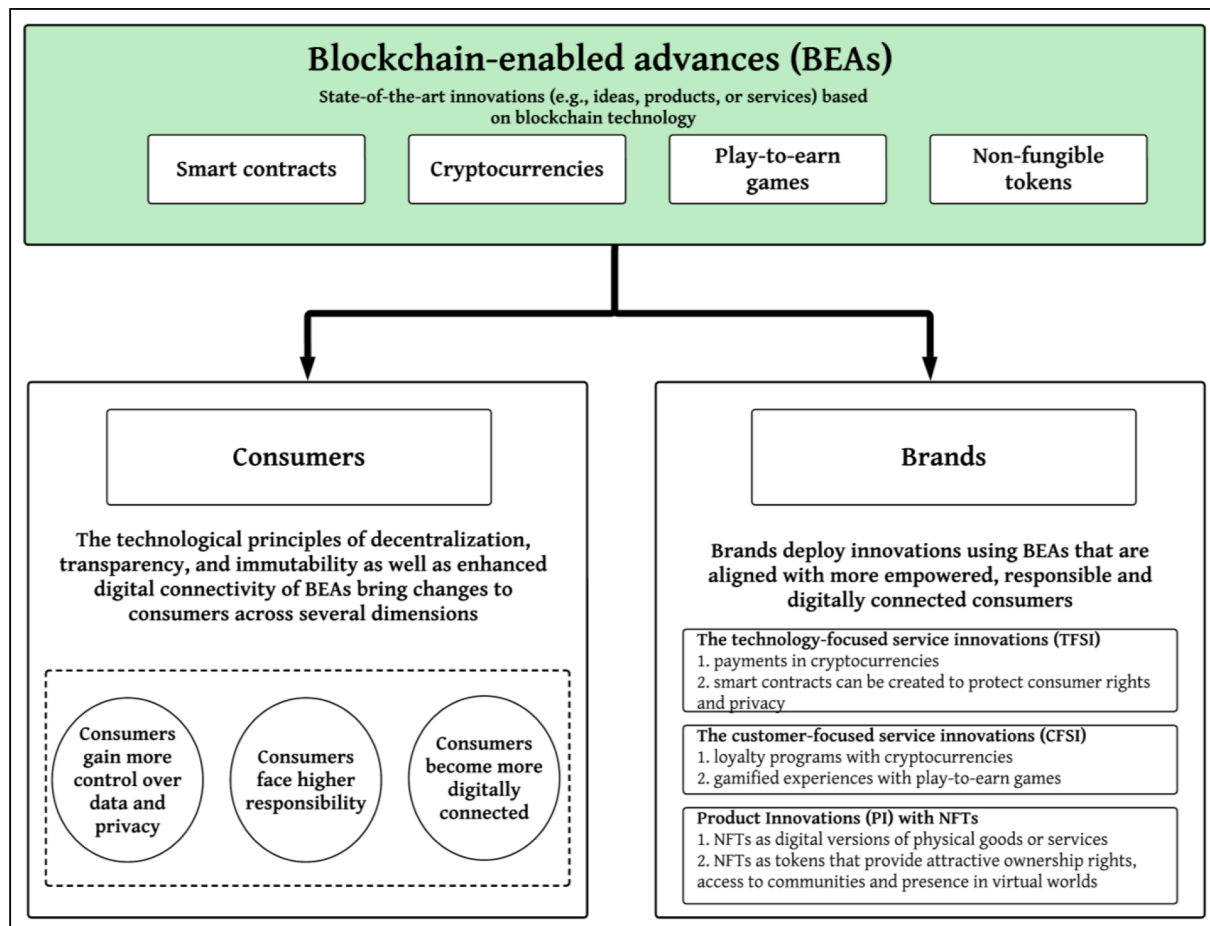


Fig. 1. Conceptual Framework.

(Peres et al., 2022). Interestingly, recent reports show that, if given a choice, some consumers might not be willing to share any of their data (Swant, 2019), while others might be willing to share only *some* selected pieces of their data as long as they can customize each sharing agreement with third parties (Data & Marketing Association, 2022). In addition, higher control of data might also mean that some consumers might want to monetize their records. Athey, Catalini, and Tucker's (2018) study show that some consumers might be willing to relinquish data in return for payment. For example, the Basic Attention coin cryptocurrency provides automatic rewards for watching advertising (Investopedia, 2022a). The Datawallet application based on smart contracts can make users the sole owners and potential distributors of their private data, while the self-sovereign identity method can allow us to verify such online information.

A key consideration here is data privacy (Pew Research Center, 2020). A Pew Research report shows that most US consumers are concerned about the monitoring and tracking their activities online and offline (Brooke et al., 2019). Maintaining privacy in blockchain data requires a fair trade-off between anonymity and identity (Bleier, Goldfarb, and Tucker, 2020; Cui et al., 2021; Mathews and Tucker, 2022). In this respect, smart contracts can protect privacy through rules on where, how, and which data is stored. Data can be stored in a decentralized manner (i.e., not under the control of a single trusted third party prone to data leaks). In addition, storing only pseudonymous data (e.g., wallet transactions without a name) can further protect user identity. Several blockchain-based startups are paving the way for creating such a privacy design (Cui et al., 2021). Examples include companies that tackle the design of privacy rights for scientific research (e.g., OpenMined), data management (e.g., Anjuna, Duality Technologies) (CoinTelegraph,

2021), and monetization of advertising (e.g., Publiq) (Bleier et al., 2020). For example, consider a smart contract, "MedStats," which underlies a medical database. Each variable is stored as a Boolean value that can suggest that a user is of high or low risk. The entity – the hospital – can then analyze such values while users can read their information (Privilege, 2020). These features are programmable and automatically executable. We foresee that discussions around consumer privacy will remain a top priority.

3.2. Consumers become more responsible

At the same time, consumers have higher responsibility when interacting with BEAs. The decentralization of BEAs carries a higher order of responsibility due to technical aspects. For example, cryptocurrencies provide new challenges as they are not stored in a traditional bank. Instead, most cryptocurrencies can either be deposited to a centralized exchange (e.g., Coinbase) or held on a so-called cold wallet which entails self-custody. The latter means that consumers can become responsible for the custody of their cryptocurrencies. This has broad implications as, for example, consumers need to remember their "seed phrases," be careful when granting rights to applications, and be vigilant when executing irreversible transactions (Peres et al., 2022). In other words, self-custody means full responsibility for their wallets and transactions (see metamask.io). Furthermore, immutability means that mistakes on the blockchain can be costly, as any mistakenly executed transaction cannot be reversed. These novelties can be challenging for consumers who are used to traditional finance in which credit cards offer protection, banks provide intermediary services, and websites are secured against malicious usage.

Table 1
Blockchain-enabled advances for consumers and brands.

BEA	Definition	Associates with which changes for consumers	Aligns with which innovation types for brands	Potential use cases	Existent industry examples
Smart contracts	Computer protocols that digitally facilitate, verify and enforce contracts between two or more parties on a blockchain (Investopedia, 2022b)	Consumers become more empowered by gaining control over data and privacy rights	Technology-focused service innovation (TFSI)	Smart contracts that contain automated and immutable policies that ensure that data cannot be shared with third parties under any circumstances (TFSI) Smart contracts for data monetization (TFSI)	Sales enterprise solutions between B2B companies
Cryptocurrencies	Digital and decentralized currencies (i.e., assets) that a particular national agency does not back (Böhme et al., 2015)	Consumers need to become more responsible in their choices	Technology-focused service innovation (TFSI) Customer-focused service innovation (CFSI)	Enabling accessible payments in cryptocurrency for goods and services (TFSI) Innovating loyalty programs with cryptocurrencies (CFSI)	Microsoft, Home Depot, and Whole Foods accept payments in Bitcoin (TFSI) 57% of companies have tested cryptocurrencies for cross-border payments (TFSI) Walmart’s crypto-back loyalty program (CFSI) Starbucks Odyssey loyalty program (CFSI)
Play-to-earn games (P2E)	A gaming business model where users play blockchain video games and earn cryptocurrency while playing (Glimpse, 2022)	Consumers become more digitally connected	Customer-focused service innovation (CFSI)	Innovative gamified experiences with P2Es (CFSI)	Gucci Garden on Roblox (CFSI) Adidas partnership with Sandbox to create gamified worlds (CFSI)
Non-fungible tokens (NFTs)	Cryptographic assets on a blockchain with unique identification codes and metadata that distinguish them from each other (Peres et al., 2022).	Consumers become more digitally connected	Product Innovations (PI)	Launching NFTs to create digital representations of the brand’s current physical goods or services (PI) Launching NFTs to allow consumers to undeniably and irrevocably prove the ownership of a unique piece (PI)	Nike and Adidas have sold many physical shoes as NFTs and vice-versa (PI) Collaboration between Marvel and Boss Beauties NFT which supports young women entrepreneurs (PI)

The transparent nature of BEAs can also mean more traceability of consumer choices and behavior, which can affect consumer responsibility ([Tan and Salo, 2021](#)). In theory, any record on a blockchain can be traced back and analyzed. For example, if consumers decide to share or monetize their data, as discussed above, anyone could link their identity with the wallet transactions, which can reveal their past choices. As a result, consumers might be more reluctant to engage in behavior that can harm them in the future. For instance, if a particular cryptocurrency becomes associated with malicious behavior, consumers might not want to have a direct association with their persona.

Similarly, the traceability of transactions can unveil what consumers like and want, so the consumers should carry greater responsibility for their actions. Previous research shows that social influences are strong when buying products and services ([Hamilton et al., 2021](#)), implying that reputation and public scrutiny are likely important factors. For example, consumers might be more careful when buying from brands with a history of non-ethical behavior (e.g., [Tan and Salo, 2021](#)) as it can harm their reputation.

3.3. Consumers become more digitally connected

BEAs also present exciting opportunities for digital connectivity. In the next decade, consumers are expected to increase the share of time spent online ([Ericsson, 2022](#)). This suggests that consumers will also become more connected to their digital lives. [Tan and Salo \(2021\)](#) propose that blockchain technology allows consumers to be more engaged and responsible with their online information and advances the notion of a new “digitalized consumer mindset” ([Tan and Salo, 2021: 30](#)). Building upon this notion, we argue that P2Es and NFTs can enrich consumers’ digital lives by encompassing the engaging nature of new digital content, interactions, and immersive experiences ([Colicev, 2022](#)). Thus, we argue that BEAs can create more digitally connected consumers.

NFT and P2Es are paving the way to connecting physical and digital

consumer lives ([Hofstetter et al., 2022](#)). NFTs propagate digitalization, placing weight on digital content, immersive experiences, and online communities (e.g., on Discord and Reddit) ([Colicev, 2022](#)). With the rise of decentralized social media platforms, NFT brand communities can allow consumers to become even more connected with their digital personas. For instance, Mastodon (<https://mastodon.social/explore>) is a completely decentralized microblogging social media platform run on 3,600 nodes worldwide. This platform has no advertising, user data trade, or profit motive ([EU Observer, 2022](#)). This grassroots approach allows users to be exposed to more freedom of expression, which creates more digitally connected communities. In addition, NFTs can dramatically change how consumers can prove and verify the ownership of a certain physical asset ([Colicev, 2022; Peres et al., 2022](#)). This feature can be particularly appealing for virtual worlds² where consumers might be willing to “flex” their authentic digital assets. Indeed, thousands of users spend multiple hours per day building their houses and business on virtual land (e.g., the Otherside). Furthermore, research has found increasing levels of excitement and interactivity in virtual worlds, albeit with caveats of fatigue and exhaustion ([Hennig-Thurau et al., 2022](#)). Finally, the reward structure in P2E games can lead to more time spent playing such games in return for digitally earned wages. Overall, it is likely that consumers will become more digitally connected than ever.

² Researchers often refer to the concept of “the metaverse” which we will not discuss here. We refer to [Boutenko, Florida, and Jacobson \(2022\)](#), [Hennig-Thurau et al. \(2022\)](#) and the Call for Papers for a Special Issue by [Haenlein et al. \(2022\)](#) for a detailed discussion on the metaverse implications for consumers, brands, regulators and society at large.

4. Brands deploy innovations with BEAs that are aligned with the more empowered, responsible, and digitally connected consumers

In turn, brands can deploy their service innovations with BEAs. We rely on the marketing literature on innovation (e.g., Chandy and Tellis, 1998, 2000; Dotzel and Shankar, 2019; Dotzel et al., 2013; Rubera and Kirca, 2012) to propose three ways in which brands can deploy BEAs. Specifically, we rely on Dotzel and Shankar's (2019) study, which outlines, defines, and provides examples of eight types of innovations investigated in previous research. First, depending on the client type of the firm and innovation, service innovations are split into business-to-customer and business-to-business service innovations. Second, depending on the focal point of the innovation, these are further split into technology-focused and customer-focused service innovations. Third, the above concepts are contrasted with product innovation. Finally, the remaining categories are people-enabled service innovations and new-to-market service innovations. Firms need to allocate resources across such innovations, and previous research has shown that these innovations can affect firm performance, albeit under different conditions (Dotzel and Shankar, 2019; Edeling, Srinivasan, and Hanssens, 2021; Rubera and Kirca, 2012).

We assess the fit between these innovation types and the BEAs discussed in this paper and propose our view on a non-exhaustive list of potential avenues for brands. We thus focus on a subset of the major innovation types from Dotzel and Shankar (2019) and specifically: technology-focused service innovations (TFSI), customer-focused service innovations (CFSI), and product innovations (PI). Such innovations must be appropriately catered to the consumers and align with a customer-centric view (Fader, 2020; Palmatier, Moorman, and Lee, 2019). Thus, we discuss how brands can roll out such innovations and align themselves with the more empowered, responsible, and digitally connected consumers.

4.1. Technology-focused service innovations with cryptocurrencies and smart contracts

A technology-focused service innovation (TFSI) is defined as a service innovation that "emphasizes the technological features of the new offering over other aspects" (Dotzel and Shankar, 2019). Examples of TFSI include allowing consumers to order and pay for goods and services online, implementing interactive and automated customer service (e.g., chatbots), and rolling out new digital solutions. We argue that brands can deploy technology-focused service innovations with BEAs in two ways: providing smart contracts for fairer data-sharing and privacy, and offering accessible crypto payments.

First, brands can implement smart contracts that can be catered to protect consumer rights and privacy. As proposed in Table 1, smart contracts can be defined as the computer protocols that digitally facilitate, verify, and enforce the contracts between two or more parties on a blockchain (Investopedia, 2022b). The program code of a smart contract is first recorded and verified on the blockchain, making the contract tamper-resistant. A smart contract might rely on a cryptocurrency or other digital asset (e.g., token) and be programmed to transfer them when predefined conditions are triggered (CoinBase, 2016; Wang et al., 2019).

Brands can also offer consumers more protections online by rolling out smart contracts that contain automated and immutable policies that ensure that data cannot be shared with third parties under any circumstance (Peres et al., 2022). For instance, agreements can be designed such that consumers have the power to customize data-sharing rules with third parties on a case-by-case basis. Several examples of such contracts are already utilized in supply chain arrangement and B2B transactions (Kumar, Liu, and Shan, 2020). Similarly, smart contracts can also protect the consumer by reducing the overwhelming amount of advertising (Ghose, 2018). Smart contracts can also be beneficial for

consumers who want to be in control over their interactions with brands. Consider an example where a consumer buys a customized product from a brand and makes a mistake in the order. Typically, this would involve interacting with customer service, which can take considerable time and effort from both sides (e.g., finding the order number, understanding the issue, and holding the line). However, if such a transaction is executed with the help of a smart contract, the issue can be traced and resolved automatically.

Second, brands can innovate by enabling accessible payments in cryptocurrency for their goods and services. As specified in Table 1, cryptocurrencies are digital and decentralized currencies (i.e., assets) that a particular national agency does not back (e.g., USD is backed by the Federal Reserve in the United States). With the inception of Bitcoin in 2009 (Böhme et al., 2015), soon to be followed by others (e.g., Ethereum, Cardano, Polkadot, and thousands more), cryptocurrencies have not only become an innovative disruption to standard payment methods but also a leading driver of utopian decentralization.

Recent reports show that only 23% of consumers hold or have held cryptocurrency during the past 12 months (PYMNTS, 2022a). Given that consumers might face several hurdles in adjusting to cryptocurrencies, brands may need to promote the benefits of crypto payments to consumers, such as faster transactions and lower fees (McKinsey, 2021). Deloitte reports that processing transactions on a blockchain can lead to a 40–80% reduction in fees with a 4–6 s average velocity of money (Deloitte, 2016). For example, a study of 200 merchants finds that 46% have already integrated cryptocurrency into their mix of accepted payment methods, with the majority reporting lower fees and gaining new consumers (PYMNTS, 2022a). Similarly, according to a recent study, 57.6% of brands have tested cryptocurrencies for cross-border payments, with Bitcoins being the most popular choice (PYMNTS, 2022b). The Bitcoin payment system is based on the Lightning Network, which provides the infrastructure that uses off-chain payment channels so that transactions do not pass through blockchain, significantly shrinking fees and waiting times (Investopedia, 2022c). Some brands are leading the way, with Microsoft, Home Depot, Starbucks, and Whole Foods already accepting payments in Bitcoin in 2022 (Buy Bitcoin Worldwide, 2022). Given the transparent nature of blockchain transactions, more responsible consumers might need to be convinced that cryptocurrencies are safe. Readily available solutions include the Ethereum protocol, with, for instance, Everest providing the technology that incorporates a payment solution, a multicurrency wallet, and a biometric identity system (Morkunas, Paschen, and Boon, 2019). The Ethereum protocols secure the payments by relying on asymmetric encryption and automation of digital signatures.

4.2. Customer-focused service innovations with cryptocurrencies and P2Es

The customer-focused service innovations (CFSI) are formally defined as service innovations that "emphasizes the customer features of the new offering over other aspects" (Dotzel and Shankar, 2019). Most examples of CFSI revolve around improving consumer experience (Eckhardt et al., 2019; Tan and Salo, 2021), such as implementing loyalty programs, gamifying interactions, and listening and responding to reviews (Dotzel et al., 2013; Fontanella, 2022). We propose two ways for brands to implement the CFSIs.

First, brands can innovate their loyalty programs with cryptocurrencies. While a recent Oracle report states that 71% of US consumers participate in one to five loyalty programs (Oracle, 2020), many consumers do not redeem their rewards. Another key problem is that consumers can rarely utilize their loyalty across brands or transfer their points from one loyalty program to another. Assuming that consumers would embrace cryptocurrencies (as discussed in the section above), cryptocurrency-based loyalty programs could help brands create more innovative loyalty programs. These programs can be designed to allow consumers to synergistically cumulate points across different

complementary vendors, which can further help adjust the loyalty programs to consumer needs. Given that all transactions in cryptocurrencies are publicly available, by creating crypto-based loyalty programs, brands can collect valuable data that can help reward loyalty more objectively. The publicly available transactions can help detect aggregate-level consumption patterns and potentially combine them with the existing marketing analytics efforts to calibrate segmentation models. For instance, consumers can be given a single wallet containing all their loyalty benefits, creating more possibilities for brands and consumers (Rejolut, 2022: 46). This can allow brands to introduce bundled products tailored to specific consumer characteristics.

Brands in travel, retail and financial sectors are paving the way, albeit with their own private blockchains. For example, consumers of Walmart stores can earn the cryptocurrency equivalent of cashback (a 4-percent “cryptoback”) for their in-store purchases (Yahoo Finance, 2022), while consumers of Singapore Airlines have a miles-based digital wallet (CoinJournal, 2022). In September 2022, Starbucks launched a new loyalty program, “Starbucks Odyssey,” enabled by the Polygon Technology blockchain (CoinDesk, 2022; Starbucks, 2022). The “digital collectible stamps” can be earned by engaging in activities such as interactive games, which can then be traded for rewards. In addition, brands do not need to take control over consumer data or privacy, which are important to consumers when interacting with BEAs.

Second, brands can roll out innovative gamified experiences with play-to-earn games (P2Es) to align with digitally connected consumers. P2Es present a gaming business model where users play blockchain video games and earn cryptocurrency while playing. The key difference with other models (e.g., Free-to-Play (F2P), subscription-based) is that gamers earn coins that have real-world value outside of the game. As a result, players can invest in, own, and trade immutable in-game assets with more control and economic certainty. The overall revenue of these games reached 1.5 billion USD in 2021, of which 73% is from the popular blockchain game Axie Infinity.

We illustrate the concept of P2E games in Table 2. Subscription-based games (e.g., Halo, World of Warcraft) generate revenue for game owners through one-time payments of ongoing rates. They do not generate income for users except for the elite professional players. Free-to-play games (e.g., Pokémon Go, Mobile Strike) generate revenue for game owners by charging users for advanced functionalities or in-game features. Similarly to subscription-based games, users do not typically earn revenue. Finally, providers generate revenue from advertising and user time monetization in the P2E model (e.g., Axie Infinity, Sandbox). By playing the game, users generate income in the form of in-game tokens that users can exchange for physical world currencies.

P2Es can leverage the power of gamification to drive consumer

Table 2
Subscription-based, Free-to-play, and Play-to-earn games.

Types of Online Games	Structure of the game	Prominent examples
Subscription-based	Providers charge for the game and functions of a game either as a one-time payment (game purchase) or monthly rates (subscriptions). Users do not generate income, except for the elite professional players.	Halo, World of Warcraft, Call of Duty
Free-to-play	Providers do not charge for gameplay and basic functions of a game but charge for the premium content of it. Users do not generate income except for elite professional players or online streamers.	Pokemon Go, Mobile Strike, Candy Crush Saga
Play-to-earn (P2E)	Providers do not charge for gameplay and basic functions of a game nor for the premium content of it. Providers earn revenue through advertising and time monetization. Users can earn money by spending time in the game.	Axie Infinity, Sandbox, Splinterlands

engagement and create brand ambassadors. An important point for consumers is that P2E games allow them to control their data, as any resource obtained in the game belongs to the consumer (vs. the company that created the game). The unique proposition of building P2Es is to enable players to invest in, own, and trade immutable in-game assets with more control and economic certainty. Brands can leverage this space by partnering with game developers, hosting tournaments with prizes, and even playing together with their consumers. In addition, brands can enter the scene by offering their “skins”; designs that players can display. For example, the luxury fashion segment is taking notice, and Morgan Stanley projects that this type of gaming may account for 10% of the Luxury Market by 2030 (CoinDesk, 2021). Brands can also use P2Es to improve their presence in virtual worlds. For instance, the Gucci Garden was unveiled on the Roblox gaming platform on May 17, 2021, to celebrate Gucci’s 100th anniversary (Roblox, 2021). This garden was composed of themed rooms that pay tribute to Gucci campaigns but also allow consumers to try, view, and purchase Gucci items for their avatars. In addition, brands can unleash their P2E games in virtual lands to display their advertisements and engage with consumers. Examples include the partnership between Adidas and Sandbox, a virtual world composed of a set of land pieces called parcels, and the creation of Nikeland and Disney Metaverse.

4.3. Product innovation with NFTs

Product innovations (PI) are formally defined as “the creation and market introduction of a physical good that is new to the firm” (Dotzel and Shankar, 2019: 134). Introducing a new line of products for an existing market or adapting products to a new market are typical examples of product innovation.

We propose that NFTs can create effective PIs for brands. Peres et al. (2022) define NFTs as “cryptographic assets on a blockchain with unique identification codes and metadata that distinguish them from each other.” NFTs are characterized by two dimensions: non-tangibility (i.e., cryptographic assets) and non-fungibility (i.e., unique codes), as represented in Table 3. Focusing on these two dimensions, we propose that NFTs can become successful PI for brands and consumers. Due to their intangible nature, launching an NFT can be an attractive and cost-effective way for brands to create product innovation. The most straightforward way to launch an NFT is to create digital representations of the brand’s current physical goods or services. These are known as digital replicas. A prominent example is digital fashion brands like Nike and Adidas, which have sold many physical shoes as NFTs and vice-versa (McKinsey, 2022). Alternatively, NFTs can also be launched as standalone products (e.g., Colicev, 2022) which do not exist in the physical world. For example,

Table 3
Fungibility and Tangibility.

	Tangible	Intangible
Fungible	Government Physical currency (e.g., USD) Gold A share of a publicly traded company	Cryptocurrencies (Bitcoin, Ethereum) Carbon Credit Government Digital Currency
Non-Fungible	A unique painting Unique baseball cards A unique designer item	NFTs

Notes. Fungibility means that one token can substitute for another. Tangibility implies that the token exists in physical space. Starting with the top-left corner, government currency is fungible and tangible because one unit of currency (e.g., USD) can substitute for another and such dollars exist in the physical space. Turning to the top-right corner, cryptocurrencies are fungible because they can be interchanged in the same way as government currencies but intangible because they exist on the ledger. Next, in the bottom-left corner, paintings are non-fungible given their uniqueness but tangible as they exist in the physical world. Finally, turning to the bottom-right corner, NFTs are both non-fungible and intangible.

Coca-Cola launched an NFT in July 2021 by making its first collection of digital collectibles available in an auction, including one-of-a-kind items such as a futuristic redesign of the iconic Coca-Cola delivery jacket in a digitally wearable form (Coinlive, 2022). NFTs also allow users to organize themselves in brand communities. For example, Discord offers a more authentic and interactive communication strategy on the platform. It also provides endless possibilities for brands to customize individual user experiences, tailoring them to their consumers. This is one of the significant factors that differentiate Discord from other platforms in the marketing handbook.

The uniqueness (i.e., non-fungibility) of NFTs, which is engraved in their metadata (e.g., list of features) (Hofstetter et al., 2022), can provide attractive features for consumers. Typically, collectors place a higher value on paintings or sculptures depending on their uniqueness, author, or origin. The attractive aspect of NFTs is that they cannot be replicated or counterfeited as they present advanced ownership rights (The Verge, 2022). NFTs can undeniably and irrevocably prove the ownership of a unique piece, which in its physical form requires a long verification process and multiple expert opinions. This is why the universe of NFTs is increasingly expanding to collectibles such as (virtual) baseball cards, gaming tokens such as weapons or skins, and, eventually, avatars in the virtual worlds (Colicev, 2022).

For consumers, NFTs can provide a status enhancement, like paintings, as they contain a detailed entire ownership history (Rejeb, Keogh, and Treiblmaier, 2020). Consumers might buy a brand's NFT because a reputable organization or individual previously held it. In addition, brands can utilize influencer marketing to promote the NFTs to their consumers by using seeding and dissemination strategies (Goldenberg et al., 2021; Lanz et al., 2019). Recently, influencer marketing strategies have hit a new low (The Wall Street Journal, 2022), including issues with tracking influencers' performance, fake or bot followers, and lack of transparency (Rejolot, 2022: 126). In turn, NFTs can allow for quick verification of the influencer's trustworthiness and performance. Consumers might also want to own a brand's NFTs that are launched with a social cause in mind. One example is the recent collaboration between Marvel and Boss Beauties NFT which supports young women entrepreneurs (bossbeauties.com). Boss Beauties are digital portraits of empowered women who serve as an aspiration for the Gen-Z audience. The entertainment giant Marvel partnered with Boss Beauties to further support women's empowerment (NFT Evening, 2021). Such partnerships can become more frequent as they enable consumers to feel more ethically responsible through buying products from such brands (de Villiers, Kuruppu, and Dissanayake, 2021).

5. Future research agenda

This paper aims to inspire new research on the role of blockchain-enabled advances (BEAs) for brands and consumers. We articulated several research directions that emerge from counterposing the discussion on brands and consumers in sections 3 and 4. We summarize these questions in Table 4.

First, we discussed how BEAs align well with three out of eight innovation types as proposed in Dotzel and Shankar (2019): technology-focused service innovations, customer-focused service innovations, and product innovations. However, it is also possible that brands could implement other innovation types with BEAs. For instance, previous research in supply chain management has investigated how business-to-business firms can benefit from transparent blockchain-based supply chains (Chod et al., 2020). Thus, it is possible that business-to-business companies can also deploy service innovations through technology (e.g., the platform for payments) or customer-focused innovations (Gligor, Pillai, and Golgeci, 2021). Similarly, brands might design people-enabled service innovations (Dotzel et al., 2013), such as educational

Table 4
Future research agenda.

Topic Area	Research Questions
Innovation types and BEAs	1. Which other types of innovations (e.g., business-to-business, new-to-market) can be theoretically linked to blockchain-enabled advances? 2. What is an appropriate blueprint of innovation with blockchain-enabled advances?
More empowered, responsible, and digitally connected consumers	3. Whether, to what extent, and under which conditions would consumers monetize their data? 4. How to achieve a fair design of data monetization for consumers, brands, advertisers, and governments? 5. What is the net effect of launching product innovations with NFTs and customer-focused service innovations with P2Es on customer perceptions?
Innovation with BEAs and consumer metrics	6. What is the role of technology-focused service innovations such as paying with cryptocurrencies on willingness to pay or purchase intent? 7. What is the theoretical and empirical fit between brand characteristics and cryptocurrencies, smart contracts, NFTs and P2Es?
Innovation with BEAs and firm performance metrics	8. What is the (relative) effect of launching CFSI, TFSI, and PI with BEAs on firm performance metrics (e.g., sales, brand value)? 9. What are the moderating conditions for the above effects? 10. What is the effect of innovation with BEAs on stock price and risk?

programs about blockchain for employees. We also foresee that brands could create new-to-market innovations (Chandy and Tellis, 1998) that could feature a combination of different BEAs³, such as NFTs and smart contracts. We encourage future research to investigate these conjectures both empirically and theoretically. For instance, theoretical models can be developed to depict the complete link between the stage of the innovation process, innovation types, and BEAs. In turn, empirical work can focus on case studies that could be utilized to set a blueprint for innovation or investigate successes and failures.

Second, we argued that consumers would be likely to become more empowered, responsible, and digitally connected in the age of decentralized, transparent, and immutable blockchain-enabled advances. However, several of these conjectures need to be tested. For instance, as consumers control their data and privacy rights, new business models, processes, and regulations (Dehghani et al., 2022) need to be developed on the data monetization front. Data monetization can benefit both consumers and brands, as the former can receive payment for otherwise freely available data, and the latter can have consumer cooperation to collect better records. However, the design of data monetization agreements might be more complicated due to future regulatory frameworks (e.g., markets in crypto-assets (MiCA); European Council, 2022). In addition, it is unclear (1) whether (2) to what extent consumers would be willing to monetize and how the process would work from both sides. Thus, experimental studies are needed to explore whether and under which conditions consumers would be willing to monetize their data. Research is also needed to propose the design of data monetization that is fair and protects all parties (consumers, brands, advertisers, and governments).

Furthermore, consumers could also expect more from the brand's service environment as they become more digitally connected. In a recent survey, 72% of consumers indicated that they believe that brand interactions in the virtual worlds will one day replace physical brand interactions (Business Wire, 2022). New research is paving the way for the potential effects of interacting in virtual worlds, including the trade-

³ We thank the anonymous reviewer for this point.

off between higher excitement and fatigue (Hennig-Thurau et al., 2022). We thus look forward to new studies that can explore the net effect on consumer perceptions when consumers interact with brand NFTs and play P2E games. The likely moderators of these relationships are consumer age, brand, and platform characteristics. Experimental work is highly needed to test these propositions. An intriguing final point is understanding whether BEAs will mark the transition to more responsible consumers and brands. The key issues are the environmental footprint of cryptocurrencies (Mora et al., 2018), the support of social causes with NFTs (Shorefire, 2022), and the extent of the responsible conduct online due to the transparency and traceability of blockchain data (Tan and Salo, 2021).

Third, a potential avenue for research is relating firm innovations with BEAs to customer performance metrics such as willingness to pay or purchase intent (Colicev, Malshe, Pauwels, & O'Connor, 2018; Zhang, 2022). For instance, imagine a scenario in which a consumer pays for a product in cryptocurrency. Even though the prices of cryptocurrencies are freely available when transacting in cryptocurrencies, most users would need to exercise more mental effort when converting a cryptocurrency to a national currency (e.g., the US dollar). In addition, the prices of cryptocurrencies are still very volatile, with some registering daily changes of tens of percentage points. Therefore, a conjecture might be that paying in cryptocurrency might not carry the usual price sensitivity patterns and might change the willingness to pay for goods and services (Zhang, 2022). Empirical studies could use survey data to relate BEAs with consumer willingness to pay. As with any new technology, not all brands and consumers would fit best with BEAs. For instance, P2E might not be relevant for many service environments where consumers engage in mundane interactions (e.g., banking and public services). NFTs might fit better with digital leader brands (e.g., Google, Microsoft, Apple). Cryptocurrencies might be the best fit with brands that cater to Gen-Z consumers. These have important consequences for using BEAs in the sharing economy as one of the key drivers of innovation (Eckhardt et al., 2019; Hawlitschek et al., 2018; Pazaitis et al., 2017; Tan and Salo, 2021). Therefore, theoretical research is needed to develop a framework for the fit between brand characteristics and BEAs.

Finally, as with any firm innovation, it would be worth relating the innovations with BEAs discussed in this study with performance metrics such as sales, brand value, and stock market price (Datta, Ailawadi, and Van Heerde, 2017; Keller and Lehmann, 2006; Srinivasan and Hanssens, 2009). Previous studies have shown that innovation is not always effective, and its relationship to firm performance might be moderated by several factors (Dotzel and Shankar, 2019; Edeling et al., 2021; Rubera and Kirca, 2012). For instance, a body of research finds mixed results on the impact of new product introduction on firm performance (Baum, Calabrese, and Silverman, 2000; Srinivasan et al., 2009). Others report that innovation is more effective for smaller firms or firms that invest more in advertising (Rubera and Kirca, 2012). Would innovating with BEAs have a positive or negative effect on performance (e.g., sales, brand value), and how do these effects compare to other innovations discussed in previous research? In addition, the scale of required innovations varies by innovation type. For instance, it might be easier and less costly to roll out a loyalty program with cryptocurrencies than to launch an NFT. Hence, it is likely that the relative impact on firm performance metrics can depend on the innovation type and BEA. In addition, it would also be worth theoretically proposing and empirically testing the moderating factors of these relationships. For instance, research and development expenses can proxy for a firm's ability to innovate (Wakelin, 2001), while advertising expenses can amplify or dampen the extent of innovation efforts (Srinivasan et al., 2009). Both can serve as useful moderators. Research can also tackle these issues from a different angle by conducting interviews and surveys with managers with practical insights into the internal cost and revenue effects. Another question is whether and to what extent investors would react positively or negatively to brands adopting cryptocurrencies, launching play-to-earn games, or rolling out smart contracts.

Cryptocurrencies are often associated with security issues, volatility, and nefarious usage, thus presenting risks for brands that adopt them. These concerns can affect how investors perceive the risk associated with a firm's stock. So, for example, what would be the effect of adopting cryptocurrencies on idiosyncratic risk? To answer these questions, future studies could conduct empirical analysis by gathering secondary data on firm innovations with BEAs (e.g., from Lexis Nexis news data). From a modeling perspective, these questions can be tackled with an event study (Sorescu, Warren, and Ertekin, 2017) or with the help of panel data analysis across a large cross-section of firms over time (Malshe, Colicev, and Mittal, 2020).

6. Conclusion

As adoption grows and technology advances, we believe in a bright future for blockchain-enabled advances (BEAs). We discussed the four most prominent BEAs that have found their way into academic literature and practical use cases: smart contracts, cryptocurrencies, P2Es, and NFTs. While we can only speculate about the future, each of these BEAs already has several use cases across business disciplines, and their number is projected to grow dramatically in the next decade. The overall aim of this paper was to provide a perspective on how BEAs can impact consumers and brands. Consumers are considered to become more in control over their data and privacy rights, more responsible, and more digitally connected than ever. Brands can respond to these changes by deploying their innovation efforts with BEAs, be it rolling out smart contracts, adopting cryptocurrency payments, designing new loyalty programs, gamifying user experiences, or launching NFTs. We hope to have sparked a new discussion with our framework and research agenda. We look forward to theoretical, empirical, and analytical studies on the consequences of BEAs for consumers and brands.

CRedit authorship contribution statement

Tuuli Hakkarainen: Writing – review & editing, Writing – original draft, Visualization, Project administration, Investigation, Conceptualization. **Anatoli Colicev:** Writing – original draft, Project administration, Investigation, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

- Data & Marketing Association. 2022. *UK Data Privacy: What the Consumer Really Thinks*.
- Athey, S., Catalini, C., & Tucker, C. E. (2018). *The Digital Privacy Paradox: Small Money, Small Costs* (p. w23488). National Bureau of Economic Research No: Small Talk.
- Baum, J. A. C., Calabrese, T., & Silverman, B. S. (2000). Don't go it alone: Alliance network composition and startups' performance in Canadian biotechnology. *Strategic Management Journal*, 21(3), 267–294.
- Bleier, A., Goldfarb, A., & Tucker, C. E. (2020). Consumer privacy and the future of data-based innovation and marketing. *International Journal of Research in Marketing*, 37(3), 466–480.
- Böhme, R., Christin, N., Edelman, B., & Moore, T. (2015). Bitcoin: Economics, technology, and governance. *Journal of Economic Perspectives*, 29(2), 213–238.
- Boutenko V, Florida R, Jacobson J. 2022. The metaverse will enhance - not replace - companies' physical locations. *Harvard Business Review* (August).
- Brooke, A., et al. (2019). *Americans and Privacy: Concerned*. Pew Research Center: Confused and Feeling Lack of Control Over Their Personal Information.
- Buy Bitcoin Worldwide. 2022. Who Accepts Bitcoin? 9 Major Companies.
- Campbell, Moorman, Toledo. 2018. Blockchain can help marketers build better relationships with their customers. *Harvard Business Review* (October).
- Chandy, R. K., & Tellis, G. J. (1998). Organizing for radical product innovation: The overlooked role of willingness to cannibalize. *Journal of Marketing Research*, 35(4), 474–487.
- Chandy, R. K., & Tellis, G. J. (2000). The incumbent's curse? Incumbency, size, and radical product innovation. *Journal of Marketing*, 64(3), 1–17.

- Chod, J., Trichakis, N., Tsoukalas, G., Aspegren, H., & Weber, M. (2020). On the financing benefits of supply chain transparency and blockchain adoption. *Management Science*, 66(10), 4378–4396.
- CoinBase. 2016. Making Sense of Blockchain Smart Contracts.
- CoinDesk. (2021). *Metaverse Gaming, NFTs Could Account for 10% of Luxury Market by 2030*. Morgan Stanley.
- CoinDesk. 2022. Starbucks to Offer NFT-Based Loyalty Program Using Polygon's Blockchain Technology.
- CoinJournal. 2022. Singapore Airlines Launches Blockchain-Based Airline Loyalty Digital Wallet.
- Coinlive. 2022. Coca-Cola joins the NFT trend with a charity auction for digital collections.
- Cointelegraph. 2021. Concerns around data privacy are rising, and blockchain is the solution.
- Colicev, A. (2022). How can non-fungible tokens bring value to brands. *International Journal of Research in Marketing*.
- Colicev, A., Malshe, A., Pauwels, K., & O'Connor, P. (2018). Improving consumer mindset metrics and shareholder value through social media: The different roles of owned and earned media. *Journal of Marketing*, 82(1), 37–56.
- European Council. 2022. Digital finance: agreement reached on European crypto-assets regulation (MiCA).
- Cui, T. H., et al. (2021). Informational challenges in omnichannel marketing: remedies and future research. *Journal of Marketing*, 85(1), 103–120.
- Datta, H., Ailawadi, K. L., & Van Heerde, H. J. (2017). How well does consumer-based brand equity align with sales-based brand equity and marketing-mix response? *Journal of Marketing*, 81(3), 1–20.
- de Villiers, C., Kuruppu, S., & Dissanayake, D. (2021). A (new) role for business – Promoting the United Nations' Sustainable Development Goals through the internet-of-things and blockchain technology. *Journal of Business Research*, 131, 598–609.
- Dehghani, M., William Kennedy, R., Mashatan, A., Rese, A., & Karavidas, D. (2022). High interest, low adoption. A mixed-method investigation into the factors influencing organisational adoption of blockchain technology. *Journal of Business Research*, 149, 393–411.
- Deloitte. 2016. *Cross-border Payments on Blockchain*.
- Dotzel, T., & Shankar, V. (2019). The relative effects of business-to-business (vs. business-to-consumer) service innovations on firm value and firm risk: An empirical analysis. *Journal of Marketing*, 83(5), 133–152.
- Dotzel, T., Shankar, V., & Berry, L. L. (2013). Service innovativeness and firm value. *Journal of Marketing Research*, 50(2), 259–276.
- Dwivedi, Y. K., Balakrishnan, J., Das, R., & Dutot, V. (2023). Resistance to innovation: A dynamic capability model based enquiry into retailers' resistance to blockchain adaptation. *Journal of Business Research*, 157(113632).
- Eckhardt, G. M., et al. (2019). Marketing in the sharing economy. *Journal of Marketing*, 83(5), 5–27.
- Edeling, A., Srinivasan, S., & Hanssens, D. M. (2021). The marketing–finance interface: A new integrative review of metrics, methods, and findings and an agenda for future research. *International Journal of Research in Marketing*, 38(4), 857–876.
- Ericsson. 2022. *10 Hot Consumer Trends 2030*.
- NFT Evening, 2021. Marvel Collabs With Boss Beauties NFT on Women Empowerment. EY. 2022. *Monetization of non-fungible tokens*.
- Fader, P. (2020). *Customer centrality: Focus on the right customers for strategic advantage*. University of Pennsylvania Press.
- Yahoo Finance. 2022. Walmart Shoppers Can Now Earn 'Cryptoback' Through StormX App.
- Fontanella C. 2022. 14 Ways to Innovate Your Customer Experience [+Examples] [Blog Post Accessed Nov 25th 2022]. Available at: <https://blog.hubspot.com/service/customer-innovation>.
- Garcia, R., & Calantone, R. (2002). A critical look at technological innovation typology and innovativeness terminology: A literature review. *Journal of Product Innovation Management*, 19(2), 110–132.
- Ghose, A. (2018). *What blockchain could mean for marketing*. Harvard Business Review (May).
- Gleim, M. R., & Stevens, J. L. (2021). Blockchain: A game changer for marketers? *Marketing Letters*, 32(1), 123–128.
- Gligor, D. M., Pillai, K. G., & Golgeci, I. (2021). Theorizing the dark side of business-to-business relationships in the era of AI, big data, and blockchain. *Journal of Business Research*, 133, 79–88.
- Glimpse. 2022. Play To Earn. Available at: <https://meetglimpse.com/trend/play-to-earn/> [14 January 2023].
- Goldenberg J, Lanz A, Shapira D, Stahl F. 2021. Influencer Marketing. *Impact at JMR* (February).
- Grand View Research. 2022. Blockchain Technology Market Size, Share & Trends Analysis Report By Type (Private Cloud, Public Cloud), By Application (Digital Identity, Payments), By Enterprise Size, By Component, By End Use, And Segment Forecasts, 2022 - 2030.
- Haenlein M, Hewett K, Trivedi M, Gielens K. 2022. Special Issue Call for Papers 'Retailing in the Metaverse' in Journal of Retailing.
- Hamilton, R., Ferraro, R., Haws, K. L., & Mukhopadhyay, A. (2021). Traveling with companions: The social customer journey. *Journal of Marketing*, 85(1), 68–92.
- Hawlitcshek, F., Notheisen, B., & Teubner, T. (2018). The limits of trust-free systems: A literature review on blockchain technology and trust in the sharing economy. *Electronic Commerce Research and Applications*, 29, 50–63.
- Hennig-Thurau T et al. 2022. *The Value of Real-time Multisensory Social Interactions in the Virtual-Reality Metaverse: Framework, Empirical Probes, and Research Roadmap*.
- Hofstetter, R., et al. (2022). Crypto-marketing: How non-fungible tokens (NFTs) challenge traditional marketing. *Marketing Letters*, 33(4), 705–711.
- Investopedia. 2022a. Basic Attention Token (BAT). Available at: <https://www.investopedia.com/terms/b/basic-attention-token.asp> [14 January 2023].
- Investopedia. 2022b. What Are Smart Contracts on the Blockchain and How They Work. Available at: <https://www.investopedia.com/terms/s/smart-contracts.asp#toc-what-is-a-smart-contract> [14 January 2023].
- Investopedia. 2022c. Lightning Network Explained: What It Is and How It Works. Available at: <https://www.investopedia.com/terms/l/lightning-network.asp#toc-what-is-the-lightning-network> [14 January 2023].
- Joo, M., Kim, S. H., Ghose, A., & Wilbur, K. C. (2022). Designing distributed ledger technologies, like blockchain, for advertising markets. *International Journal of Research in Marketing*.
- The Wall Street Journal. 2022. Kim Kardashian to Pay \$1.26 Million to Settle SEC Investigation Into Role in Crypto Deal.
- Keller, K. L., & Lehmann, D. R. (2006). Brands and branding: Research findings and future priorities. *Marketing Science*, 25(6), 740–759.
- Kumar, A., Liu, R., & Shan, Z. (2020). Is blockchain a silver bullet for supply chain management? Technical challenges and research opportunities. *Decision Sciences*, 51(1), 8–37.
- Lanz, A., Goldenberg, J., Shapira, D., & Stahl, F. (2019). Climb or jump: Status-based seeding in user-generated content networks. *Journal of Marketing Research*, 56(3), 361–378.
- Malshe, A. V., Colicev, A., & Mittal, V. (2020). How main street drives wall Street: Customer satisfaction, short sellers, and shareholder value. *Journal of Marketing Research*, 57(6), 1055–1075.
- Mathews, A., & Tucker, C. (2022). What blockchain can and Can't do: Applications to marketing and privacy. *International Journal of Research in Marketing*.
- McKinsey. 2021. *The 2021 McKinsey Global Payments Report*.
- McKinsey. 2022. *Value creation in the metaverse*.
- Mora, C., et al. (2018). Could Bitcoin emissions push global warming above 2 °C? *Nature Climate Change*, 8(11), 931–933.
- Morkunas, V. J., Paschen, J., & Boon, E. (2019). How blockchain technologies impact your business model. *Business Horizons*, 62(3), 295–306.
- NonFungible. 2021. *Yearly NFT Market Report*.
- EU Observer. 2022. Can Mastodon be the first big social network 'Made in Europe'?.
- OECD. 2013. *OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data*.
- Oracle. 2020. *The Marketer's Guide to Brand Loyalty*.
- Palmatier, R. W., Moorman, C., & Lee, J.-Y. (2019). *Handbook on customer centricity: Strategies for building a customer-centric organization*. Edward Elgar Publishing.
- Pazaitis, A., De Filippi, P., & Kostakis, V. (2017). Blockchain and value systems in the sharing economy: The illustrative case of Backfeed. *Technological Forecasting and Social Change*, 125, 105–115.
- Peres, R., Schreier, M., Schweidel, D. A., & Sorescu, A. (2022). Blockchain meets marketing: Opportunities, threats, and avenues for future research. *International Journal of Research in Marketing*.
- Pew Research Center. 2020. *Half of Americans have decided not to use a product or service because of privacy concerns*.
- Privledge. 2020. Reasoning about privacy in smart contracts [Blog Post, Feb 28, 2020]. Available at: <https://privledge-project.eu/news/reasoning-about-privacy-in-smart-contracts>.
- PYMNTS. 2022a. *Paying With Cryptocurrency: What Consumers And Merchants Expect From Digital Currencies*.
- PYMNTS, 2022b. *Cryptocurrency Blockchain And Cross-Border Payments: How Multinationals Leverage New Technology To Optimize Business Payments*.
- Rejeb, A., Keogh, J. G., & Treiblmaier, H. (2020). How blockchain technology can benefit marketing: Six pending research areas. *Frontiers in Blockchain*, 3(3).
- Rejolut. 2022. *Top Blockchain Use Cases for Enterprises*.
- Roblox. 2021. The Gucci Garden Experience Lands on Roblox.
- Rubera, G., & Kirca, A. H. (2012). Firm innovativeness and its performance outcomes: A meta-analytic review and theoretical integration. *Journal of Marketing*, 76(3), 130–147.
- Shorefire, 2022. Fandiem Launches "NFTs For A Cause" NFT Platform Set To Revolutionize Charitable Fundraising.
- Sorescu, A., Warren, N. L., & Ertekin, L. (2017). Event study methodology in the marketing literature: An overview. *Journal of the Academy of Marketing Science*, 45(2), 186–207.
- Srinivasan, S., & Hanssens, D. M. (2009). Marketing and firm value: Metrics, methods, findings, and future directions. *Journal of Marketing Research*, 46(3), 293–312.
- Srinivasan, S., Pauwels, K., Silva-Risso, J., & Hanssens, D. M. (2009). Product innovations, advertising, and stock returns. *Journal of Marketing*, 73(1), 24–43.
- Starbucks. 2022. Starbucks Brewing Revolutionary Web3 Experience for its Starbucks Rewards Members.
- Swant M. 2019. People Are Becoming More Reluctant To Share Personal Data, Survey Reveals. *Forbes*.
- Tan, T. M., & Salo, J. (2021). Ethical marketing in the blockchain-based sharing economy: Theoretical integration and guiding insights. *Journal of Business Ethics*, 1–28.
- Tan, T. M., & Saraniemi, S. (2022). Trust in blockchain-enabled exchanges: Future directions in blockchain marketing. *Journal of the Academy of Marketing Science*, 1–26.
- Tapscott, D., & Tapscott, A. (2016). How Blockchain Will Change Organizations. *MIT Sloan Management Review*, 58(2), 10.
- Tapscott, D., & Vargas, R. V. (2021). *Blockchain Is Changing How Companies Can Engage with Customers*. Harvard Business Review (January).
- Termly. 2022. 75 Biggest Data Breaches, Hacks, and Exposures [2022 Update].

- Treiblmaier, H., & Garaus, M. (2023). Using blockchain to signal quality in the food supply chain: The impact on consumer purchase intentions and the moderating effect of brand familiarity. *International Journal of Information Management*, 68 (102514).
- The Verge. 2022. NFTs, explained.
- Vergne, J. (2020). Decentralized vs. distributed organization: Blockchain, machine learning and the future of the digital platform. *Organization Theory*, 1(4).
- Wakelin, K. (2001). Productivity growth and R&D expenditure in UK manufacturing firms. *Research Policy*, 30(7), 1079–1090.
- Wang, W., et al. (2019). A survey on consensus mechanisms and mining strategy management in blockchain networks. *IEEE Access*, 7, 22328–22370.
- Wang, W., Lumineau, F., & Schilke, O. (2022). *Blockchains: Strategic Implications for Contracting, Trust, and Organizational Design*. Cambridge: Cambridge University Press.
- Wind J, Mahajan V. 1997. Issues and Opportunities in New Product Development: An Introduction to the Special Issue. *Journal of Marketing Research* 34(1): 1–12.
- Business Wire. 2022. Survey: Consumers Ready to Meet Brands in Metaverse.
- Zhang, J. (2022). Cryptopricing: Whence comes the value for cryptocurrencies and NFTs? *International Journal of Research in Marketing*.
- Zhou, K. Z., Kin, C., Yim, B., & Tse, D. K. (2005). The effects of strategic orientations on technology-and market-based breakthrough innovations. *Journal of Marketing*, 69(2), 42–60.
- Prof. Anatoli Colicev is Chair in Marketing, Strategy, and Analytics at the University of Liverpool School of Management. His research interests include marketing strategy, blockchain, NFTs, marketing-finance interface, and social media marketing. He earned his Ph.D. in Decision Sciences and Statistics from ESSEC Business School (2016). His work has appeared in *Journal of Marketing (JM)*, *Journal of Marketing Research (JMR)*, *Strategic Management Journal (SMJ)*, *International Journal of Research in Marketing (IJRM)*, *Long Range Planning*, *Journal of Interactive Marketing*, and *IJPE*, among others. In his research, Anatoli actively collaborates with companies, including YouGov Group and Metro AG group. Anatoli has been a visiting scholar at KU Leuven, Aalto University, WU Vienna, and Duke University.
- Dr. Tuuli Hakkarainen is a Lecturer (Assistant Professor) of Human Resource Management and Organisational behavior at the Department of Work, Organisation and Management at the University of Liverpool Management School. Her research is published in *Strategic Management Journal*. She obtained her Ph.D. in December 2020 from Aalto University with her dissertation on sharing expertise in multinational corporations, which was the finalist for the “Buckley & Casson Dissertation Award for the Best IB Dissertation” at AIB 2021. She also received the “AIB Award for the Best Doctoral Dissertation Proposal” at AIB 2019, “The Michael Z. Brooke Prize” in AIB (UKI) 2018, and has been nominated as the runner-up for “CBS Prize” at EIBA 2017.