Chapter 6
Revealing the Disintermediation Concept of Blockchain Technology:
How Intermediaries Gain From Blockchain Adoption in a New Business Model

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ABSTRACT

Typically, people have a misconception about blockchain as they associate this technology with cryptocurrency. This chapter does not focus, however, on bitcoin or cryptocurrencies that pertain to its intrinsic value. Rather, the authors focus on the disintermediation feature of blockchain technology by providing insights into how this technology could substitute for the functions and roles of the intermediary. The findings show that blockchain technology is not equipped with financing and physical distribution functions. The current research further demonstrates that most of the blockchain service providers that are listed in the Liechtenstein Blockchain Act are required to perform the traditional roles of an intermediary. Thus, blockchain technology is not found to support a full concept of disintermediation. This chapter is vital in order for existing intermediaries to gain a deeper understanding of how to analyze and optimize their existing functions and roles while adjusting their business model in the token-based economy.

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INTRODUCTION

The approval of the Token and Trustworthy Technology Service Providers Act (AKA Liechtenstein Blockchain Act or simply the Blockchain Act), which came into force on January 1, 2020, has introduced a new list of blockchain service providers. Importantly, the Blockchain Act focuses on blockchain and tokens in general rather than emphasizing cryptocurrency. In this regard, any form of assets or rights—money, securities, rights to assets, rights to real estate, license rights, rights of use—could be tokenized, and *a token* is defined as "a piece of information in a [blockchain][1] system which can represent claims or rights of memberships against a person, rights to property, or other absolute or relative rights, and is assigned to one or more [blockchain] identifiers" (p. 117 of the Blockchain Act). Thus, the token-based economy relates to using a set of immutable digital data to represent any assets or rights with blockchain technology. With this Blockchain Act, tangible and intangible assets could be legally tokenized on the blockchain platform, and thereby, firms should equip themselves with the knowledge of analyzing how blockchain technology could bring benefits to their business model.

A business model is essential to a firm's plan for making a profit and ensuring business sustainability. It explains how the firm creates, delivers, and captures value in the economy (Chong et al., 2019). As opposed to being firm-internal centric, Berglund and Sandström (2013) suggested that a technology-oriented business model should be recognized from an open systems perspective, which highlights the importance of making sure that the business model is complementary with other business partners and mutually beneficial to collaborative business relationships (Hummel et al., 2010). Following this notion, an open business model is considered relevant to blockchain service providers due to blockchain's distributed database that facilitates resource sharing (Goertzel et al., 2017), such as an open-source model (Casadesus-Masanell & Llanes, 2011). Despite this, previous research has found that blockchain technology could transform the economy by accelerating the disintermediation of many key players in the marketplace, such as banks (Scott et al., 2017), auditors (Dai & Vasarhelyi, 2017), lawyers (Pivovarov, 2019), and real estate brokers (Kejriwal & Mahajan, 2017). As such, blockchain technology itself is considered an autonomous entity (Tapscott & Tapscott, 2016) as it can perform the functions and roles of the intermediary.[2] Nonetheless, some scholars have raised their concerns regarding the disintermediation role of blockchain technology (Hawlitschek et al., 2018; Zamani & Giaglis, 2018).

To the best of our knowledge, no research has provided a marketing theory-based analysis of the intermediary functions and roles in the context of blockchain technology. In this chapter, we aim to fill this research gap by focusing on whether the existing intermediaries may optimize current functions and roles while adjusting their business model in the token-based economy. Thus, drawing on intermediary functions (Alderson & Martin, 1965; Monash, 2020) and middleman theory (Krakovsky, 2015), we conducted a series of theory-based analyses, exploring the potentials and limitations of blockchain technology in performing the intermediary functions and roles, as well as mapping the intermediary roles with the descriptive roles of the blockchain service providers that are stated in the Liechtenstein Blockchain Act.

In so doing, the current research contributes to several works of literature. First, regarding the disintermediation concept of blockchain technology (Hawlitschek et al., 2018), our results contrast with and challenge the prior research, which has mostly reported the advantages of blockchain technology across the distribution networks (Chang et al., 2019; Rashideh, 2020). Indeed, blockchain technology has its inherent limitations in regard to performing financing and physical distribution functions; however, this technology owns three core intermediary functions: reducing transaction costs, the automation of agree-

ment (i.e., smart contracts), and the integration of information and shared resources. Second, we extend the middleman literature (Krakovsky, 2015) by extending the descriptive roles of the intermediary into the context of blockchain service providers. Remarkably, most of the blockchain service providers have to perform the traditional roles of the intermediary since blockchain technology itself does not have the capacity to match the potential sellers and buyers. Third, we also provide a contribution to the integration of the blockchain marketing strategy and open business model literature (Casadesus-Masanell & Llanes, 2011; Goertzel et al., 2017). We demonstrate that marketing strategy is considered essential for achieving a sustainable open business model; it highlights the functions and roles of the intermediary as a link between the collaborative blockchain organizations (e.g., service providers) and their customers (Gattringer & Wiener, 2020).

The managerial implications of our findings state that for taking innovative action towards transforming business models in the token-based economy, the existing intermediaries should focus on those intermediary functions and roles that are not accomplished by the blockchain technology itself. Further, apart from blockchain governance, the revenue model, financial strategy, and supply chain strategy, blockchain service providers should include a thoughtful marketing strategy as part of their process in preparing business models.

The Disintermediation Concept Of Blockchain Technology

In the context of blockchain, *disintermediation* refers to the power of removing intermediaries in the distribution network (Gaur, 2020), which means transferring power from suppliers to consumers by establishing a direct relationship between the producers and end users via a blockchain platform (Rashideh, 2020). In this regard, the disintermediation role of blockchain technology is expected to lower costs, reduce inefficiencies, and increase data security (Chang et al., 2019).

Blockchain is considered a trustworthy technology as it is characterized by decentralized networks, an immutable and timestamped database, data transparency and traceability, and a unique data security mechanism (Wang et al., 2019). *Decentralized networks* refer to governing a network in a distributed fashion, which means that no single authority has absolute rights to exert power in the network, whereas data is copied and spread across a network of computers (Beck et al., 2018). In contrast to the relational database that allows for modifications and updates, blockchain data is stored chronologically and the data cannot be altered or deleted (Michelman, 2017). Further, blockchain enables the transparency of information (Chong et al., 2019), and it is possible to perform an audit trail to trace back each transaction due to its immutability feature. Lastly, blockchain technology offers highly secure and tamper-proof access to shared information by utilizing top-level cryptographic technology, which ensures that only authorized network nodes can access data (Wang et al., 2019).

Technically, blockchain technology provides a trust mechanism for the multistakeholder in the blockchain ecosystem (Chang et al., 2019). That is, consumers or involved parties put their trust in the blockchain platforms rather than trusting intermediaries that serve to protect against the risks associated with the exchange of resources (Zamani & Giaglis, 2018). In this regard, blockchain technology creates an internet [or Internet] of trust that guarantees trust in monetary transactions, the exchange of information, security, privacy, and it directly reduces the cost of building trust that is conventionally performed by the intermediaries (Ahluwalia et al., 2020). For this reason, an exchange of value and transfer of ownership occur in a trustless environment as blockchain is an authentication and verification technology without the presence of a trusted third party or central institution (Kiviat, 2017).

Recently, Hawlitschek et al. (2020) criticized the common misconception (i.e., the disintermediation fallacy) about the applicability of blockchain technology in superseding the intermediary roles in the sharing economy. In theory, it is understood that blockchain should be decentralized and the community should be incentivized to take responsibility for the platform (Beck et al., 2018). However, in practice, especially for online business platforms that aim to survive in a competitive environment, it is unfeasible to achieve sustainable business models if there are no central platform providers that are accountable for thoughtful designs and management of the blockchain-based marketplace platform (Hawlitschek et al., 2020). Besides, new types of intermediaries should evolve across the adoption of blockchain technology in different industries, albeit some existing intermediaries will be ostracized by blockchain technology (Zamani & Giaglis, 2018). Based on this notion, we argue that the central value proposition of blockchain technology is unconvincingly associated with the concept of disintermediation.

The Analysis Of The Blockchain Capability And The Key Functions Of Intermediary

To provide insights into how blockchain technology could possibly replace intermediaries in the distribution network (i.e., disintermediation), we analyzed the capability of blockchain technology substituting for the functions of the intermediary. From the marketing perspective, intermediaries exist between firms as they enhance end-user convenience, market coverage, and the efficiency of the distribution network by performing three basic functions in the distribution channel (Alderson & Martin, 1965; Monash, 2020):

- **Transactional Functions:** This function explains how intermediaries create and improve a marketplace, which includes their resources for increasing market linkages between the sellers and buyers, establishing a satisfactory buyer–seller relationship, minimizing transaction costs, and bearing the risk of loss of money. As presented in Table 1, we argue that blockchain technology itself increases the market linkages as it provides a public trading environment; however, this function is only applicable for permissionless blockchain networks such as Bitcoin and Ethereum. In terms of permissioned blockchain technology (e.g., Libra and Hyperledger), participants must first join a consortium to access their membership rights in the network. Thus, a mis-linkage of market linkages occurs if any relevant and important parties are not part of the consortium. Despite blockchain technology enhancing transparency, reducing information asymmetrically, and subsequently minimizing transaction costs in a trustless environment (Kiviat, 2017), it does not guarantee a long-term buyer–seller relationship since other criteria should be considered, such as product quality and the post-purchase customer experience. With a smart contract, risk management may be performed by carefully predefining a self-executed smart contract. However, blockchain technology itself does not bear any unsold inventory and volatile assets as handled by intermediaries. Thus, blockchain technology partially fulfills the transactional functions of the intermediary.
- **Facilitating Functions:** To enhance the engagement between sellers and buyers, intermediaries play an important function in facilitating both physical exchange and the transaction of goods, including providing relevant information, financing, the preparation of a purchase agreement, and the post-purchase customer experience. In general, buyers and sellers can access relevant information easily from the blockchain technology; however, it only covers the necessary information about the products/transaction and information that is shared by the participants within

the blockchain network. Other important information for decision-making—such as market intelligence, market research data, statistics, and customer feedback on competitor products—are not indispensably appended in the blockchain. The main reason given is that self-executed agreements on smart contracts only process transactional-related information. Importantly, our analysis found that blockchain technology itself does not offer financing services,[3] instead, financing activities are independently handled by another entity or intermediaries. Further, blockchain technology itself does not include non-transactional initiatives in the smart contract, such as customer inquiries, product care tips and updates, and a newsletter. As such, blockchain technology only handles the post-purchase customer experiences that are listed on the smart contract's predefined terms and conditions, such as refunds and returns, a warranty, rewards for loyalty, replenishment reminders, and product satisfaction feedback. Thus, blockchain technology does not fully cover the facilitating functions of the intermediary, including providing relevant information for decision-making, a financing facility, and a post-purchase customer experience.

- **Logistical Functions:** This function focuses on the flow of goods, resources, and information between the origin and the endpoint of consumption. The logistical function includes both physical distribution (e.g., product storage, shipping, and assortment) and the integration of information and shared resources. As stated by Catalini and Gans (2020), blockchain technology is more suitable for digitalized assets (e.g., cryptocurrencies, music, software, and e-books); such an inherent characteristic has prevented blockchain from performing physical distribution as the movement of a physical object occurs in the physical world. An important remark is that we reject the idea of an IoT blockchain as an IoT device is considered a separate entity/actor in the blockchain ecosystem (Tan & Saraniemi, 2020). Thus, blockchain technology only performs information integration using different entities and shared resources.

Table 1. An analysis of using blockchain technology in substituting for the functions of the intermediary

The basic functions of the intermediary	Capability of blockchain technology (Is blockchain technology capable of replacing the function?)
Transactional functions (marketplace)	
• Increase market linkages.	Partially
• Reduce transaction costs.	Yes
• Establish a buyer–seller relationship.	Partially
• Bear risks.	Partially
Facilitating functions (engagement)	
• Provide relevant information.	Partially
• Make agreements.	Yes
• Enable/provide financing.	No
• Provide a post-purchase customer experience.	Partially
Logistical functions (the flow of goods, resources, and information)	
• Physical distribution.	No
• Integration of information and shared resources.	Yes

How Do The Existing Roles Of The Intermediary Match With Blockchain Service Providers?

We suggest that, in general, blockchain technology itself could partially improve or substitute for certain functions of the intermediary. However, our findings do not support the concept of disintermediation—cutting out the intermediaries—that has been heavily communicated in scientific research (e.g., Morkunas & Paschen, 2019; Rashideh, 2020) and popular news media (Kejriwal & Mahajan, 2017; Pivovarov, 2019). To elucidate how the existing intermediaries could act as the legalized entities that are stated in the Liechtenstein Blockchain Act, we conducted the following analysis by classifying the intermediary roles of blockchain technology into certifier, enforcer, risk bearer, concierge, bridge, and insulator roles (Krakovsky, 2015):

- **Certifier:** We suggest that blockchain technology should play a vital role as the certifier; it adds value for both buyers and sellers by performing the business and/or transaction verification process (Catalini & Gans, 2020). Further, blockchain's immutable and audit trail features make it credible for it to act as a certifier. For these reasons, blockchain technology can act as the intermediary and completely supersedes most of the certificate authorities or entities.
- **Enforcer:** Due to blockchain's timestamp, transparency, and decentralized characteristics, blockchain could theoretically make sure buyers and sellers put forth a full effort, cooperate, and stay honest. Essentially, a legally enforceable smart contract can be stored in a blockchain and it automatically executes. For instance, payment is automatically transferred to recipients' accounts when predetermined terms and conditions are met between the parties involved. Nonetheless, when there is a dispute or misbehavior during the transaction, blockchain merely does not proceed with the non-compliant smart contract, without having any authority to punish or to enforce that "bad players" act in good faith (Gomez et al., 2019). To overcome this issue, related authorities have to step in to protect against the post-contractual pitfalls of misappropriating actions. As such, blockchain technology partially plays the role of the enforcer.
- **Risk Bearer:** This role serves to reduce uncertainty between the parties involved, which requires the ability to recognize both internal and external risks, as well as excel in risk management. We propose that blockchain technology could partially act as an effective risk bearer because of its capability to integrate information and shared resources. For example, the data/information of the business intelligence in risk management could be stored in the blockchain and subsequently be embedded in the smart contract. That is, blockchain technology utilizes an integrated database to diversify risk by performing risk management functions rather than directly bearing risk on behalf of parties involved.
- **Concierge, Bridge, and Insulator:** A *concierge* serves to make buyers' lives easier by compiling information in one place (e.g., aggregators, such as Expedia, Skyscanner, and Booking.com). A *bridge* serves to create opportunities or a marketplace by matching disconnected buyers and sellers, for example, Facebook social commerce, eBay, Uber, and Airbnb. An *insulator* serves to diffuse the responsibilities of sellers and buyers so as to avoid an unwilling experience occurring during the transaction process, which is highly associated with the task to "act and hold responsibility on involved parties' behalf." For example, an insulator is a professional football agent who is fully responsible for negotiating an agreed price, salary package, and benefits on the behalf of players while transferring to another football club. One common characteristic amongst these

three intermediary roles is the ability to match the potential sellers and buyers. That is, such roles require the capability of understanding customers' needs and sellers' offers, an act of searching, an act of matching, an act of negotiating, and other value-added efforts. In this sense, we argue that blockchain technology itself is not designed to perform matchmaking activities.

Referring to the Liechtenstein Blockchain Act, we conducted an analysis by mapping the existing roles of intermediaries with the descriptive roles of blockchain service providers. As shown in Table 2, we found that only verifying authority could be replaced by the blockchain technology itself as it only functions in the certifier roles. Other proposed blockchain service providers are found to play other intermediary roles that are not absolutely substituted for by the blockchain technology (i.e., enforcer, risk bearer, concierge, bridge, and insulator).

Table 2. Mapping between blockchain service providers and the roles of the intermediary

Blockchain service providers	**The roles of intermediary**					
	Certifier[a]	**Enforcer[b]**	**Risk bearer[b]**	**Concierge[c]**	**Bridge[c]**	**Insulator[c]**
Verifying authority	Yes	-	-	-	-	-
Physical validator	Yes	Yes	Yes	-	-	-
Depositaries	-	-	Yes	-	-	-
Token issuer	-	Yes	Yes	-	-	-
Protector	-	Yes	-	-	-	Yes
Exchange service provider	-	-	-	-	Yes	-
Price service provider	-	-	-	Indirectly	-	-
Identity service provider	Yes	-	Yes	-	-	-

[a] Blockchain acts as the intermediary.
[b] Blockchain partially acts as the intermediary.
[c] Blockchain is not able to act as the intermediary.

- **Verifying Authority:** This term relates to a person or entity that verifies the legal capacity and requirements for token disposal. This blockchain service provider can be performed by software or an individual human being in checking these prerequisites for disposal (the certifier role).
- **Physical Validator:** This is a person or entity who ensures the existence and enforcement of contractually obligatory rights to property represented in a blockchain technology system in the sense of property law. That is, the physical validator—a legal entity—serves to guarantee that the tokenized object or item physically exists, which shall be recognized in both digital and analog worlds. The physical validator covers three intermediary roles, including the identification and rights to the object of value (the certifier role), ownership transfer of the object (the enforcer role), and storage of the physical object on behalf of the owners (the risk bearer role).
- **Depositaries:** There are two types of depositaries: key and token depositaries. A key depositary is defined as a person or entity acting as a custodian who holds private keys on behalf of the principal, whereas a token depositary relates to a person or entity who holds tokens (both private and public keys) on behalf of another person or another person's or entity's account. Such service

providers are important to owners for reducing the risk of losing private keys—a private key and token are entrusted to depositories for safekeeping and to bear the risk of hacker attacks (the risk bearer role). The reason given is that in the token-based economy, owners will not able to retrieve their assets if they lose the private keys, and any tokenized rights in assets are lost to heirs if the decedents fail to make their private keys accessible to inheritors.

- **Token Issuer:** This is a person or entity offering tokens to the public on the token issuer's behalf or that of another person or entity. To provide protection for users and to minimize the risk of abuse, a token issuer must ensure the token issuance follows the guidelines of the Financial Market Authority (the enforcer role). The token issuer also has responsibilities in the disclosure of basic information at any time during token issuance, the execution of token issuance, and the maintenance of interruptions during the token issuance (the risk bearer role).
- **Protector:** This is a person or entity holding tokens in their own name in a blockchain technology system for the benefit of a third party (the insulator role) that has authorization pursuant to the Trustees Act. An important note is that only service providers licensed under the Banking Act or the Professional Trustees and Fiduciaries Act are permitted to perform the role of protector so as to ensure the legitimate protection of privacy and to minimize the risk of money laundering in blockchain systems (the enforcer role).
- **Exchange Service Provider:** This is a person or entity who exchanges fiat (legal tender) for tokens (or vice versa). Such a blockchain service provider connects disconnected buyers and sellers in their exchange or trading platforms by publicly disclosing comparable market prices and the up-to-date purchase and selling prices of the traded tokens (the bridge role).
- **Price Service Provider:** This is a person or entity providing blockchain technology system users with aggregated price information based on buying and selling offers or completed transactions. As mentioned in the introduction, the token-based economy consists of a wide range of tokenized assets and rights, such as the rights to real estate (e.g., land and houses), rights to assets (e.g., diamonds and paintings), or license rights (e.g., music rights). As such, these categories of price information may not be publicly accessible compared with the price movement of cryptocurrency. Thus, a price service provider is essential in ensuring the transparency of a published price, avoiding insider dealing and conflicts of interest when setting prices, and in disclosing relevant information to involved parties, which indirectly establishes a new and *price-informed* marketplace amongst parties who are interested in selling and buying the tokenized assets and rights (the concierge role).
- **Identity Service Provider:** This provider serves to identify the *actor* in possession of the right of disposal related to a token and the provider records it in a blockchain directory. There are two forms of actors in the blockchain context: legal persons or representatives who are physically present (e.g., business entities and individual human beings) and legal persons who are not physically present (e.g., IoT devices and decentralized autonomous organizations). This service provider ensures that the involved sellers and buyers are lawful actors (the enforcer role) and that they are reliably identified before the transaction occurs (the certifier role).

In both analyses, our findings show that the blockchain technology itself is not able to supersede either the functions or the roles of the intermediary utterly. In this regard, the existing intermediaries should recognize the approval of the Blockchain Act as a golden opportunity to take innovative action to

transform or adjust their business model in the token-based economy rather than view the development of blockchain technology as a threat to their future revenue model (Sandner et al., 2020).

Theoretical Implications

This research provides a three-fold contribution. First, using existing intermediary theories, our study addresses how blockchain could accelerate disintermediation in the token-based economy (Hawlitschek et al., 2018; Zamani & Giaglis, 2018). To the best of our knowledge, this is the first research that systematically analyzes the capability of blockchain to substitute for the functions of intermediaries (Alderson & Martin, 1965; Monash, 2020) throughout the distribution channel. We provide a detailed breakdown for each basic function and classify each function with a key attribute in the context of blockchain technology. Specifically, the transaction function is related to the marketplace, the facilitating function reflects the engagement process, and the logistical function refers to the flow of goods, resources, and information. Such theoretical implication is important to any intermediary analysis of new technology (e.g., artificial intelligence and virtual reality) as the technology itself should not unconditionally replace the entire functions of the intermediary. Seemingly, blockchain technology owns three core intermediary functions: reducing transaction costs, the automation of agreement (i.e., smart contracts), and the integration of information and shared resources. However, blockchain technology itself is not an autonomous entity that has cognitive, analytical, and strategic mindsets with which to perform business operations. For this reason, it faces inherent limitations in providing financing and distributing or storing a physical item, which is witnessed by most of the functions of the existing intermediaries (e.g., banks, suppliers, and retailers).

Second, the current research contributes to the middleman theory (Krakovsky, 2015) by articulating the intermediary roles of blockchain technology. Blockchain technology itself does not have the capacity of understanding customers' needs and sellers' offers. An important note is that artificial intelligence (AI) is another form of technology, and thus, this chapter does not consider the matching capability to use AI with blockchain data. In this sense, blockchain technology is not designed to act as a concierge, bridge, or insulator for business matchmaking activities when no predefined conditions are stated in a particular smart contract (Gomez et al., 2019). Rather, blockchain technology plays an absolute role as the certifier, as well as partially acting as enforcer or risk bearer. Further, we provide the relevancy of existing intermediary roles by mapping blockchain service providers that are stated in the Liechtenstein Blockchain Act. Interestingly, most of the listed blockchain service providers overlap with the intermediary roles that could not be autonomously performed by the blockchain technology itself. That is, despite exaggerating the disintermediation feature of blockchain technology, we found that, regardless of how services are provided, most of the listed blockchain service providers are required to perform the traditional roles of the intermediary in the blockchain ecosystem, including overcoming an agreement dispute (the enforcer role), risk management and diversification (the risk bearer role), the creation of a marketplace with aggregated information (the concierge role), the matching between disconnected parties for business opportunities (the bridge role), and the role of acting as a representative (the insulator role).

Third, we shed light on the importance of integrating marketing strategy and open business model literature (Casadesus-Masanell & Llanes, 2011; Goertzel et al., 2017) in the context of blockchain. Blockchain technology has been heavily associated with disintermediation (Rashideh, 2020), and it plays a crucial role in disrupting social media marketing (e.g., Facebook/YouTube ads) by incentivizing consumers to have a direct-brand relationship (Harvey et al., 2018). In this regard, less attention has been

placed on the relationship between the blockchain business model and marketing strategy. Critically, our findings show that blockchain technology itself is not equipped with the capability of understanding the needs and wants of customers, whereas most of the blockchain service providers that are stated in the Liechtenstein Blockchain Act have to have such a capability in the marketplace. Thus, our research demonstrates that marketing strategy is considered essential for achieving a sustainable open business model as it highlights the function and roles of the intermediary as a link between the collaborative blockchain organizations (e.g., service providers) and their customers (Gattringer & Wiener, 2020).

Managerial implications

To date, most research on blockchain's use in business has focused on blockchain governance (Beck et al., 2018; Montes & Goertzel, 2019), business models (Chong et al., 2019; Xu et al., 2018), financial strategy (Böhme et al., 2015), and supply chain strategy (Kshetri, 2018). Relatively, we suggest that blockchain service providers have to include contemplative planning for their marketing strategy into their business models. Specifically, more marketing effort has to be focused on those intermediary functions and roles that are not effectuated by the blockchain technology itself, including how to (a) understand the market trend and customers' needs and wants, (b) create business opportunities between potential buyers and sellers, (c) increase market linkages, (d) establish a buyer–seller relationship, (e) reduce or diversify the risk between buyers and sellers, (f) provide financing facilities, (g) enhance the post-purchase customer experience, and (h) distribute physical products efficiently and effectively.

Besides the above, we suggest that the existing intermediaries—such as banks, audit firms, law firms, and real estate brokers—should view blockchain technology as a business transformative opportunity by understanding the impacts of blockchain technology on their current business models. In this regard, intermediaries first should analyze how blockchain technology could possibly affect existing functions and roles in the marketplace (i.e., what are their current weaknesses) and how it is unlikely to affect existing functions and roles in the marketplace (i.e., what are their current strengths). Then, intermediaries can take innovative actions to optimize their strengths while piloting blockchain technology in their business operations.

For instance, banks are expected to be essential players in the context of the Facebook-initiated Libra stablecoin and the digital programmable Euro (Sandner et al., 2020). The reason given is that banks could utilize their existing capability and networks to provide custody for digital money and distribute digital money, to ensure daily transactions are in compliance with Know Your Customer and Anti-Money Laundering policies, to get involved in the development of an interoperability standard in a banking consortium, and to act as designated dealers or virtual asset service providers in the Libra stablecoin ecosystem.

Auditing services could be transformed into more technological, analytical, and consulting-oriented services, including code audits on smart contracts, predictive audits, fraud detection, and risk management (Dai & Vasarhelyi, 2017). As for law firms, lawyers should benefit relatively from their legal knowledge; they need to equip themselves with the fundamental knowledge about blockchain in order to code the agreement of a smart contract that is enforced under the law (Kiviat, 2015). Despite blockchain in real estate being perceived to have the potential to replace intermediaries (Kejriwal & Mahajan, 2017), we strongly believe that brokers will maintain their position in searching for the right property that matches the needs of purchasers, especially for non-public listed properties. Thus, in line with the work of Seyedsayamdost and Vanderwal (2020), we find that blockchain technology does not appear to comply

with its disintermediation roles is in the marketplace; rather, it replaces traditional and nonprofessional intermediaries with new blockchain experts and professional service providers.

LIMITATIONS AND FUTURE RESEARCH

Our research has several limitations that can be seen as directions for future research. First, the current study only conducts analysis based on the blockchain service providers that are listed in the Liechtenstein Blockchain Act. Key-informant interviews (Kumar et al., 1993) and case studies (Yin, 2014) of blockchain utilization could be conducted to further differentiate the functions and roles of the intermediary that are performed by blockchain technology itself versus blockchain service providers. Second, the functions and roles of the intermediary are considered an essential element of the marketing strategy. Thus, future research could investigate other elements of the marketing strategy in the context of blockchain technology, such as segmentation, branding, communication and engagement, the marketing mix, and the role of the institutional environment in marketing channels (Grewal & Dharwadkar, 2002). Third, future research should analyze the blockchain business model using a boundary-spanning perspective (Zott et al., 2011). Fourth, our discussions do not make a distinction between permissionless versus permissioned blockchain technology. For this reason, future research that focuses on a comparison of different blockchain platforms (e.g., Ethereum, Hyperledger, Stellar, EOS, and R3 Corda) is needed in order to provide greater understanding of blockchain-marketing strategy. Lastly, future research should investigate how the evolving role of intermediaries due to blockchain affecting value network structures, platform-based business settings, and even industrial or business segments as a whole.

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KEY TERMS AND DEFINITIONS

Blockchain: A distributed ledger database that is consensually shared and synchronized across the multistakeholder using cryptography.

Decentralized Networks: Refer to governing a network in a distributed fashion, which means that no single authority has absolute rights to exert power in the network, whereas data is copied and spread across a network of computers.

Disintermediation: Refers to the power of removing intermediaries in the distribution network.

Exchange Service Provider: A person or entity who exchanges fiat (legal tender) for tokens (or vice versa).

Functions of Intermediary: Include transactional functions, facilitating functions, and logistical functions.

Identity Service Provider: A provider serves to identify the actor in possession of the right of disposal related to a token and the provider records it in a blockchain directory.

Intermediary: A mediator or middleman who acts as a link between people/business entity in order to try and bring about an agreement.

Key Depositary: A person or entity acting as a custodian who holds private keys on behalf of the principal.

Physical Validator: A person or entity who ensures the existence and enforcement of contractually obligatory rights to property represented in a blockchain technology system in the sense of property law.

Price Service Provider: A person or entity providing blockchain technology system users with aggregated price information based on buying and selling offers or completed transactions.

Protector: A person or entity holding tokens in their own name in a blockchain technology system for the benefit of a third party that has authorization pursuant to the Trustees Act.

Smart Contract: A self-executing digital contract that automatically executes the terms and conditions of an agreement in a blockchain or distributed ledger technology.

Token: A token is defined as a piece of information in a blockchain system which can represent claims or rights of memberships against a person, rights to property, or other absolute or relative rights, and is assigned to one or more blockchain identifiers.

Token Depositary: A person or entity who holds tokens (both private and public keys) on behalf of another person or another person's or entity's account.

Token Issuer: A person or entity offering tokens to the public on the token issuer's behalf or that of another person or entity.

Token-Based Economy: Using a set of immutable digital data to represent any assets or rights with distributed ledger or blockchain technology.

Verifying Authority: A person or entity that verifies the legal capacity and requirements for token disposal.

ENDNOTES

1. To maintain the consistency of the terminology used in this chapter, we replaced the original term *trustworthy technology* with *blockchain*.
2. *Function* refers to the natural purpose of the duty of the blockchain technology itself, whereas *role* is a part played by blockchain technology or blockchain service providers in a certain situation.
3. One exception is using a smart contract to automatically receive financing from decentralized autonomous organizations. Nevertheless, such a theoretically possible implication is not successfully evidenced yet.