JURNAL EKONOMI DAN BISNIS
Journal homepage: www.ejournal.uksw.edu/jeb
ISSN 1979-6471 E-ISSN 2528-0147

The essential benefits of an enterprise blockchain in business model innovation

Ambara Purusottama[a]*, Yohanes Berenika Kadarusman[b]

[a] *School of Business and Economics, Universitas Prasetiya Mulya, Jakarta, Indonesia; ambara.purusottama@pmbs.ac.id**

[b] *School of Business and Economics, Universitas Prasetiya Mulya, Jakarta, Indonesia; yohanes.kadarusman@pmbs.ac.id*

A R T I C L E I N F O

Article History:
Received 07-07-2020
Revised 04-26-2021
Accepted 06-02-2021

Kata Kunci:
Blockchain, inovasi model bisnis, perusahaan, privat, konsorsium

Keywords:
Blockchain, business model innovation, enterprise, private, consortium

A B S T R A K

Teknologi blockchain mendatangkan perubahan dan disrupsi atas model bisnis yang sudah ada sehinga patut untuk dianalisis lebih lanjut. Atas dasar itu, penelitian ini bertujuan untuk menjelaskan fenomena teknologi blockchain pada inovasi bisnis model pada ekosistem perusahaan. Secara empiris, teknologi blockchain terbukti meningkatkan kinerja organisasi. Studi ini menggunakan konsep value system untuk menjelaskan fenomena tersebut. Melalui penalaran abductive, studi ini menggunakan multiple-case study untuk menjawab persoalan penelitian. Secara garis besar, hasil studi ini menemukan bahwa teknologi blockchain mendatangkan manfaat kepada organisasi denga cara: (i) value capture melalui peningkatan profitabilitas, (ii) value creation melalui private parnership, (iii) value delivery melalui smart-contract, dan (iv) value proposition yang mendorong nilai yang berbasis pada peningkatan nilai bisnis organisasi melalui perbaikan operasional. Selain itu, studi ini juga mengusulkan tipe ekosistem blockchain yang berbeda pada organisasi: privat dan konsorsium. Ekosistem privat berorientasi pada perbaikan internal kinerja organisasi dalam satu entitas bisnis. Sebaliknya, ekosistem konsorsium berorientasi pada kolaborasi bisnis.

A B S T R A C T

Blockchain brings changes and disruptions to the existing business models and therefore deserves further analysis. Accordingly, this study aims to explain the phenomenon of blockchain technology in the business model innovation in the enterprise ecosystem. Empirically, numerous studies have shown that blockchain technology improves organizational performance. This study uses a

**Corresponding Author*

value system framework to explain the enterprise blockchain phenomenon. Through abductive reasoning, this study uses a multiple-case study to answer the research questions. In sum, this study finds that blockchain technology delivers benefits to organizations in: (i) value capture through increased profitability; (ii) value creation through private partnership; (iii) value delivery through smart contracts; and (iv) value proposition that encourages improving the existing value proposition through operational improvements. Besides, the study also proposes the different types of enterprise blockchain ecosystems: private and consortium. The private ecosystem focuses on improving organizational performance through competition. In contrast, the consortium ecosystem focuses on business value collaboration.

INTRODUCTION

The discussion of business model innovation, which is emphasized through the concept of collaboration to overcome organizational limitations (Chesbrough, 2003), is exhaustive but interesting (Halilbegovic et al., 2019; Warner & Wäger, 2019). Such collaboration facilitates innovations to maintain organizations' sustainability more effectively and efficiently (Teece, 2010). Such innovations arguably contribute more to organizations than other innovation types, including product, process, and technological ones. The internet enables such innovations (Yip, 2004) by eliminating limited access to data/information.

The emergence of blockchain technology enables organizations to engage in business model innovation (Nakamoto, 2008). Blockchain technology disrupts the global financial industry through cryptocurrency (e.g., bitcoin). Its decentralized protocols can eliminate intermediaries such as financial institutions in supporting transaction activities. Furthermore, it evolves into a system applicable in other business activities previously inaccessible by the technology (Crosby et al., 2016; Hughes et al., 2019). This particular protocol can resolve fundamental business issues in conducting transactions, such as trust (Shin, 2019). This system translates these values into a system to address business challenges.

Blockchain technology allows for a solution in data/information exchange that involves multiple entities. Angelis and Ribeiro (2019) emphasize the role of blockchain in business collaboration. Data/information access is a fundamental protocol in creating business collaboration. This scenario is possible if all stakeholders have equal access to data/information and maintain transparency. Blockchain technology operates as an algorithm-based smart contract (Hamida et al., 2017). The algorithm is a system code that supports business transactions.

The transformation of blockchain technology into enterprise's blockchain defines the blockchain ecosystem. The enterprise ecosystem applies blockchain technology to help organizations pursue specific purposes, including improving organizational performance. The enterprise ecosystem accommodates two interaction patterns (inter-and intra-organization) to achieve different objectives. As a collaboration platform, blockchain technology can be implemented in specific organizations or ecosystems. This technology potentially improves organizational performance.

Blockchain technology and business model innovation have attracted academic attention. Morkunas et al. (2019) explain this concept through the business model canvas. Nowiński and Kozma (2017) discuss a similar arrangement from the integrated business model as a different research framework. Both findings indicate that blockchain technology affects the existing business models. Although blockchain offers many benefits, especially innovative business models, few firms are aware of its existence and have adopted it. Therefore, it is essential to understand the role of blockchain in firms, which is still relatively understudied in Indonesia. Accordingly, this study contributes by filling in this research gap.

This study also aims to formulate and explain the coexistence of business model innovations and the enterprise blockchain ecosystem. We use abductive reasoning and multiple-case study to answer the research questions. This paper is organized as follows. After the introduction, the next section presents the literature review, followed by the research methods. The findings are analyzed and discussed in the following part. The last section concludes, discusses the limitations, and offers recommendations.

LITERATURE REVIEW

This study uses several concepts to support the research, namely business model innovation, blockchain technology, and enterprise blockchain ecosystem. The following parts discuss the concepts.

Business Model Innovation

Business models refer to a framework to formulate organizations' business activities. They enable one to provide visual representations of organizations. Various scholars have defined business models differently. Chesbrough and Rosenbloom (2002) explain that business models represent how organizations commercialize products/ services. Meanwhile, Teece (2010) considers that business models translate ideas into economic perspectives. A business model is defined "as a model that

describes the logic of how an organization creates, delivers, and controls value and how money is earned in a company" (Osterwalder & Pigneur, 2010). In sum, business models help organizations deal with dynamic business situations.

Business model innovation refers to organizational efforts to change business models due to changing business environments. Demil and Lecocq (2010) define business model innovation as an evolutionary process, "a fine-tuning process involving voluntary and emergent changes in and between permanently linked core components." Furthermore, the concept refers to learning processes. Business model innovation helps organizations use their learning and experience from prior business models to create new business models (Teece, 2010). It also challenges existing business conditions to make innovative business models arguably more productive than other innovation modes, including product innovation and technological innovation (Chesbrough, 2007).

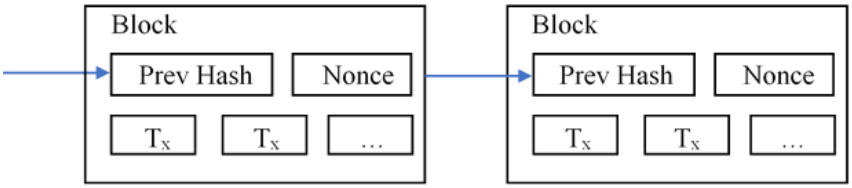
The effectiveness of business model innovation depends on how organizations use logic in arranging business model elements, i.e., a business model is a framework that connects critical elements. Zott and Amit (2010) use the activity system concept to explain interactions in business models or business model innovations. Accordingly, Bocken et al. (2015) introduce the value system concept consisting of well-defined and systematic four dimensions: value capture, value creation, value delivery, and value proposition.

Value systems fundamentally represent a series of activities. Value capture explains how organizations capture values from an economic perspective or "monetization of values" (Baden-Fuller & Haefliger, 2013). Meanwhile, value creation refers to opportunities to reveal organizational values to consumers (Demil & Lecocq, 2010). Simultaneously, Schaltegger et al. (2012) emphasize value delivery through effective communication and relationships to consumers to convey organizational value propositions. Lastly, a value proposition is inherent in products/services offered to communities to display value capture and value creation (Teece, 2010).

Blockchain Technology

The history of blockchain technology coincides with Bitcoin as a cryptocurrency that disrupted the global financial industry. Bitcoin and blockchain have been initially considered different technologies, with bitcoin as the product of blockchain technology. Blockchain is a technology with a decentralized system responding to conventional systems that harm the world economy (Nakamoto, 2008). Also, the blockchain inventor noticed that decentralized technology is safer to use and might facilitate financial transactions more quickly and accurately.

Blockchain technology delivers a decentralized protocol to secure data/information exchange. This technology involves the protocol to be the witness and verifier (Wang et al., 2016). Transactions are safer when they involve more verifiers or parties. Blockchains allow peer-to-peer relationships between entities without facilitators (Nakamoto, 2008), implying that every transaction is carried out directly. The mechanism of blockchain work begins with developing the user code in the system. Because of its decentralized nature, blockchain has members/nodes that facilitate data/information exchange. Transactions between nodes must be verified and approved by other nodes. Then, the data are sealed and encrypted into the system. In its development, the system has evolved to adjust to societal needs.



Source: Nakamoto (2008)
Figure 1
Blockchain Workflow Process

Like Bitcoin, Blockchain development begins with a financial transaction system (Zhao et al., 2016). This technology leads to faster, more transparent, and more secure transactions. Therefore, the system applies to data/information transfer (Hughes et al., 2019). Simply put, the blockchain's scope becomes more extensive than the financial system. The development of blockchain technology to date has resulted in three versions: (i) blockchain 1.0 that focuses on data/information transaction speed; (ii) blockchain 2.0, or smart-contract, that emphasizes the use of algorithms in its system protocols; and (iii) blockchain 3.0 that applies smart-contracts on decentralized applications (Dapps). The blockchain's high adaptability allows it to provide many benefits and create new opportunities.

Blockchain Economics

Blockchain technology now plays a significant role in economic infrastructure. This technology has changed the way people carry out economic activities or transactions (Dwyer, 2015) due to blockchain-based economic products, such as Bitcoin, which significantly increase value. Bitcoin, a cryptocurrency that relies on computing power, has been transformed into arguably the most valuable currency today. Böhme et al. (2015) explain that Bitcoin governance is carried out in a decentralized system using market mechanisms (supply and demand). Bitcoin is slowly transforming into a global medium of exchange that several countries have

recognized. The currency reflects real economic conditions because it minimizes entities that can intervene in its use. Furthermore, the utilization of a blockchain goes beyond Bitcoin since the technology encourages economic redistribution through efficient transaction costs.

The blockchain protocol obliges transactions to be executed peer-to-peer, implying lower transaction costs due to the loss of intermediaries (Schmidt & Wagner, 2019). Individuals or organizations can minimize transaction costs (searching, monitoring, and adapting costs) carried out by intermediaries. In other words, a blockchain provides direct access to data/information sources. Berg, Davidson, and Potts (2019) argue that blockchain improves the efficiency of transaction costs because of its three main characteristics: correct, decentralized, and cost-efficient. A blockchain ensures data/information integrity through distributed data/information and a decentralized authority-consensus decision-making model. The recorded data/information cannot be changed because it requires a massive amount of energy or a 51 percent attack.

Business Model Innovation and Blockchain Technology

Adaptive blockchain technology offers significant benefits to business knowledge. A Deloitte survey (2019) highlights the importance of the latest technological position in accommodating business activities. First, decentralized technology eliminates intermediary entities and reduces transaction costs (DaSilva & Trkman, 2014). Consequently, business activities have become more efficient and transparent. Second, the technology provides security for each transaction (Kshetri, 2017). The involvement of other nodes in each transaction, i.e., the tiered encryption system, and the nature of decentralization allows for increased data/information security. Third, blockchain facilitates business model changes (Chen & Bellavitis, 2020). Hence, peer-to-peer relationships potentially open up innovation.

Blockchain technology allows organizations to review their existing business models and capture opportunities for new models. The presence of technology investment encourages the development of business model innovation concepts (Yip, 2004). As a collaboration platform, business model innovation and blockchain technology aim to improve organizational performance. Smart contracts, as blockchain products, potentially reduces inaccurate information in supply chains (Di Vaio & Varriale, 2019; Queiroz & Wamba, 2019). Furthermore, decentralized protocols within supply chains can reduce transaction costs and redistribute these costs to the units involved in the system (Schmidt & Wagner, 2019). The latest innovation, the blockchain platform, encourages new creations to increase revenues through equal

investments. Blockchain's various advantages have encouraged experts to analyze further their business impacts.

The academic literature has enthusiastically discussed the link between blockchain technology and business model innovation. Morkunas et al. (2019) use the business model canvas framework (the nine building blocks) to show the significance of using the blockchain platform for business models. Their findings reveal that the use of blocks affects all framework's blocks. Meanwhile, Nowiński and Kozma (2017) utilize an integrated business model framework to identify the role of blockchain technology in business model innovation. In sum, both studies find blockchain's promising benefits despite different frameworks used in the analysis.

Enterprise Blockchain Ecosystem

In its application, the blockchain platform can be utilized to support enterprise-activity-limited users. The enterprise ecosystem focuses on providing platforms for entities that collaborate with similar goals. The implementation of the blockchain platform aims to leverage business values through collaboration among business members. Consequently, it is necessary to modify the decentralized protocol through entity restrictions. Enterprise ecosystems can be classified into two interaction forms: intra-organization (i.e., different entities but within the organization) and inter-organization (i.e., different entities and organizations) (Weking et al., 2019).

Both inter-and intra-organization ecosystems affect the blockchain ecosystem. The intra-organization ecosystem denotes data/information exchange through a decentralized protocol in the intra-organization scope. In contrast, the inter-organization pattern acts as an underlying system in the consortium ecosystem. This ecosystem involves other organizations in their business activities. However, both private and consortium ecosystems provide equal access to all registered nodes.

Blockchain technology provides equal benefits to members or nodes within an ecosystem (Schmidt & Wagner, 2019). The blockchain implementation on the private blockchain is implemented through a smart contract that is agreed upon in advance among the members. The automation process likely eliminates data/information transaction failures or manipulation. Besides, the data/information process is transparent and visualized precisely the same as the other nodes. Blockchain technology in the private ecosystem potentially offers more benefits than conventional systems and even replaces them. Some of these advantages provide more added value to private ecosystems.

Research Framework

Based on the literature, this study identifies the significant interactions between

business model innovation and the enterprise blockchain ecosystem. The research framework integrates business model innovation through the value system concept (Bocken et al., 2015) and the enterprise blockchain ecosystem consisting of private and consortium ecosystems (Angelis & Ribeiro, 2019; Crosby et al., 2016). Figure 2 illustrates the research framework that is used as a reference for designing the research methodology.

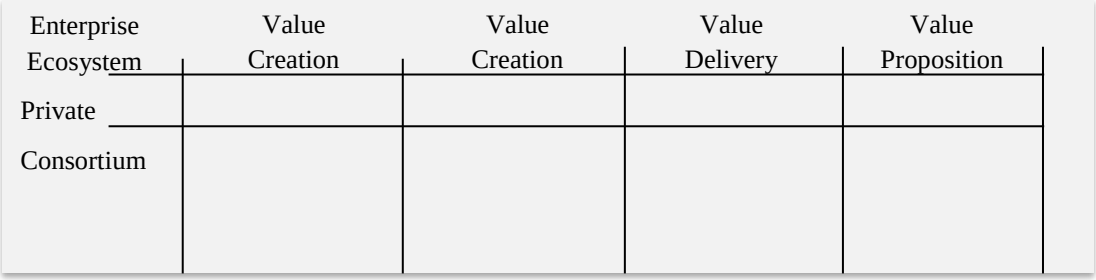


Figure 2
Research Framework

RESEARCH METHODS

This study uses abductive reasoning to explain the phenomenon. Abductive reasoning tries to explain the importance of understanding the truth through facts that appear but still uses the literature as a reference for researchers to explain these facts. Consequently, the case study is arguably the most relevant research strategy for this approach (Sobh & Perry, 2006). In this respect, the multiple case study method is recommended to investigate the research issue better because this strategy reinforces the findings and avoids research bias (Yin, 2014). Specifically, four cases are considered sufficient for generalizing the findings. Following these recommendations, this study uses at least four active participants in the enterprise blockchain ecosystem.

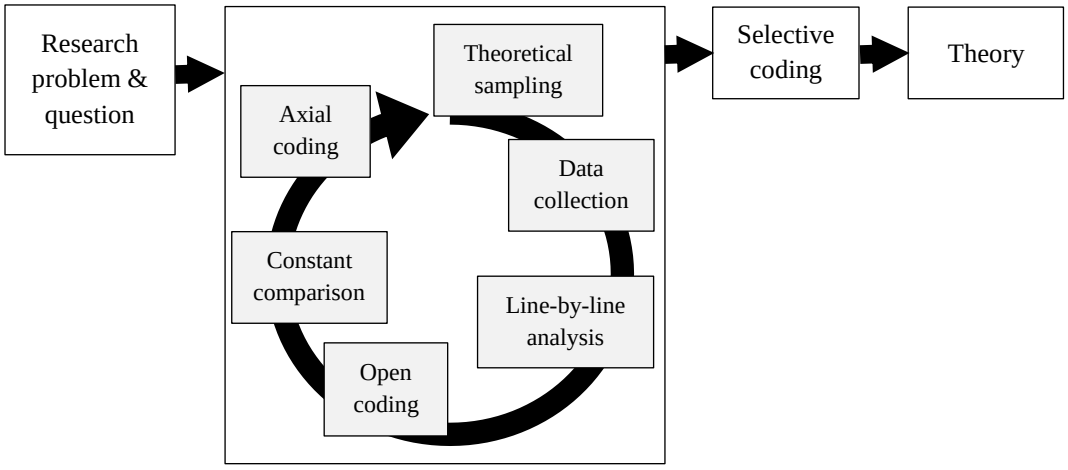
This study also employs four different organizations that represent the enterprise blockchain ecosystem. This study uses pseudonyms when explaining informants' and organizations' profiles to uphold the research code of ethics. Informants agree to be published while maintaining their confidentiality. Therefore, this study uses Enterprise 1, Enterprise 2, Enterprise 3, and Enterprise 4 to represent the organizations' actual names. This study further conducts preliminary studies to determine prospective informants with the following requirements: having more than five years' experience in the enterprise blockchain ecosystem, can represent the organization, are willing to contribute, having excellent communication skills, and willing to allocate an hour for the interview.

Table 1
Informants' Profiles and Interview Duration

Interview	Position	Organization	Duration
Mahmud	Chairman	Enterprise 1	1:15
Katherine	Vice President	Enterprise 2	1:11
Danny	Director	Enterprise 3	1:36
Eduardo	General Manager	Enterprise 4	1:14

We use the value system to explain business model innovation in an enterprise blockchain ecosystem. This study also uses semi-structured interviews (Adams, 2015) and is fully aware that four cases constitute the relevant number to be performed. This research type is resource-intensive and requires adequate skills and knowledge. For this reason, this study uses primary and secondary literature to gain a better understanding of the research topic.

Data validity and reliability are the main challenges of the case study research. Hence, this study applies a research protocol to all cases. The research protocol also serves as the reference in the data collection process because this study involves multiple cases.



Source: Choi et al. (2018)
Figure 3
Coding Process of This Study

This study uses a grounded theory framework to analyze the concepts more structured (Eisenhardt, 1989). The grounded theory analyzes the data using process coding to synthesize data/information obtained from informants (Corbin & Strauss, 1990). The study begins with open coding and translating the data/information conceptually from the informant. Further, the study proceeds with axial coding and ends with selective coding. This coding process takes place iteratively, back and forth. Figure 3 illustrates the coding process. We highly rely on the accuracy of the coding

process synthesis. Thus, the coding results are confirmed by experts and informants to justify the synthesis of the coding process.

ANALYSIS AND DISCUSSION

This study follows the coding process as a tool to analyze findings from in-depth interviews. Then, the interview data are analyzed line by line and via open coding based on a value system to explain the business model innovation model.

Open Coding

We use four concepts in value systems to categorize or group the business model innovation concept: value capture, value creation, value delivery, and value proposition.

Value Capture

The application of blockchain technology in the enterprise ecosystem focuses on improving organizational performance, as indicated by financial performance (Table 2). The use of this technology can improve financial performance by increasing efficiency and productivity.

The technology increases efficiency by reducing transaction costs. Assuming income constant, the use of this technology potentially reduces operational costs such as transaction costs (including fees paid) for using intermediaries or insurance costs. Blockchain reduces transaction costs through a decentralized protocol that allows peer-to-peer interaction between units/organizations. Eventually, increased efficiency improves profits.

> "*For organizations that already have business value, the blockchain system is useful for streamlining business operations*." – Katherine, Enterprise 2

Firms increase their profits also by increasing productivity. A decentralized system of blockchain technology enables organizations to increase their productivity through accurate data/information. In this regard, inaccurate data/information creates inter-unit conflicts and disrupts productivity. Decentralized protocols increase data/information accuracy because users directly input the data and require verification of other parties that causes greater trust between entities than centralized systems.

Table 2
Open Coding of Value Capture

Open Coding	Rationale
Reduce costs	Economic implications of the loss of intermediary parties
Higher margin	Financial performance initiated from increased sales or cost-efficiency

Value Creation

Organizations need to perform their critical activities to initiate organizational business values through blockchain technology (Table 3). The interaction scope is limited on the private blockchain platform and is only viable within the organizations or intra-organization. In the consortium ecosystem, the coverage involves different organizations in particular areas. Thus, business opportunities can be initiated through collaboration models or inter-organizational patterns. The application of blockchain technology in this specific ecosystem adjusts to the limitation of the interaction among the units.

The realization of the interaction patterns on the enterprise ecosystem necessitates imposing constraints on units that have committed to participate in the ecosystem. Simply put, it prevents non-corporating entities from accessing the platform. Before the technology can be operated, organizations registered in the ecosystem must reach an agreement.

> "*The main purpose of adopting blockchain platform in enterprises is to integrate data in an organizational environment using the common system (interoperability) and mutual controls. It also seeks to integrate different entities..."* – Danny, Enterprise 3

The primary premise underlying the operation of an enterprise's blockchain platform is agreement within the ecosystem. Every organization incorporated into the platform must understand the system, as the agreement is embedded in the technology. The agreement aims to avoid disputes that may arise when business activities operate on the blockchain platform.

Table 3
Open Coding of Value Creation

Open Coding	Rationale
Intra-organization	The relationship pattern between entities within the organization
Inter-organization	The relationship pattern among business entities in distinct business ecosystems
Customizable	Adjustment of several blockchain attributes based on the needs and interests of its market segments
Service level agreement	The form of agreement that is approved among nodes and incorporated into the agreement in the system

Value Delivery

As shown in Table 4, value delivery is a mechanism to deliver value propositions to users. A blockchain uses legal procedures to complete business transactions. The legal procedures are governed by algorithmic codes that constitute the law. Due to the closed-system nature of enterprise blockchains, they are immutable. Besides, they utilize code or algorithms to describe business activities. Additionally, the mechanism is strengthened through verification, which involves a small number of nodes in the ecosystem.

In the enterprise blockchain, two-way communication becomes a means of interaction between organizations or units. Each member is required to participate in the system's activities. Along with transaction execution, nodes are required to verify the data/information transaction before execution. This verification aims to reduce exhaustion on every transaction. The transaction can be conducted if it is appropriate. On the other hand, a rejected transaction due to a data/information mismatch cannot be completed. Transactions are permitted only with the approval of other members.

> "*Cryptocurrency like Libra, a Facebook product, can carry out reversible actions following the banking service level agreement. That is the value of Libra compared to Bitcoin that cannot perform those activities*." – Danny, Enterprise 3

The agreement of other nodes is a logical outcome of the enterprise ecosystem's disintermediation process. The transaction is no longer verified by intermediaries thanks to the decentralized protocol. Instead, the blockchain protocol involves nodes embedded in the ecosystem to verify transactions. Member involvement is considered more effective because it allows mutual supervision and involves the parties' interests.

Table 4
Open Coding of Value Delivery

Open Coding	Rationale
Legal procedure	The law inherent in the platform
Algorithm-based	A systematic procedure used to support the blockchain system
Two-way communication	Receive and respond to activities as a consequence of supporting the decentralized system. This mechanism forces the node to monitor both data and information concurrently.
Disintermediation	Relationships receive and respond to data. This mechanism forces the node to monitor and verify transactions simultaneously.

Value Proposition

The use of the blockchain platform in the enterprise ecosystem initiates value transfer or delivery (Table 5). Decentralized protocols define how data/information is

distributed. In other words, transactions only require approval of the data/information distributed in each node. If approved, the data/information transfer process is not necessary. The approval order will execute the process immediately. Additionally, a decentralized system increases cost efficiency by eliminating transaction costs in these activities.

Transaction costs arise because of the intermediary-mediated transaction process. Typically, transaction costs are applied to each service transaction generated by the process. The blockchain's presence permits the abolition of intermediaries. Because of peer-to-peer data/information transactions, transaction costs can be eliminated. However, this system requires the involvement of other nodes to execute data/information exchange and consensus among the nodes.

> *"Transparency on the blockchain platform contributes to the security of data processing. Each node has the same levels of access and roles in data monitoring*." – Eduardo, Enterprise 4

Table 5
Open Coding of Value Proposition

Open Coding	Rationale
Delivery	Transfer value via distributed data; transactions can be completed more quickly.
Cost efficiency	Distributed data improves cost efficiency by eliminating ineffective costs.
Consensus	The agreement mechanisms among nodes support the decentralized system.
Transparency	Distributed data provides each node equal access to the data.

The consensus system in transactions is a fundamental principle of blockchain technology. This character is responsible for securing all transactions between nodes or units inside the enterprise ecosystem. Data/information transparency is required to reach a consensus. Each node or unit on the blockchain platform has equal access. Data/information can be preserved effectively since this system adheres to the witnessing principle in each transaction.

Coding Process

The value capture coding process begins with open coding (Table 6). The findings indicate that the open coding of data/information demonstrates the enterprise ecosystem's use of the blockchain platform, which intends to cut costs and boost profit margins. Therefore, open coding can be synthesized as a cost orientation on axial coding. Meanwhile, in selective coding, profitability is the primary objective of using this platform.

To maximize value capture potential, firms must define their business activities. Open coding generates four concepts: intra-organizational, inter-organizational, customizable, and service-level agreements. The open coding process is synthesized into two notions in axial coding: the interaction form and the corporate platform. The outcomes of intra-organizational and inter-organizational synthesis are used to derive the interaction. Meanwhile, the enterprise platform is built on top of a configurable service-level agreement. The private partnership is a notion developed in selective coding to express the value creation dimension.

Table 6
The Research Coding Process

Dimension	Selective Coding	Axial Coding	Open Coding
Value capture	Profitability	Cost orientation	Cost reduction
			Higher margin
Value creation	Private partnership	Interaction form	Intra-organization
			Inter-organization
		Enterprise platform	Customizable
			Service-level agreement
Value delivery	Smart contract	Automation	Legal procedure
			Algorithm-based
		Peer-to-peer transaction	Two-way communication
			Disintermediation
Value proposition	Operation based	Value transfer	Delivery
			Cost efficiency
		Verifiability	Consensus
			Transparency

Value delivery utilizes a smart contract to operate the blockchain technology. A smart contract is a device that enables the blockchain platform's users to use it. This concept is born out of the axial coding process and manifests itself in automation and peer-to-peer transactions. Automation is an algorithm-based notion that evolves from the legal procedure concept. In contrast, the peer-to-peer transaction notion results from the synthesis of the two-way communication and disintermediation concepts.

When the value proposition dimension is open coded, four notions emerge: delivery, cost-effectiveness, consensus, and transparency. The value transfer and verifiability concepts are created through an axial coding method. Value transfer is the outcome of a synthesis of delivery and cost-efficiency. The verifiability concept is effective because of the synthesis of consensus and transparency. The result of axial coding is the operation-based idea of selective coding.

Discussion

This study empirically shows the potential use of a blockchain in enterprises that is relatively understudied. The use of blockchain offers benefits to all elements of business model innovation. The key benefit provided by the enterprise blockchain ecosystem is increased performance (Di Vaio & Varriale, 2019; Queiroz & Wamba, 2019). The improvement aims to boost profitability by lowering transaction costs and improving organizational productivity (Schmidt & Wagner, 2019). Improving financial performance focuses on transaction cost-driven inefficiencies (Morkunas et al., 2019; Nowiński & Kozma, 2017). Firms must structure their activities through private partnerships to achieve this performance level. A private partnership is a small-scale activity in which firms agree to participate in the ecosystem (Mendling et al., 2018). The firm then utilizes a blockchain, i.e., a smart-contract product, to generate business values within the enterprise ecosystem (Chang et al., 2019). Blockchain technology is used in this ecosystem to optimize organizational performance.

Halal food is an excellent illustration of how blockchain-based supply chains enable business model innovation in the enterprise blockchain ecosystem. A blockchain stimulates change from all elements of the business model innovation. It also seeks to optimize the business process in creating values. Ecosystem's members enable transparent process monitoring. Costs will be more efficient from a value-capture standpoint because the system will be fully monitored by the ecosystem using a confidential identity, removing the need for a centralized system. Additionally, blockchain adoption aims to boost consumer views of a product's halal status. In a blockchain-based supply chain, the value proposition provides unique value propositions (traceability and trackability), potentially expanding the market.

Research Proposition

Although the private and consortium ecosystems have similar characteristics, both of them have fundamental differences. First, the private ecosystem has a more limited scope of interactions, i.e., intra-organization, which is an interaction among units that are still in a single organization. Meanwhile, the consortium ecosystem has a broader range of interactions involving other organizations with different interests to collaborate or inter-organize. Second is the objective of performing the blockchain platform. In private ecosystems, the performance that can be optimized is limited to improvements in a single organization. On the other hand, applying this ecosystem seeks to facilitate common goals or collaboration in the private ecosystem.

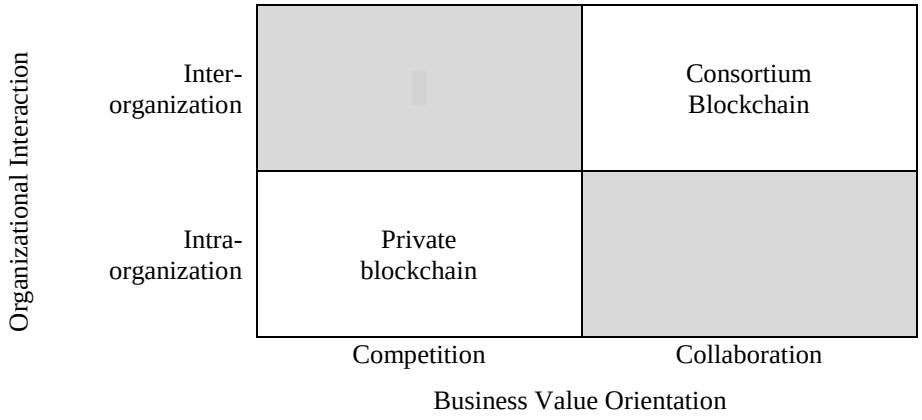


Figure 4
Blockchain Ecosystem Matrix

As seen in Figure 4, we introduce two propositions based on these findings. The results indicate two fundamental ideas in the enterprise ecosystem: interaction structure and business model orientation (Beck & Müller-bloch, 2017). The synthesis results find different insights from the private and consortium ecosystems. The private ecosystem focuses on a single organizational goal: optimizing business performance or competitiveness. On the other side, the consortium ecosystem, which focuses more on inter-organizational interactions, is more concerned with asset utilization (Angelis & Ribeiro, 2019; Swan, 2015).

Thus, the following are the research propositions:

P1: A private blockchain that covers intra-organization interaction facilitates organizational business model innovation to compete.

P2: A consortium blockchain, which involves different entities (inter-organization) in the ecosystem, leverages business model innovation through effective collaboration.

The basic goal of enterprise blockchain use is to maximize firm values. However, differences in interaction modes diverge the ecosystems. Intra-organizational interactions in the private ecosystem focus on internal collaboration. Blockchain technology enables organizations to improve their competitiveness through greater efficiency and productivity. The adoption of these technologies intends to assist organizations in increasing their competitiveness. In contrast to intra-organization, inter-organization provides a broader view by incorporating other

organizations in the business activities. The application of blockchain technology fosters collaboration between various enterprises to achieve common goals.

The readiness of organizations to adopt new paradigms, such as blockchain technology, will be critical to their success in improving their performance. The matrix illustrates that involving other organizations will improve the effectiveness of blockchain technology. A decentralized system is a data/information exchange platform that requires the coexistence of all members to deliver shared goals. Collaboration with other business entities will reduce the blind spots that develop into organizational limitations (Chesbrough, 2003). However, the use of this technology has a logical consequence that is not in line with the existing paradigm. All nodes can fully access data distributed in a system as parts of the ecosystem. The biggest challenge in adopting this technology is not the technology itself but the acceptance of a new way of conducting business. Organizational readiness to adopt new paradigms, including blockchain technology, will be critical to improving organizational performance.

CONCLUSION, LIMITATIONS, AND RECOMMENDATIONS

This study aims to explain the enterprise blockchain ecosystem and business model innovation. Through the value system framework and coding process, the findings show that the role of a blockchain is critical because it offers value capture (blockchain increases organizational profitability), value creation (private partnerships activities that explain how blockchain technology contributes), value delivery (the blockchain application in an enterprise ecosystem through smart-contracts), and value proposition (this platform increases current business values by strengthening organizational operation). Based on these findings, this study explains the significant differences between different enterprise ecosystem forms (private and consortium). This study discusses the different ecosystem characteristics through the matrix. The private ecosystem focuses on leveraging business value through competition, while the consortium ecosystem emphasizes pursuing business value through collaboration.

This study identifies two limitations. First, its qualitative approach inherently suffers the interpretation bias, which can emerge because of the perception differences in available data/information. However, this study confirms the findings to the practitioners and experts to minimize interpretation bias. The second caveat is related to data validity and reliability. Hence, this study uses selected informants and interview protocol to mitigate potential data/information inaccuracies. Overall, this study contributes to the relevant literature and recommends more refined analysis in future studies.

REFERENCES

Adams, W. C. (2015). Conducting semi-structured interviews. In *Handbook of Practical Program Evaluation* (Fourth, pp. 492–505).

Angelis, J., & Ribeiro, E. (2019). Blockchain adoption: A value driver perspective. *Business Horizons*, *62*(3), 307–314. https://doi.org/10.1016/j.bushor.2018.12.001

Baden-Fuller, C., & Haefliger, S. (2013). Business models and technological innovation. *Long Range Planning*, *46*(6), 419–426. https://doi.org/10.1016/j.lrp.2013.08.023

Beck, R., & Müller-bloch, C. (2017). Blockchain as radical innovation: A framework for engaging with distributed ledgers. *Proceedings of the 50th Hawaii International Conference on System Sciences*, 5390–5399.

Berg, C., Davidson, S., & Potts, J. (2019). Blockchain technology as economic infrastructure: Revisiting the electronic markets hypothesis. *Frontiers in Blockchain*, *2*(December), 1–6. https://doi.org/10.3389/fbloc.2019.00022

Bocken, N. M. P., Rana, P., & Short, S. W. (2015). Value mapping for sustainable business thinking. *Journal of Industrial and Production Engineering*, *32*(1), 88–102. https://doi.org/10.1080/21681015.2014.1000399

Böhme, R., Christin, N., Edelman, B., & Moore, T. (2015). Bitcoin: Economics, technology, and governance. *Journal of Economic Perspectives*, *29*(2), 213–238.

Chang, S. E., Chen, Y., & Lu, M. (2019). Supply chain re-engineering using blockchain technology: A case of smart contract based tracking process. *Technological Forecasting & Social Change*, *144*(C), 1–11. https://doi.org/10.1016/j.techfore.2019.03.015

Chen, Y., & Bellavitis, C. (2020). Blockchain disruption and decentralized finance: The rise of decentralized business models. *Journal of Business Venturing Insights*, *13*(June), 1–22. https://doi.org/10.1016/j.jbvi.2019.e00151

Chesbrough, H. (2003). *Open innovation: The new imperative for creating and profiting from technology*. Harvard Business School Press.

Chesbrough, H. (2007). Business model innovation: It's not just about technology anymore. *Strategy and Leadership*, *35*(6), 12–17. https://doi.org/10.1108/10878570710833714

Chesbrough, H., & Rosenbloom, R. S. (2002). The role of the business model in

capturing value from innovation: Evidence from Xerox Corporation's technology spin-off companies. *Industrial and Corporate Change*, *11*(3), 529–555.

Choi, Y. J., Choi, H. B., & O'Donnell, M. (2018). Disaster reintegration model: A qualitative analysis on developing korean disaster mental health support model. *International Journal of Environmental Research and Public Health*, *15*(2), 1–12. https://doi.org/10.3390/ijerph15020362

Corbin, J., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology*, *13*(1), 3–21.

Crosby, M., Nachiappan, Pattanayak, P., Verma, S., & Kalyanaraman, V. (2016). Blockchain technology: Beyond bitcoin. In *Applied Innovation Review* (Issue 2).

DaSilva, C. M., & Trkman, P. (2014). Business model: What it is and what it is not. *Long Range Planning*, *47*(6), 379–389. https://doi.org/10.1016/j.lrp.2013.08.004

Deloitte. (2019). Deloitte's 2019 global blockchain survey blockchain gets down to business. In *Delloite*.

Demil, B., & Lecocq, X. (2010). Business model evolution : In search of dynamic consistency. *Long Range Planning*, *43*(2–3), 227–246. https://doi.org/10.1016/j.lrp.2010.02.004

Di Vaio, A., & Varriale, L. (2019). Blockchain technology in supply chain management for sustainable performance: Evidence from the airport industry. *International Journal of Information Management*, *52*(June), 102–104. https://doi.org/10.1016/j.ijinfomgt.2019.09.010

Dwyer, G. P. (2015). The economics of bitcoin and similar private digital currencies. *Journal of Financial Stability*, *17*(April), 81–91. https://doi.org/10.1016/j.jfs.2014.11.006

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, *14*(4), 532–550. https://doi.org/10.5465/amr.1989.4308385

Halilbegovic, S., Kadic, Z., Celebic, N., Arapovic, A., & Kulovic, D. (2019). Impact of blockchain technology on the payment management systems – What future holds? *European Journal of Economic Studies*, *8*(1), 43–51. https://doi.org/10.13187/es.2019.1.43

Hamida, E. Ben, Brousmiche, K. L., Levard, H., & Thea, E. (2017). Blockchain for

enterprise: Overview, opportunities and challenges. *The Thirteenth International Conference on Wireless and Mobile Communications (ICWMC 2017).*

Hughes, A., Park, A., Kietzmann, J., & Archer-Brown, C. (2019). Beyond bitcoin: What blockchain and distributed ledger technologies mean for firms. *Business Horizons*, *62*(3), 273–281. https://doi.org/10.1016/j.bushor.2019.01.002

Kshetri, N. (2017). Blockchain' s roles in strengthening cybersecurity and protecting privacy. *Telecommunications Policy*, *41*(10), 1027–1038. https://doi.org/10.1016/j.telpol.2017.09.003

Mendling, J., Weber, I., Van Der Aalst, W., Brocke, J. Vom, Cabanillas, C., Daniel, F., Debois, S., Di Ciccio, C., Dumas, M., Dustdar, S., Gal, A., García-Bañuelos, L., Governatori, G., Hull, R., La Rosa, M., Leopold, H., Leymann, F., Recker, J., Reichert, M., … Zhu, L. (2018). Blockchains for business process management - Challenges and opportunities. *ACM Transactions on Management Information Systems*, *9*(1), 1–16. https://doi.org/10.1145/3183367

Morkunas, V. J., Paschen, J., & Boon, E. (2019). How blockchain technologies impact your business model. *Business Horizons*, *62*(3), 295–306. https://doi.org/10.1016/j.bushor.2019.01.009

Nakamoto, S. (2008). *Bitcoin: A peer-to-peer electronic cash system*.

Nowiński, W., & Kozma, M. (2017). How can blockchain technology disrupt the existing business models? *Entrepreneurial Business and Economics Review*, *5*(3), 173–188. https://doi.org/10.15678/EBER.2017.050309

Osterwalder, A., & Pigneur, Y. (2010). *Business model generation* (T. Clark (ed.)). John Willey & Sons.

Queiroz, M. M., & Wamba, S. F. (2019). Blockchain adoption challenges in supply chain: An empirical investigation of the main drivers in India and the USA. *International Journal of Information Management*, *46*(November 2018), 70–82. https://doi.org/10.1016/j.ijinfomgt.2018.11.021

Schaltegger, S., Lüdeke-Freund, F., & Hansen, E. G. (2012). Business cases for sustainability: The role of business model innovation for corporate sustainability. *International Journal of Innovation and Sustainable Development*, *6*(2), 95–119. https://doi.org/10.1504/IJISD.2012.046944

Schmidt, C. G., & Wagner, S. M. (2019). Blockchain and supply chain relations: A transaction cost theory perspective. *Journal of Purchasing and Supply*

Management, *25*(4), 100552. https://doi.org/10.1016/j.pursup.2019.100552

Shin, D. D. H. (2019). Blockchain : The emerging technology of digital trust. *Telematics and Informatics*, *45*(1), 101278. https://doi.org/10.1016/j.tele.2019.101278

Sobh, R., & Perry, C. (2006). Research design and data analysis in realism research. *European Journal of Marketing*, *40*(11–12), 1194–1209. https://doi.org/10.1108/03090560610702777

Swan, M. (2015). *Blueprints for a new economy* (T. McGovern (ed.); First Edit, Vol. 293, Issue 11). O'Reilly Media Inc.

Teece, D. J. (2010). Business models, business strategy and innovation. *Long Range Planning*, *43*(2–3), 172–194. https://doi.org/10.1016/j.lrp.2009.07.003

Wang, H., Chen, K., & Xu, D. (2016). A maturity model for blockchain adoption. *Financial Innovation*, *2*(1), 1–11. https://doi.org/10.1186/s40854-016-0031-z

Warner, K. S. R., & Wäger, M. (2019). Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. *Long Range Planning*, *52*(3), 326–349. https://doi.org/10.1016/j.lrp.2018.12.001

Weking, J., Hein, A., & Hermes, S. (2019). The impact of blockchain technology on business models – a taxonomy and archetypal patterns. *Electronic Markets*, *30*(2), 285–305.

Yin, R. K. (2014). *Case study research: Design and methods* (5th ed.). SAGE Publication, Inc.

Yip, G. S. (2004). Using strategy to change your business model. *Business Strategy Review*, *15*(2), 17–24.

Zhao, J. L., Fan, S., & Yan, J. (2016). Overview of business innovations and research opportunities in blockchain and introduction to the special issue. *Financial Innovation*, *2*(28), 1–7. https://doi.org/10.1186/s40854-016-0049-2

Zott, C., & Amit, R. (2010). Business model design: An activity system perspective. *Long Range Planning*, *43*(2–3), 216–226. https://doi.org/10.1016/j.lrp.2009.07.004