

**CITY UNIVERSITY OF HONG KONG**

香港城市大學

**An Empirical Study on the Adoption Determinants of  
Permissioned Blockchain as Inter-Organizational Systems in  
Hong Kong**

需授權區塊鏈在香港作為跨機構系統的採用決定因素之實證  
研究

**Submitted to**

**College of Business**

商學院

**in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Business Administration**

工商管理學博士學位

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**July 2021**

二零二一年七月

# Abstract

Blockchain is one of the latest digitization technologies which changes how businesses are conducted between trading partners with low trust. It can be categorized into Permissionless Blockchain and Permissioned Blockchain based on its applications. Permissioned Blockchain leverages distributed ledger, smart contract, and decentralized applications and has wide applications in business-to-business transactions. Permissionless Blockchain essentially is the foundation of cryptocurrencies despite it may also leverage Smart Contract and decentralized applications for exchanges such as Non-Fungible Token (NFT).

This research tries to understand what the determinants are of Permissioned Blockchain adoption as Inter-organizational Systems (IOS). In addition, it tries to ascertain the relationship between these determinants and the adoption of Permissioned Blockchain.

Literature on innovation adoption, Blockchain adoption, and Inter-organizational Systems (IOS) was reviewed extensively with several limitations identified. The key ones include the lack of research on Permissioned Blockchain adoption; insufficient understanding of Inter-organizational determinants on Permissioned Blockchain adoption as IOS; insufficient understanding of Permissioned Blockchain adoption determinants from corporate decision's perspective; and the lack of foundation for researching the development of Permissionless & Permissioned Blockchain in next stage.

This research built its theoretical foundation on the TOE Framework with the consideration of Permissioned Blockchain's IOS nature. It is because TOE Framework is the most relevant theory for studying innovation adoption as a corporate decision. The conceptual model proposed an Inter-organizational Context in addition to TOE as Permissioned Blockchain is perceived as a new generation of Inter-organizational Systems (IOS) in this study so inter-organizational factors are crucial to adoption.

A total of 11 independent variables were identified and their relationship with Permissioned Blockchain adoption was examined. Two of them are Permissioned Blockchain specific including the Existence of Blockchain Characteristics and Blockchain Industry Consortium. The investigation is based on a mixed-method research methodology and the selected research location is Hong Kong. It included interviews with 10 CIO-level executives and a questionnaire survey to 212 IT managers. Both adopters and non-adopters were participated to secure a balanced view.

An exploratory approach was taken for analyzing the survey data given this technology is new and new independent variables from literature other than innovation adoption were introduced. This approach is based on Exploratory Factor Analysis and Logistic Regression. The data model demonstrated good validity and reliability through tests. During the factor analysis, it was observed that two constructs, namely Organization Size and Scope of Business, are converged and they were combined for the subsequent Logistic Regression.

In this research, it is found out that Perceived Benefits are important but not the most important determinant. Instead, Top Management Support is the most significant determinant. Technology Maturity is the “diamond in the dirt.” Scale is not important for Permissioned Blockchain adoption. As far as Blockchain-specific factors are concerned, Blockchain Industry Consortium is significant, Blockchain Characteristics is not.

There are several theoretical contributions of this research. First of all, it provides empirical research on Permissioned Blockchain adoption. Secondly, it identifies and ascertains Permissioned Blockchain adoption determinants for the TOE Framework. It also improves understanding of Inter-organizational determinants on Permissioned Blockchain adoption as IOS and Improves understanding of Permissioned Blockchain adoption determinants from corporate decision’s perspective. Last but not the least, it provides a foundation for researching the development of Permissionless & Permissioned Blockchain in their next stage of development.

There are three practical implications of this study. It prepares adopters for their next phase of adoption. It supports non-adopters to make an informed decision in adoption. It also provides valuable insights to those who promote the adoption of Permissioned Blockchain.

The limitation of this research is the generalizability of the result. This study was conducted in the introductory stage of Permissioned Blockchain in Hong Kong. It will be interesting to replicate the study to other countries from a comparative perspective. Countries with proactive government engagement in Permissioned Blockchain adoption, such as Singapore and China, may see a different relationship between the independent variables and adoption.

It is also appropriate to conduct the study again in 3 – 5 years to get a longitudinal view. As the adoption of Permissioned Blockchain increases, the significance of different factors may change. It is meaningful to examine if the maturity of Permissioned Blockchain has any moderating effect on the different adoption determinants.

While the understanding of Permissioned Blockchain starts from its' underlying technology, there are many interesting topics to be studied that are relevant for organizations planning for digitization or transformation. This research is taking the first step to explore the subject matter and hopefully lays a foundation for future studies as a contribution. For example, an interesting observation of this study is the differentiation between individual adoption of Permissioned Blockchain and adoption through Industry Consortium. Going forward, it will be interesting to study and compare the determinants and issues of these two types of adoptions.

We are just at the beginning of a Blockchain era!