แบบจำลองทางเลือกของ UTAUT ที่มีอิทธิพลต่อการยอมรับแพลตฟอร์มการตรวจสอบ ย้อนกลับด้วยบล็อกเชนในห่วงโซ่อุปทานอุตสาหกรรมยางพาราของประเทศไทย

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บทคัดย่อ

การศึกษานี้มีวัตถุประสงค์เพื่อสำรวจปัจจัยที่เกี่ยวข้องกับแพลตฟอร์มบล็อกเชนในการตรวจสอบย้อนกลับ ภายใต้แบบจำลอง UTAUT ที่ตั้งสมมติฐานไว้ และเพื่อพัฒนาแบบจำลอง UTAUT ทางเลือก ที่มีอิทธิพลต่อการนำ แพลตฟอร์มบล็อกเชนในการนำไปใช้ในห่วงโซ่อุปทานอุตสาหกรรมยางพาราของประเทศไทย โดยได้ทดสอบแบบจำลอง UTAUT แบบดั้งเดิมร่วมกับการเพิ่มปัจจัยความวิตกกังวลทางเทคโนโลยี (TA) ซึ่งได้ตั้งสมมติฐานว่ามีอิทธิพลต่อ การยอมรับแพลตฟอร์มบล็อกเชนของผู้มีส่วนได้ส่วนเสีย ในการนี้แบบจำลอง UTAUT แบบดั้งเดิมประกอบด้วยปัจจัย อิทธิพลทางสังคม (SI), เงื่อนไขส่งเสริม (FC), การคาดหวังด้านประสิทธิภาพ (PE) และการคาดหวังด้านความพยายาม (EE) ซึ่งปัจจัยดังกล่าวอาจมีอิทธิพลต่อความตั้งใจในการใช้งาน (BI) กลุ่มตัวอย่าง คือ ผู้มีส่วนได้ส่วนเสีย จำนวน 130 ราย เครื่องมือที่ใช้ในการวิจัย คือ แบบสอบถาม วิเคราะห์ผลการทดลองโดยใช้เทคนิค Structural Equation Modeling (SEM) โดยโปรแกรม Excel และโปรแกรม JAMOVI (เวอร์ชัน 2.6) เพื่อทดสอบแบบจำลอง UTAUT ที่ตั้งสมมติฐานไว้ และแบบจำลอง UTAUT ทางเลือก

ผลการวิจัยพบว่า แบบจำลอง UTAUT ที่ตั้งสมมติฐาน ไม่สอดคล้องกับข้อมูลเชิงประจักษ์ จึงนำเสนอผล การวิเคราะห์แบบจำลอง UTAUT ทางเลือก ซึ่งพบว่าสอดคล้องกับข้อมูลเชิงประจักษ์ โดย BI มีอิทธิพลอย่างชัดเจนต่อ การนำมาใช้ในห่วงโซ่อุปทานอุตสาหกรรมยางพารา จึงสรุปได้ว่า ปัจจัย FC มีอิทธิพลโดยตรงต่อ BI (β = 0.996; p<0.001) ซึ่ง FC สามารถส่งเสริมการขับเคลื่อนบทบาทของผู้มีส่วนได้ส่วนเสียในกระบวนการของห่วงโซ่ยางพารา และ เน้นความสำคัญของ FC เช่น โครงสร้างพื้นฐานด้านเทคโนโลยีสารสนเทศ การปรับปรุงกฎระเบียบให้ทันสมัย และ การฝึกอบรมด้านเทคโนโลยีบล็อกเชนให้แก่ผู้มีส่วนได้ส่วนเสีย อย่างไรก็ตาม ปัจจัย TA, PE, SI และ EE ได้ส่งผลอิทธิพล ทางอ้อมต่อ BI ดังนั้น จากผลการศึกษาดังกล่าว จึงได้มีข้อเสนอแนะสำหรับแต่ละปัจจัยต่อการยางแห่งประเทศไทย เพื่อพิจารณาสนับสนุนและส่งเสริมการนำแพลตฟอร์มบล็อกเชนสำหรับการตรวจสอบย้อนกลับมาใช้ในห่วงโซ่อุปทาน อุตสาหกรรมยางพาราของประเทศไทยต่อไป

คำสำคัญ: แบบจำลอง UTAUT ห่วงโซ่อุปทานยางพารา เทคโนโลยีบล็อกเชน พฤติกรรมการยอมรับ โมเดลทางเลือก

Alternative UTAUT Model Influencing the Adoption of a Blockchain Traceability Platform in the Rubber Industry Supply Chain in Thailand

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Abstract

This study aimed to explore factors related to the blockchain traceability platform within the hypothesis of the Unified Theory of Acceptance and Use of Technology (UTAUT) model and to develop an alternative UTAUT model that influenced the adoption of a blockchain traceability platform in the rubber industry supply chain in Thailand. The study employed the conventional UTAUT model by incorporating the Technological Anxiety (TA) factor, which was hypothesized to influence stakeholders' adoption of the blockchain traceability platform. The conventional UTAUT model included Social Influence (SI), Facilitating Conditions (FC), Performance Expectancy (PE), and Effort Expectancy (EE) factors, all of which were theorized to influence Behavioral Intention (BI). The sample group consisted of 130 stakeholders. The research tool was a questionnaire, and the results were analyzed using Structural Equation Modeling (SEM), utilized Excel and JAMOVI Software (Version 2.6), for statistical analysis, testing both the hypothesis of the UTAUT model and an alternative UTAUT model.

The findings revealed that the hypothesis of the UTAUT model was not consistent with the empirical data. Therefore, an alternative UTAUT model was proposed, which was found to be consistent with the empirical data. In this model, BI had a clear influence on the adoption of blockchain in the rubber supply chain industry. It was concluded that FC had a direct influence on BI ($\beta = 0.996$; $p < 0.001$). FC plays a significant role in driving stakeholder participation in the rubber supply chain process and highlights the importance of facilitating conditions, such as information technology infrastructure, regulatory modernization, and blockchain technology training for stakeholders. However, TA, PE, SI, and EE were found to have an indirect influence on BI. Based on these findings, the study provides specific recommendations for each factor, suggesting that RAOT should support and encourage the adoption of the blockchain traceability platform in Thailand's rubber industry supply chain.

Keywords: UTAUT Model, Rubber Supply Chain, Blockchain Technology, Adoption Behavior, Alternative Model

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169

Introduction

Natural rubber, also known as India rubber, is derived from latex produced by rubber trees. Thailand is the world's leading natural rubber producer, contributing 35% of global production in 2022. In this business line, the Thai government established the Rubber Authority of Thailand (RAOT) in 2015 to support the rubber industry, improve stakeholder livelihoods, and stabilize prices. At the present, RAOT is facing challenges in managing big data related to rubber production and trade, which hinders effective supply chain management and demand forecasting. With the advancement of digital technology, the blockchain technology is considered as a decentralized technology, with its transparency, security, and reliability, offering a potential solution to these challenges by enabling efficient data management and traceability. While the Unified Theory of Acceptance and Use of Technology (UTAUT) framework is interesting for understanding how and why people accept and use technology, it can be useful to solve those challenges of the RAOT in the future (Venkatesh et.al., 2003).

Due to abovementioned in term of stakeholders, RAOT's challenges and a potential technological solution as "Blockchain Traceability Platform", it is important for finding what is an essential key success to the implementation of blockchain in Thai rubber industry. It may be the acceptance of all stakeholders in cooperation with the implementation process. However, it is necessary for the study to find out the factors influencing the way of all stakeholders' acceptance, the UTAUT will be appropriate model to test the acceptance of technology among all stakeholders in rubber supply chain.

Therefore, this study aims to explore the digital technology as the blockchain to overcome challenges by applying the possible Unified Theory of Acceptance and Use of Technology (UTAUT) framework in order to test the factors influencing the adoption of the blockchain technology in the rubber industry supply chain. in Thailand.

Research Objectives

1. To explore factors that are related to the blockchain traceability platform within the hypothesis of the Unified Theory of Acceptance and Use of Technology (UTAUT) model.

2. To develop an alternative UTAUT model that influences the adoption of a blockchain traceability platform in the rubber industry supply chain in Thailand.

Scope of Study Area

1. The scope of contents: The study of five factors including Social Influence (SI), Facilitating Conditions (FC), Performance Expectancy (PE), Effort Expectancy (EE) and Technological Anxiety (TA) that influence the Behavioral Intention (BI).

2. The scope of population and sample size: This research focused on a total of 130 respondents from five groups of stakeholders (farmers, collectors, exporters, government agencies, and

others) in the rubber supply chain in Thailand. Due to the high cost of the technology and limitations of the data server, the study specifically targeted large landowners owning more than 100 rai, as well as the 10 largest businesses registered in the government database, which had a significant impact on the industry.

3. The Scope of Area: Covering five regions and 24 provinces, including the Northern, Central, Northeastern, Eastern, and Southern regions. The sample distribution across these regions is illustrated in Figure 1.

4. The scope of period: November 2023 – April 2024
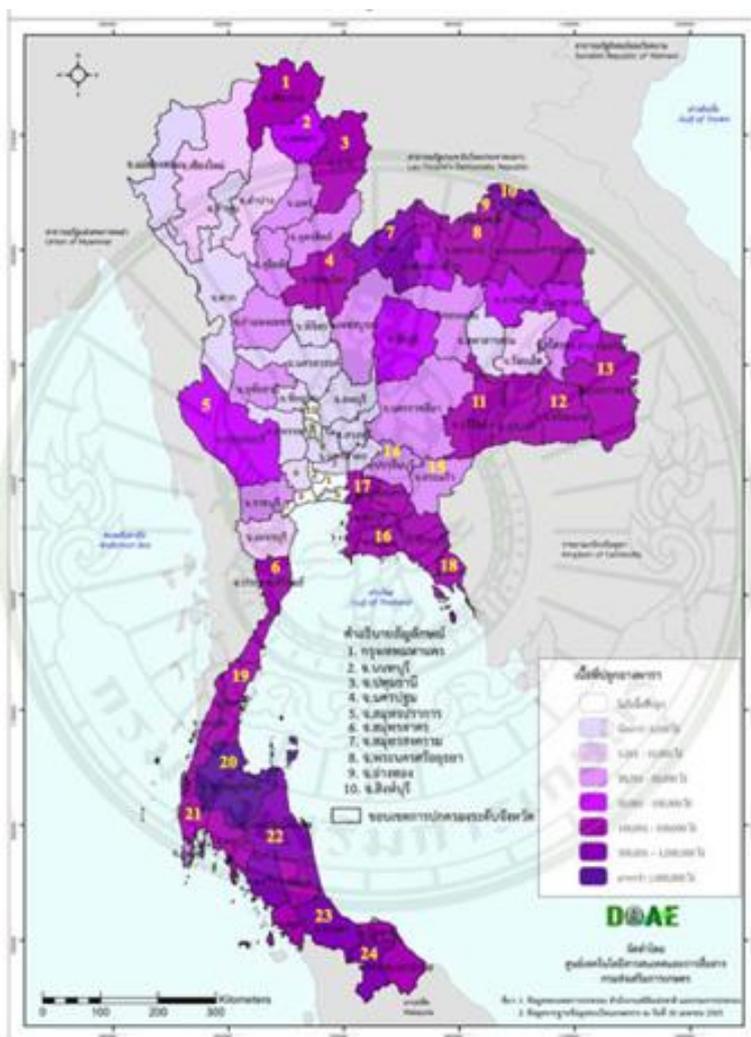
Regions	Provinces
Northern	1. Chiang Rai
	2. Phayao
	3. Nan
	4. Phitsanulok
Central	5. Kanchanaburi
	6. Prachuap Khiri Khan
Northeaste	7. Loei
	8. Udon Thani
	9. Nong Khai
	10. Bueng Kan
	11. Buri Ram
	12. Si Sa Ket
	13.Ubon Ratchathani
Eastern	14. Prachinburi
	15. Sakaeo
	16. Rayong
	17. Chachoengsao
	18. Trat
Southern	19. Chumphon
	20. Surat Thani
	21. Phang Nga
	22. Nakorn Srithammarat
	23. Songkhla
	24. Yala

Figure 1 The Map of Sample Distribution in Rubber Supply Chain
(Adapted from Department of Agricultural Extension (2022).
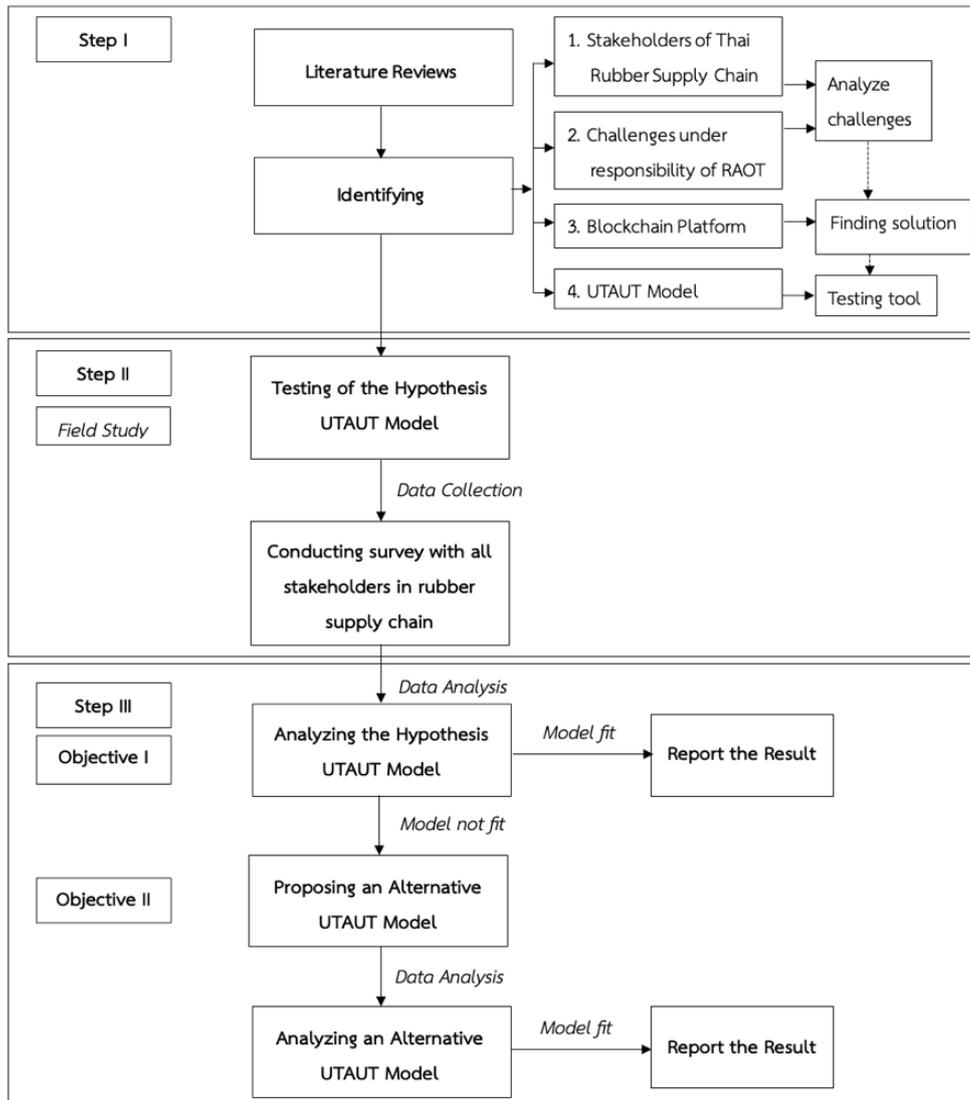
Conceptual Framwork

Figure 2 Conceptual Framwork

Literature Reviews

Thailand's rubber industry, governed by the Rubber Control Act (1999) and the Rubber Authority of Thailand Act (2015), operated through a structured three-tier supply chain (upstream, midstream, downstream), maintaining its global leadership. However, the sector faced price volatility as the major challenge due to supply-demand imbalances, economic slowdowns in key markets (China, the US, Japan), and investor speculation in futures markets. Although supply-demand imbalances were considered a minor challenge, they underscored the need for innovative solutions by RAOT, such as the adoption of blockchain technology to enhance transparency and stabilize the market, especially in relation to the Rubber Trading License Policy, which was the root cause of the lack of data on domestic supply and demand. RAOT needed to address data gaps and improve stakeholder collaboration to strengthen supply chain efficiency and maintain competitiveness.

Thailand's rubber sector faced critical data management challenges, with RAOT struggling to integrate rubber production and trade data across government and private stakeholders. This data fragmentation hindered effective supply chain management and accurate demand forecasting. Blockchain technology offered a transformative solution through its decentralized, transparent ledger system since its 2008 introduction (Nakamoto, 2008; Chang & Chen, 2020). Proven successful in agriculture for traceability and verification (Lin et al., 2020), blockchain could enhance supply chain visibility, improve demand-supply balance and reduce price volatility (Wang et al., 2020).

To understand stakeholder acceptance of blockchain technology in Thailand's rubber industry, this study employed the Unified Theory of Acceptance and Use of Technology (UTAUT) as its theoretical framework. Originally developed by Venkatesh et al. (2003), the conventional UTAUT model examines four factors: (1) Performance Expectancy (PE) refers to the extent to which an individual believes that using a new system will enhance job performance, with this relationship moderated by gender and age (Venkatesh et al., 2003), (2) Effort Expectancy (EE) refers to the degree of ease associated with using a new system, with this relationship moderated by gender, age, and experience (Venkatesh et al., 2003), (3) Social Influence (SI) refers to the extent to which an individual perceives that others' beliefs influence their decision to use a new system, with this relationship moderated by gender, age, experience, and voluntariness (Venkatesh et al., 2003), and (4) Facilitating Conditions (FC) refers to the extent to which an individual believes that an organization's system and technical infrastructure support the use of a new system, with this relationship moderated by age and experience (Venkatesh et al., 2003). This research extended the conventional UTAUT model by incorporating Technological Anxiety (TA) is defined based on Bozionelos (2001) study, which investigated computer anxiety related to the use of computers, an additional factor that Bozionelos (2001) did a research. The hypothesis UTAUT model was visually shown in Figure 2 and supported by previous research findings presented in Table 1.
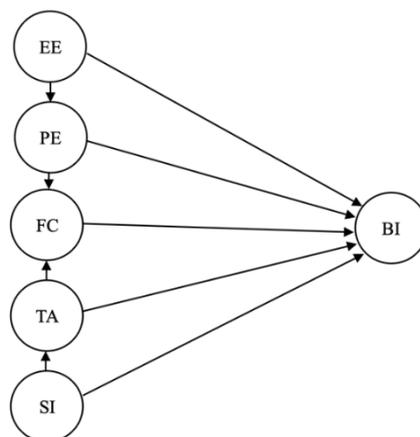

Figure 3 The Hypothesis UTAUT Model with Additional TA Factor
(Adapted from Venkatesh et al., 2003).

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173

Table 1 Previous Studies Related to Various Factors in the UTAUT Model

Author	Category Field	Factors Influenced to BI					FC	PE	TA
		PE	EE	SI	FC	TA	Others		
Budhathoki *et al.*, 2024	ChatGPT	√	√	√	√	√	-	-	-
Popova and Zagulova., 2022	Smart City	√	-	√	-	-	-	FC	-
Smyth *et al.*, 2021	Automated Vehicles	-	-	-	-	-	-	EE	-
Gunasinghe *et al.*, 2019	Education	√	-	-	√	√	-	TA	-

Methodology

1. Data Collection

This study collected data by implementing a constructed questionnaire survey approach. The development process began with focus group meetings involving stakeholders and experts to identify key concerns and challenges related to the study objectives. Insights from these meetings, along with open-ended responses, informed the initial draft of the questionnaire. The draft was reviewed by senior supply chain specialists to ensure alignment with the study's objectives. The final questionnaire designed based on focus group feedback and specialist input (Mazur and Bennett, 2008) included closed-ended questions and a 7-point Likert scale for responses, ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). This scale was chosen to provide greater response variety and better capture stakeholders' perceptions and beliefs (Joshi et al., 2015).

2. Sample Groups

This study determined the sample size for structural equation modeling (SEM) using Analytics Calculators (2024), a widely used tool for calculating sample sizes. The calculation indicated that the recommended minimum sample size was 88 stakeholders from the rubber supply chain industry in Thailand. The research was designed using a multi-stage sampling method, combining stratified random sampling and quota sampling. A total of 130 respondents were selected from five groups of stakeholders in the rubber supply chain across Thailand, covering the northern, northeastern, central, eastern, and southern regions, as shown in Figure 1. The details of the sample groups were as follows.

2.1 Farmers: There were 1,667,095 rubber farming families, most of whom owned areas of 20–30 rai, registered in the government database for growing rubber trees and producing materials such as cup lump, latex, and crepe rubber, which were sold to collectors. This study focused on large landowners, specifically those owning more than 100 rai, who represented 0.01% of the families registered in the government database.

2.2 Collectors: There were around 1,000 middlemen and factories registered in the government database. The middlemen and factory operators purchased natural rubber from farmers, processed it into semi-finished or finished products, and sold it to exporters or other buyers. This study focused on the 10 largest businesses registered in the government database.

2.3 Exporters: There were 38 export companies registered in the government database. They were responsible for exporting semi-finished products (e.g., block rubber, ribbed smoked sheets) and finished products (e.g., tires, medical gloves). This study focused on the 10 largest businesses registered in the government database.

2.4 Government Agencies: The government agencies involved in the Thai rubber supply chain included three key organizations: the Rubber Authority of Thailand (RAOT), the Department of Agriculture (DOA), and the Customs Department. These agencies played important roles in the rubber industry supply chain. This research focused on executives, heads of rubber divisions, and staff responsible for rubber data.

2.5 Others: This group included brokers from the business sector, who facilitated trade within the supply chain, and rubber scholars from government agencies and universities, who contributed academic and technical expertise to the industry.

3. Statistical Data Analysis

Structural Equation Modeling (SEM): SEM was used to analyze the relationships between observed and latent variables, providing a systematic method for testing hypotheses. The proposed modified UTAUT model was evaluated using SEM in five steps, following Schumacker and Lomax's structural thinking framework (Suksawang, 2020), and based on the conceptual framework shown in Figure 2. The study utilized Excel and JAMOVI software (Version 2.6) (The jamovi project, 2024) for statistical analysis. JAMOVI is a modern, user-friendly, open-source alternative to proprietary software such as SPSS, and was applied for testing both the hypothesis and the alternative UTAUT model. Licensed under the GNU General Public License (GPL), it is entirely free and is becoming increasingly popular alongside established tools such as LISREL, AMOS, and Mplus. Its accessibility and ease of use made it an effective choice for data analysis in this study.

Research Results

1. Respondent's General Information

The validity of the questionnaire from the focus group comprised 27 statement items as shown in Annex 1. The results of questionnaire survey was distributed to 130 respondents, with demographic analysis revealing the following key characteristics: Gender: 98% male (typically family heads and key contributors to the rubber industry) and 2% female, Experience: Most respondents have over five years of experience, establishing them as industry specialists, Age: Predominantly between 51-65 years, Occupation: Farmers (31%), collectors (22%), government agencies (22%), exporters (12%), and others, including brokers and rubber scholars (13%). These findings are summarized in Table 2.

Table 2 Respondent's General Information

General Information	Items	Number	Percentage (%)
Gender	Male	128	98%
	Female	2	2%
Age range	51-65		
Experience	Over 5 years	130	100%
Stakeholders	Farmers (F)	40	31%
	Collectors (C)	29	22%
	Government Agencies (G)	29	22%
	Exporters (E)	15	12%
	Others (Brokers, Rubber Scholars) (O)	17	13%
	Total	130	100%

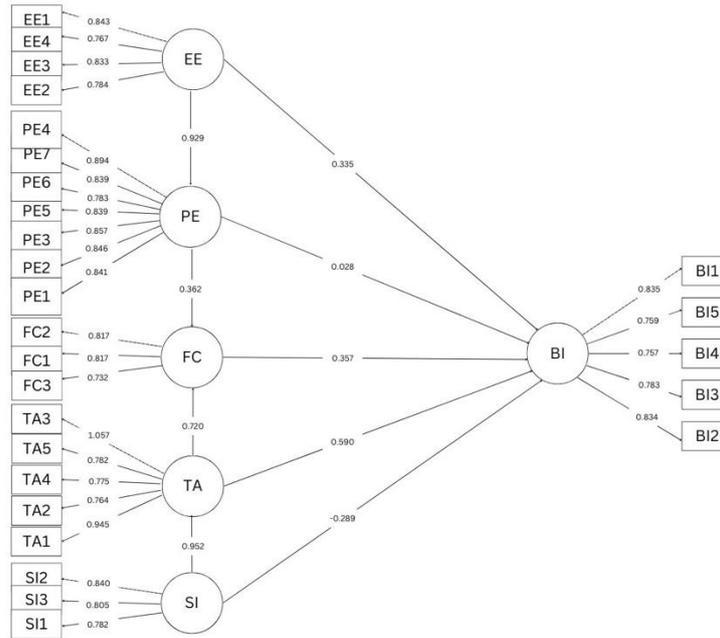## 2. Path Analysis of the Hypothesis UTAUT Model

The analysis consider the β ratios, z ratios, and *p*-values. The acceptance criteria require that the values of β do not exceed the threshold of 1 and are in a positive direction, with $z > 1.96$ being significant at 0.05 or $z > 2.58$ being significant at 0.01, as the rule of thumb. These results must align with the criteria for model fit with $N < 250$ and $12 < m < 30$ which require a Relative Chi-Square of less than 2, RMSEA or SRMR values below 0.08, CFI or TLI values above 0.97 (Hair et al., 2019).

The results showed that the hypothesized UTAUT model was not consistent with the empirical data and could not be accepted, as shown in Table 3 and Figure 4. One possible reason was that the factors had an indirect influence on behavioral intention (BI). Therefore, it was necessary for this study to propose an alternative UTAUT model, developed based on information gathered during the focus group discussion, which better fits the adoption of the blockchain traceability platform, as shown in Table 4 and Figure 5.

Table 3 Path Analysis of the Hypothesis Structural Model

Construct path			β	z	*p*-value	Result
PE	→	BI	0.0281	0.153	0.878	Rejected
EE	→	BI	0.3350	1.091	0.275	Rejected
SI	→	BI	-0.2891	-1.021	0.307	Rejected
FC	→	BI	0.3567	1.534	0.125	Rejected
TA	→	BI	0.5903	1.980	0.048	Accepted
PE	→	FC	0.3618	2.351	0.019	Accepted
TA	→	FC	0.7201	4.650	<.001	Accepted
EE	→	PE	0.9292	20.346	<.001	Accepted
SI	→	TA	0.9516	28.891	<.001	Accepted

Note: m = number of observed variables; N = applies to a number of observations per group when applying CFA to multiple groups at the same time.

176

Alternative UTAUT Model Influencing the Adoption of a Blockchain Traceability Platform in the Rubber Industry Supply Chain in Thailand

Chi-Square (χ2) = 220, df = 214, Relative Chi-Square= 1.8 , *p*-value = 0.377 , RMSEA = 0.015, SRMR = 0.049, CFI = 1.000, TLI = 1.000

Figure 4 The Hypothesis UTAUT Model.
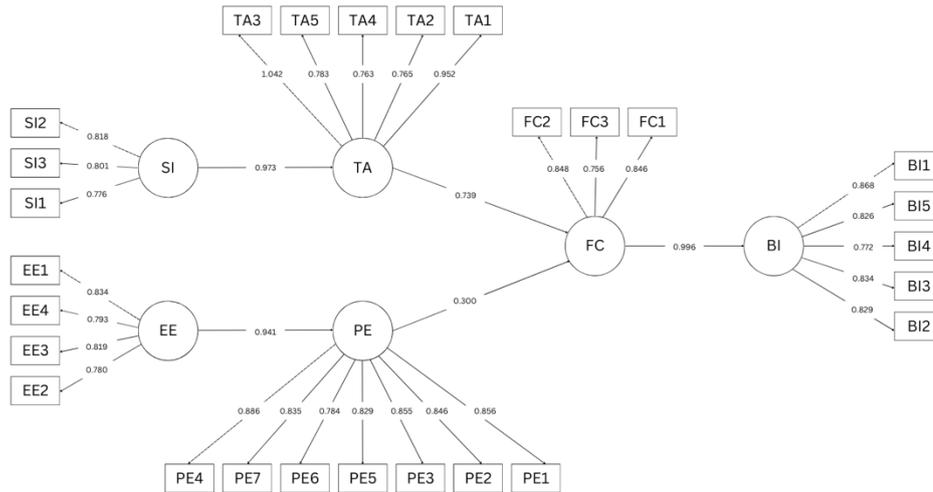
3. Path Analysis of an Alternative UTAUT Model

The analysis consider the β ratios, z ratios, and *p*-values. The acceptance criteria require that the values of β do not exceed the threshold of 1 and are in a positive direction, with z > 1.96 being significant at 0.05 or z > 2.58 being significant at 0.01, as the rule of thumb. These results must align with the criteria for model fit with N < 250 and 12 < m < 30 which require a Relative Chi-Square of less than 2, RMSEA or SRMR values below 0.08, CFI or TLI values above 0.97 (Hair et al., 2019).

The results showed that the alternative UTAUT model was consistent with the empirical data, indicating that the model was a good fit. Moreover, the alternative model included six factors, with the strongest influencing indicators for each factor listed, as shown in Table 4 and Figure 4

Table 4 The Path Analysis of an Alternative UTAUT Model

Construct path	β	z	*p-value*	Result
FC ➡ BI	0.996	28.73	<0.001	Accepted
PE ➡ FC	0.300	2.47	0.013	Accepted
TA ➡ FC	0.739	6.03	<0.001	Accepted
EE ➡ PE	0.941	19.75	<0.001	Accepted
SI ➡ TA	0.973	24.57	<0.001	Accepted

Note: m = number of observed variables; N = applies to a number of observations per group when applying CFA to multiple groups at the same time.

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177

Chi-Square (χ2) = 511, df = 286, Relative Chi-Square= 1.8, *p-value* <0.001, RMSEA = 0.078, SRMR = 0.068, CFI = 0.997, TLI = 0.996

Figure 5 An Alternative UTAUT Model

Discussion and Conclusion

Discussion

1. The effect of the hypothesis UTAUT model on the behavior intention (BI) of a blockchain traceability platform.

These results indicate that the hypothesis based on the UTAUT model, which incorporated the addition of "Technological Anxiety (TA)" from Bozionelos (2001) into the model structure. The model had a non-significant influence on the intention to adopt a blockchain traceability platform in Thailand's rubber industry supply chain, and was therefore rejected, as shown in Table 3 and Figure 4. One possible explanation for these results is that TA, PE, EE, SI, and FC may have an indirect rather than a direct influence on Behavioral Intention (BI). The findings show that only TA had a direct influence on BI, while the other constructs did not. Therefore, it was found that PE and TA influence FC, EE influences PE, and SI influences TA.

2. The effect of an alternative UTAUT model on the behavior intention (BI) of a blockchain traceability platform.

on Behavioral Intention (BI), this study aimed to further explore how individual factors influence BI. Therefore, an alternative UTAUT model was developed by integrating SI, TA, EE, PE, and FC, all of which are consistent with BI toward the adoption of a blockchain traceability platform in Thailand's rubber industry supply chain. The path coefficients of the alternative UTAUT model were constructed based on findings from the hypothesis UTAUT model results and 27 statement items gathered from focus group discussions with stakeholders. The results indicate a positive and significant influence of the alternative UTAUT model on the adoption of the blockchain traceability platform. The contributing factors are as follows

2.1 The factor that directly influences BI is as follows.

2.1.1 FC (**β** = 0.996; *p*< 0.001), as reported by Budhathoki et al. (2024) and Gunasinghe *et al.* (2019). FC refers to the extent to which an individual believes that an organization's systems and technical infrastructure support the use of a new system (Venkatesh et al., 2003).

2.2 The factors indirectly influence BI are as follows.

2.2.1 SI directly influences TA at (**β** = 0.973; *p*<0.001), as reported by RAOT (2024). SI refers to the extent to which an individual perceives that others' beliefs influence their decision to use a new system (Venkatesh et al., 2003). In this result, it is indicated that others' beliefs influence TA.

2.2.2 TA directly influences FC (**β** = 0.739; *p*<0.001), as reported by RAOT (2024). TA is defined based on the study by Bozionelos (2001), which investigated computer anxiety related to the use of computers. The results indicate that computer anxiety influences FC.

2.2.3 EE directly influences PE at (**β** = 0.941; *p*<0.001), as reported by Smyth *et al.*, 2021. Users perceive that the system is not easy to use, as the blockchain traceability platform is an advanced technology that is difficult to understand. This observation is supported by the prior research of Umbas et al. (2022). The results indicate that the the degree of convenience regarding the use of the system influences PE.

2.2.4 PE directly influences FC (**β** = 0.300; *p*<0.013), as reported by Popova and Zagulova., 2022. PE refers to the extent to which an individual believes that using a new system will enhance job performance (Venkatesh et al., 2003). The results indicate that the belief in improved job performance through the use of a new system influences FC.

Hence, the development of an alternative UTAUT model was shown to the consistent with the empirical data, confirming that BI strongly strengthens the process of rubber supply chain by driving the adoption of the blockchain traceability platform rubber industry supply chain in Thailand.

Conclusion

In conclusion, regarding the first objective of this research found out that the hypothesis UTAUT model with 4 original factors plus TA factor does not directly influence BI. Then, TA, PE, EE, SI and FC factors may have some influences between each factors, as the results indicate inconsistencies in terms of the empirical data. Therefore, with these results also guiding to the second objective of this study, the design of an alternative UTAUT model is to develop for finding out which factors influence BI in terms of direct and indirect aspects. It is confirmed that FC directly influences BI (β = 0.996; *p*<0.001), that will strengthen the process of rubber supply chain by the active involvement of all stakeholders. Therefore, it also indicates the importance of facilitating conditions (FC) (e.g. IT infrastructure, updated rules & regulations, capacity building to the blaockchain technology for all stakeholders) to be emphasized in order to promote the adoption of the blockchain traceability platform in Thailand rubber industry supply chain. But TA and PE also directly influence FC, both factors also need some support in

terms of PDPA (Personal Data Protection Act) compliance, Non-rigid system, clear benefit to stakeholders, one-stop system for all, etc.

The study also recommends to RAOT that the adoption of a blockchain traceability platform is highly possible to implement in the supply chain of the rubber industry in Thailand. To achieve the success of the blockchain traceability platform implementation, it is necessary for the RAOT to play a significant and supportive roles such as to updated IT literacy to all stakeholders, proactive and clear communication of the blockchain benefits, modernized rules & regulation, etc. which will actively strengthen the process of supply chain by the involvment of all stakeholders.

Recommendation

This study is the first in Thailand to apply a blockchain traceability platform to the rubber supply chain, focusing on a major sector of the rubber industry by specifically targeting large landowners owning more than 100 rai, as well as the 10 largest businesses registered in the government database, including farmers, collectors, factories, exporters, government agencies, brokers, and experts, all of whom have a significant impact on the industry. Due to its broad scope, the research faces several challenges and limitations, including the complexity of the rubber supply chain industry and the high cost of technology and data servers. It is recommended that future research focus on smaller-scale operations, particularly rubber farmers (1,667,095 farming families) most of whom own areas of 20–30 rai and are registered in the government database or other stakeholder groups.

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แบบจำลองทางเลือกของ UTAUT ที่มีอิทธิพลต่อการยอมรับแพลตฟอร์มการตรวจสอบย้อนกลับด้วยบล็อกเชนในห่วงโซ่อุปทานอุตสาหกรรมยางพาราของประเทศไทย

181