GUIDELINES FOR PROMOTING UNDERSTANDING OF BLOCKCHAIN'S INFLUENCE ON BUSINESS OPERATIONS IN SERVICE SECTOR

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Abstract: The objective of this study is to investigate the level of understanding of blockchain technology for businesses in the service sector and the level of impact of blockchain technology on business operations in the service sector, with the further aim of recommending readiness planning for the impact of blockchain technology on business operations in the service sector. The outcome of the study revealed that participants perceived the overall level of impact of blockchain technology on business operations in the service sector to be at mid-level. However, almost half of the participants were unsure about the level of impact of blockchain technology on business operations in the service sector. The issue about which most participants were uncertain was if the application of blockchain technology in businesses in the service sector could facilitate their work or coordination with suppliers. 58.40% of participants were unsure about this issue. Furthermore, the outcome of the study showed that understanding blockchain technology influenced the impact of blockchain technology on business operations in the service sector and could forecast 61.4% of the impact. As for readiness planning for the impact of blockchain technology on business operations in the service sector, it can be recommended that operators prepare their personnel and human resources, both in terms of numbers and capacity, to respond to changing trends in the market as well as basic understanding about blockchain technology. Operators should also prepare their business infrastructure by setting up a system to develop blockchain technology for management work within their organizations.

Key words: Blockchain Technology/ Service Sector Business/ Impact of Blockchain Technology

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Introduction

In recent years, the dynamics of rapid technological changes, including mobile technology with an instant internet connection, cloud computing, and big data analytics (Center for Risk Management, Mahidol University, 2019), have led to rapid social and economic changes. With the development of information and communication technologies, digitization is essential for the growth of economy, and the improvement of society and the state. Digitalization involves the transition to the communication method, and then data is recorded and transmitted using digital devices (Shkarlet et al., 2020). Increasing the wealth and living standards of residents

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are the primary goals of all nations. Increased productivity and sustainable economic growth depend heavily on realizing profitable and competitive domestic economic activities. The spread of new technologies to multiple sectors enabled by more effective use of human capital and knowledge has led to productivity increases; thus, technological developments are associated with both productivity and higher value-added in economic activities. At the same time, new technological products and services often have high value-added and greater economic welfare (Dahmani, Mabrouki & Ben Youssef, 2022). Particularly for the private sector, taking advantage of digital technology will become an important factor for businesses' growth. As such, several organizations have started to utilize digital technology in modifying their work and delivering concrete business results. To meet the expectations of customers predominantly related to the pace of product innovation and their personalization, in order to provide the necessary flexibility in the production systems, intelligent elements have been introduced in the companies (Stacho, Stachova, Vareckova & Matusova, 2021). In today's world, the data set is enormous. Organizations cannot manage data using old tools due to the size and speed of data processing, which could be done better through big data analysis. One technology that has received a lot of interest in data management technology, which is the basis of organizational management. Blockchain technology is a platform for information storage in the form of distributed ledger technology. All data is connected within a system that guarantees security such that information stored previously could not be altered or edited. All users would see the same data set, with cryptography and distributed computing capabilities as mechanisms for confidence building (Yermack, 2017). The main highlight of blockchain technology, which is a technology for storing information without the need of a third party, causes service businesses that deal with massive information to start adapting and introducing various technologies to support their internal work system, both for customer data management, financial data management, or internal data system without a third party. Hence, blockchain technology presently is the main factor in driving businesses and competitiveness. The first time such a mechanism was used concerned the creation of a safe space for digital currency exchange, or "Bitcoin" (Nakamoto, 2008), which experts worldwide recognize and accept as capable technology. The same technology could be adapted for other business sectors beyond the financial and banking sectors. It could be seen that blockchain technology is starting to be influential in various businesses in the service sector, such as healthcare business which uses it to enhance the security of data sharing across platforms and networks. It could also be applied for educational purposes, counting votes, as well as government work such as data storage and social security and pension payments (Office of the National Broadcasting and Telecommunications Communication, 2017). The service sector has also applied blockchain to speed up response to public demands, increase transparency in information management and increase confidence in getting the right information to consumers. For the retailing sector, blockchain can help manage customer data so that businesses can offer useful information, provide a solution,

and make data more secure (Techsauce media, 2017). In the tourism sector, blockchain can help develop tourism businesses by creating systems for reservations and secure and convenient online payment (Sapsrisopha, J., 2022). The future evolution of blockchain technology centers around the world will depend entirely on each blockchain hub's organizational, technological, and other talent capacities (Lim et al., 2019). FinTech is likely to disrupt and generate a new variety of risks. Regulators around the world are working hard to provide protection to the consumer and maintain good financial stability, and at the same time to create an environment for guarded Fintech and blockchain innovation (Jagtiani & John, 2018). However, it has not gained enough acceptance since blockchain technology is still considered new for Thai business owners and service providers who are still more familiar with traditional services. The role of the academic in the university must provide and promote essential information to the users more and more since an entrepreneurial knowledge-based economy and universities are regarded as a key pillar for growth and welfare (Kirby et al., 2011) and generate creative individuals who will serve as stimuli for economic growth, competitiveness, and innovation (Nelles & Vorley, 2011). Lastly, the government must provide an ecosystem which perceives usefulness, ease of use and practical implications for blockchain and online platforms (Bharadwaj & Deka, 2021).

Study Motivation and Aims

Therefore, the researcher deems it important to study the level of comprehension of blockchain among entrepreneurs and staff of service sector businesses in Thailand, as well as understand and realize that their businesses need to adjust and prepare for changes in service business models, which necessitate integrating blockchain to develop the capacity of businesses and to gain the advantage. Moreover, the researcher will examine the impact of blockchain technology on business operations in service sector businesses and find a way to prepare for the impact of blockchain technology on businesses in the service sector. As a result, the capacity of service sector businesses, which mostly are low productivity industries and hirers of low-skill labor and are basic service providers, could be improved. The service sector in Thailand has not been adding value sustainably. However, service businesses are significant to the country. Bringing in blockchain and applying it to the service sector can add value to the business. Therefore, preparation for the impact of blockchain technology on business operations in the service sector will promote readiness for meeting changes brought about by digital technology and increase international competitiveness. The research had three objectives which are to study the level of technical literacy of blockchain technology for business operations in the service sector, to study the level of impact of blockchain technology on business operations in the service sector and to recommend readiness planning for the impact from blockchain technology on business operations in the service sector.

In this study, the researcher has examined the concept of blockchain technology and its application and usefulness in various sectors, including the business sector, along with the concept of impact of technology which could happen through technology transfer, IT assimilation, technology

acceptance, and digital transformation, as well as the concept of technological literacy. Based on this approach, the researcher has analyzed and concluded a set of recommendations for readiness planning for the impact of blockchain technology on businesses in the service sector. The sample in the study included entrepreneurs and staff/employees of business groups in the service sector in Thailand. The researcher used the maximum sample size, which was 400 persons. For maximum robustness of the research outcome, the researcher expanded the sample size to cover 5 areas, each area with 400 persons, with a total of 2,000 persons. Each area was selected specifically according to the criteria of the highest level of economic activities – namely the provinces of Bangkok, Chiang Mai, Nakhon Ratchasima, Phuket and Chonburi. The researcher used purposive sampling to select participants for informational interviews, with a sample group of business people in the service sector that has applied blockchain in their organizations, for a total of 6 persons. Five provinces with high economic activities are Bangkok, Chiang Mai, Nakhon Ratchasima, Phuket and Chonburi.

Research Methodology

This research employed a mixed method of quantitative research and qualitative research. The researcher employed quantitative research to address research objectives numbers 1 and 2 to understand the level of technological literacy of blockchain for service sector business operations and the level of impact of blockchain technology on service sector business operations. The population in the sample included entrepreneurs and staff/employees of businesses in the service sector in Thailand. Sampling population size was determined by Cochran formula as the true number of populations was unknown. The result of the calculation was 384 persons. However, to maximize comprehensiveness and minimize errors, the researcher chose to use maximum sample size of 400 persons. To enhance research robustness, the researcher expanded the sample group to cover all regions of the country, using multistage sampling as follows:

1) Random selection in specific areas in each region – classifying into 5 regions and selecting provinces with high economic activities to represent each region. For example, Phuket represented the southern region, Chonburi represented the middle and eastern regions, Nakhon Ratchasima represented the northeastern region, Chiang Mai represented the northern region, and Bangkok was the capital. The sample group from each region numbered 400 persons, with an overall total of 2,000 persons.

2) Voluntary selection – sample group was selected from volunteers who participated willingly as well as those who expected compensation. The researcher recruited volunteers through announcements.

3) Snowball selection – for complete and sufficient data collection, sample groups were selected based on possession of desirable qualities by introducing another sample group that could identify the groups with similar qualities. Once achieved, data collection was concluded.

The tool for quantitative research was the questionnaire, both close-ended and open-ended, to investigate how to promote understanding of the influence of blockchain

on business operations in the service sector. Using index of consistency (IOC), the validity test found that the questionnaire had an IOC value between 0.66-1.00, which passed the standard. The questionnaire was also subject to a reliability analysis through a try-out, the result being that the confidence test alpha value was 0.97 and every question had a reliability value within the standard. Therefore, it could be concluded that the questionnaire was a tool fit for the study.

For the quantitative analysis, the researcher collected the data and ran an integrity and accuracy test of the questionnaire based on parts 1-3 of the questionnaire, organized the data by coding, and processed the data by computer using the SPSS program for studying personal factors that influenced the impact of blockchain technology on business operations in the service sector. The researcher employed the analytical method of independent sample t-test and one way ANOVA. For the analysis of technological literacy of blockchain in the service sector, which influenced the impact of blockchain technology on business operations in the service sector, the researcher applied a simple linear regression analysis with a significance level of 0.05. The correlation was tested by Pearson's Product Moment Correlation Coefficient.

The researcher employed qualitative research to address research objective number 3: to recommend readiness planning for the impact of blockchain on service sector business operations. The researcher used the purposive selection method to choose the key informants for qualitative research. The criteria for selection were: 2 blockchain technology specialists; 2 representatives of agency responsible for blockchain technology; and 2 businesspersons who have adopted blockchain technology in their organizations. The researcher used interviews as the tool for data collection, which had been subjected to a validity test. Before the conclusion was reached, the data collected from interviews was subjected to content analysis, classified and categorized. Results from data analysis served as the basis for the recommendations for readiness planning for the impact of blockchain on service sector business operations.

Research Results

From the personal data of 2,000 persons in the sample group, the research found that the majority of the sample were male, 1,469 persons or 73.50% of the sample size. 917 persons were aged between 40 and 54 years old, equivalent to 45.90% of the sample size. 1,030 persons, or 52 %, were married. 840 persons, or 59.90%, had more than 90,001-baht income per month. 1,198 persons, or 59.90%, had bachelor's degrees. 1,154 persons, or 57.70%, were entrepreneurs in the business sector. 849 persons in the sample, or 42.30%, were employees. 697 persons, or 34.90%, were involved in retailing businesses.

For this topic, the researcher examined three issues: behavior of technological literacy of blockchain in the service sector, test of technological literacy of blockchain, and level of technological literacy of blockchain in service sector business operations. Details are as follows:

1) For the level of behavior of technological literacy of blockchain in the service sector, the researcher found that most of the sample group had a low level of familiarity with blockchain technology. 22.30% of the sample was familiar with blockchain. They also found that 27.40 % of the sample were not familiar with blockchain technology. For the level of understanding of the benefits of blockchain technology for business operations in the service sector, the results showed that most of the sample group had a low level of understanding of blockchain technology. 19% were familiar with the benefits of blockchain technology. The researcher also found that 53.50% of the sample group did not understand the benefits of blockchain technology for business operations in the service sector.

2) Results of the test of technological literacy of blockchain can be explained as follows:

Question 1: Blockchain is a technology for decentralized data storage, true or false? 303 participants (15.10%) answered true. 217 participants (10.90%) answered false. 1,480 participants (74%) were unsure.

Question 2: The security system of blockchain is the storage of data in blocks, which cannot be modified, true or false? 452 participants (22.60%) answered true. 295 participants (14.80%) answered false. 1,253 (62.60%) were unsure.

Question 3: Blockchain needs a third party for data storage and a host for data storage, true or false? 360 participants (18.00%) answered true. 311 participants (15.50%) answered false. 1,329 participants (66.50%) were unsure.

Question 4: No one can access data sending and receiving through data coding mechanisms, true or false? 361 participants (18.10%) answered true. 295 participants (14.80%) answered false. 1,344 participants (67.10%) were unsure.

Question 5: The main features of blockchain are data security and transparency? 304 participants (15.20%) answered true. 294 participants (14.70%) answered false. 1,402 participants (70.10%) were unsure.

Question 6: Blockchain was first mentioned because it was a secured platform for bitcoin exchange, true or false? 303 participants (15.40%) answered true. 298 participants (14.90%) answered false. 1,394 (69.70%) were unsure.

Question 7: Blockchain can be used only for financial and banking businesses, true or false? 338 (16.90%) answered true. 309 (15.50%) answered false. 1,353 participants (67.60%) were unsure.

3) The level of technological literacy of blockchain for business operations in the service sector is summarized in the following table:

Table 1. The level of technological literacy of blockchain for business operations in the service sector.

Technological literacy of blockchain for business operations in the service sector	Group with literacy			Group without literacy	
	x,$^-$	S.D.	Perception level	Frequency	Percentage
1. Blockchain technology helps businesses in the service sector manage their data effectively.	2.64	1.063	middle	1,089	54.50
2. Blockchain technology reduces steps that are unsafe in business procedures.	2.59	.987	low	1,100	55.00
3. Blockchain helps businesses in the service sector conveniently contact and connect data with customers.	2.60	1.028	low	1,136	56.80
4. Clients do not have to go through cumbersome business procedures in the service sector.	2.49	.958	low	1,129	56.50
5. Blockchain helps businesses in the service sector overcome limitations in documentation and errors in data storage, especially for healthcare businesses.	2.56	1.037	low	1,135	56.80
6. Blockchain connects relationships between content creators and clients.	2.55	1.060	low	1,097	54.90
7. Blockchain reduces the gap between business operators and clients.	2.49	.945	low	1,088	54.40
8. Blockchain help to identify the origin of goods and services with certainty.	2.68	1.040	middle	1,120	56.00
9. Blockchain can be applied to service businesses effectively.	2.65	1.015	middle	1,126	56.30
Total	**2.58**	**1.014**	**low**	**-**	**-**

Table 1 demonstrates the level of technological literacy of blockchain for business operations in the service sector. Overall, the study found that participants had a low level of literacy ($\bar{x}$ = 2.58, S.D. = 1.014). When considering the average value of participants' level of literacy, three issues had the highest average value: 1) blockchain could help identify the origin of goods and services with certainty ($\bar{x}$ = 2.68, S.D. = 1.040); 2) blockchain could be applied to service businesses effectively ($\bar{x}$ = 2.65, S.D. = 1.015); 3) blockchain technology would help businesses in the service sector manage their data effectively ($\bar{x}$ = 2.64, S.D. = 1.063).

Nevertheless, the research results regarding technological literacy of blockchain for business operations in the service sector revealed that more than half of the participants answered that they had no knowledge of each issue. The issue with the least knowledge was that blockchain would help businesses in the service sector conveniently contact and connect data with customers (56.80%).

The research results reflected the proportion of the population who did not know blockchain and did not know the benefits for business operations in the service sector. Over 50% of the population was uncertain about information related to blockchain technology. As such, the result of this study corresponds with the World Economic Forum Survey (2015) (as referred to in Office of Digital Economy Promotion, 2017), which found that the total value of transactions conducted on blockchain technology, including bitcoin, was still small when compared to global GDP, accounting for only 0.025%. As such, only a handful of businesses, also those in the service sector, have adopted blockchain technology to add value to goods and services. Nevertheless, the study showed that blockchain technology usage was likely to increase in economic value because various businesses have seen the benefits and importance of adopting blockchain technology in their work. Presently, blockchain technology has been adopted on a wider scale, not limited to only the banking and financial sectors. Furthermore, the study found that most participants, or 72.40%, in the sample group were unsure if they had ever used blockchain technology services, and those who said they never used blockchain technology services accounted for 10.10%. The total of these two groups, or 82.50%, corresponds to the data from the survey conducted with companies in Thailand by the National Science and Technology Development Agency (NSTDA), which found that about 36.80% of companies in Thailand have integrated or implemented digital transformation for sections dealing with customer service within their organizations in a continuous manner. Only 10.50% had a business model which contained digital transformation strategy for adjusting to the market and customers. This reflects the level of readiness of Thai businesses to adopt digital technology to change the way they operate their businesses. Blockchain technology could be considered a type of digital technology for business operations, which could help businesses elevate their capacity and develop strategies for a rapidly evolving society.

The level of impact of blockchain technology on business operation in the service sector

Results of the study on the impact of blockchain technology on business operations in the service sector can be classified into two issues:

1)The level of behavior of adopting blockchain in business operation in the service sector. The outcome showed that the majority of the sample group, or 72.40%, were unsure if they had used blockchain technology service in service business operations, and 76.90% were unsure if they had used blockchain technology service in service business operations in the past 1 month. 68.00% of the sample group were unsure if blockchain technology applications had benefits for service business operation. Regarding the level of understanding of the benefits of blockchain technology for service business operations, it was found that only 10.40% of the sample group were aware of the benefits of blockchain technology for service business operations. In comparison, 70.50 % were unsure of the benefits of blockchain technology for service business operations.

2) The level of the impact of blockchain technology on business operations in the service sector can be summarized in the following table.

Table 2. The level of impact of blockchain technology on business operation in the service sector.

Impact of blockchain technology on business operation in the service sector	Group that experienced impact			Unsure group	
	$\bar{x}$	S.D.	Perception	Frequency	Percentage
1. Application of blockchain technology in service sector businesses can create business opportunities.	3.40	1.029	Medium	1,109	55.55
2. Application of blockchain technology in service sector businesses can reduce the cost of doing business.	3.37	1.025	Medium	1,116	55.80
3. Application of blockchain technology in service sector businesses can help speed up communications with customers.	3.45	.993	Medium	1,132	56.60
4. Business owners or employees are aware of the ability of blockchain technology to enhance efficiency and credibility of data management.	3.31	1.069	Medium	1,162	58.10
5. Application of blockchain technology in service sector businesses can enhance customer confidence.	3.28	.980	Medium	1,096	54.80

Impact of blockchain technology on business operation in the service sector	Group that experienced impact			Unsure group	
	x,⁻	S.D.	Perception	Frequency	Percentage
6. Application of blockchain technology in service sector businesses can facilitate work or coordination with suppliers.	3.13	1.069	Medium	1,168	58.40
7. Application of blockchain technology in service sector businesses can make work more systematic, secure, and faster.	2.49	1.088	Low	1,140	57.00
8. Blockchain technology creates more competition for businesses in the service sector	2.45	1.042	Low	1,099	55.00
9. Blockchain technology can leapfrog the efficacy of business management.	2.39	1.070	Low	1,119	56.00
10. Blockchain technology helps clients access more diverse and cost-effective service businesses.	2.34	1.037	Low	1,127	56.40
11. Application of blockchain technology for data systems of service businesses helps clients receive continuous service without having to provide redundant data.	2.37	1.028	Low	1,075	53.80
12. Application of blockchain technology in service sector businesses allows clients to get faster service.	2.83	1.009	Medium	1,093	54.70
13. Application of blockchain technology in service sector businesses allows clients to get cheaper service.	2.87	.752	Medium	1,084	54.20
14. Application of blockchain technology in service sector businesses allows clients to verify past data in a short amount of time.	2.82	.952	Medium	1,108	55.40
15. Application of blockchain technology in service sector businesses enhances the transparency and security of clients' personal data.	2.90	1.012	Medium	1,099	55.00

Impact of blockchain technology on business operation in the service sector	Group that experienced impact			Unsure group	
	$\bar{x}$	S.D.	Perception	Frequency	Percentage
16. You believe that clients will be protected by law if problems should arise from using blockchain technology in service sector businesses.	2.80	.942	Medium	1,124	56.20
17. Application of blockchain technology in service sector businesses helps protect clients' personal data from privacy risks.	2.85	1.061	Medium	1,074	53.70
18. Clients can set their privacy to allow business owners or service business staff to access their personal data.	2.98	.697	Medium	1,086	54.30
Total	**2.89**	**.996**	**Medium**	-	-

Table 2 illustrates the level of impact of blockchain technology on business operations in the service sector. Overall, participants who responded to the questionnaire experienced mid-level impact ($\bar{x}$ = 2.89, S.D. = .996). When considering the average value of impact experienced by participants, the researcher found that three issues with the highest average value were: application of blockchain technology in service sector business would help speed up communications with customers ($\bar{x}$ = 3.45, S.D. = .993); application of blockchain technology in service sector businesses would create business opportunities ($\bar{x}$ = 3.40, S.D. = 1.029); and application of blockchain technology in service sector business would reduce cost in doing business ($\bar{x}$ = 3.37, S.D. = 1.025). However, it was also found that for each issue regarding the impact of blockchain technology on business operations in the service sector, more than half of the participants responded that they were unsure if they had experienced the impact. Most participants were unsure about the issue that the application of blockchain technology in service sector business would facilitate work or coordination with suppliers, which accounted for 58.40% of the respondents. The study of the level of impact of blockchain technology on business operations in the service sector showed that, overall, participants who responded to the questionnaire experienced mid-level impact. This corresponded to the findings of the research by (Somnuxpong, 2017) on "Trends and Thailand 4.0 Tourism Market." The said research found that Thailand 4.0 policy influenced the policy of Thailand's tourism industry and tourism market 4.0, which emphasized innovation, technology, and creativity in the management of tourism and tourism market, resulting in the rise of tourism start-up operators that used more technology and creativity, as well as "So Lo Mo" which stood for "Social Local" or "Location and Mobile" tourists who used technology for traveling on their own. This

emergence of a new model for the tourism market which emphasized online marketing reflected the inevitable influence of Thailand 4.0 policy and the impact of blockchain technology. Therefore, the level of impact found in this study reflected the unreadiness of service sector businesses in adjusting to the trends of the new tourism model whereby communications technology would allow customers to exchange knowledge and search for information, sell and buy products and services without borders. Particularly, blockchain technology would make the third party obsolete in managing customers' data within the organization, thereby making service businesses more efficient.

Personal factors that influenced the impact of blockchain technology on business operation in the service sector

The analysis of personal factors that influenced the impact of blockchain technology on business operation in the service sector found that the factors concerning gender, marital status, educational level, and diverse involvement in businesses in the service sector did not affect the differing perceptions about the impact of blockchain technology on business operations in the service sector with the level of significance of 0.05. However, age differences did affect the perceptions of the impact of blockchain technology on business operations in the service sector, with a significance level of 0.05. Participants under 21 years of age would have different perceptions about the impact from those in the age group of 55-73 years and 40-54 years. Participants in the age group of 22-39 years would have different perceptions about the impact from those in the age group of 40-59 years. Similarly, different monthly incomes produced different perceptions about the impact of blockchain technology on business operations in the service sector, with a significance level of 0.05. Participants in the group with a monthly income below 30,000 baht had different perceptions about the impact than those with a monthly income of 30,001-50,000 baht. Those in the monthly income group of 30,001-50,000 baht had different perceptions about the impact from those who had a monthly income of 50,001-70,000 baht, 70,001-90,000 baht, and above 90,0001 baht. For the type of business in the service sector, the researcher found that different types of business in the service sector influenced the different perceptions about the impact of blockchain technology on business operation in the service sector, with a significance level of 0.05. Participants belonging to the tourism business had a different perception about the impact from those in the recruitment business and other types of business. Those who belong to retailing business had different perceptions about the impact from those in the recruitment business, who also had different perceptions from those in the transportation business.

Technological literacy which influenced the impact of blockchain technology on business operation in the service sector

Multiple regression analysis on technological literacy, which influenced the impact of blockchain technology on business operation in the service sector, showed that, with the level of significance of 0.05, the said independent variable could forecast 61.4 % ($R^2 \times 100$) of technological literacy which influenced the impact of

blockchain technology on business operation in the service sector. The multiple correlation coefficient was equal to 0.130, and the standard errors of forecast (S.E.$_{est}$) were equal to 0.286.

Results of Qualitative Analysis

Interviews of the key informants for the issue of the impact of blockchain technology on business operation in the business sector produced two conclusions, as follows:

1) Present-day business operations in the service sector of Thailand

Thailand's service sector had low labor productivity output compared to other sectors, both in value and growth rate. The main reason for the low productivity of Thai labor force came from the fact that most of them were concentrated in the traditional service sector, which did not rely on technology but rather on low-skilled labor for providing services. The key informants proposed that Thailand's service sector adjusts to the rapidly changing technology and consumer behavior in the digital age. Transformation from traditional services to modern services has been a much-discussed issue. The key informants also proposed a study of the application of Thailand Competitiveness Matrix (TCM) and employment data to identify a concise guideline for supporting the Thai service sector according to a variety of growth paths. From this, service business in Thailand could be categorized into four groups: 1) group with capacity, 2) group to be strengthened, 3) group going against world trends and 4) group that must change for survival.

2) Blockchain technology for business operation in the service sector

Blockchain technology has been applied to businesses in the service sector to enable transformation toward modern services, which carry greater economic value. Additionally, blockchain technology could provide solutions for both front end and back-office problems, thereby increasing income and reducing redundant costs for businesses. Blockchain was also an important technology that would help improve the efficiency of business operations in the service sector relating to human resource management. Labor in the service sector was made up mostly of operational workers. Blockchain technology could help manage staff information, such as time attendance, shift management, and payroll, as well as analyze staff performance and how they could provide more efficient service for each customer. Blockchain could also help with accounting and budget management. Most businesses in the service sector had costs from paying interest rates on loans. Blockchain technology could support data management to identify whether the current account management of the company was in good standing, as well as report and analyze the current financial situation of the company regarding its debt management, earnings, profits, and losses so that the company could better manage its finances. Most importantly, blockchain technology had a role in business data management, which could be used to improve operations and marketing and verify information, especially for the security of data that was being sent both within and outside the organization.

3. Readiness planning for the impact of blockchain technology on business operation in the service sector

3.1 Personnel and human resources: when taking steps to make preparations for adopting blockchain technology for businesses in the service sector, actions should be taken to prepare personnel or staff. There should be enough personnel who should also have the skills that keep up with the changing markets, as well as basic knowledge and understanding of blockchain technology. The personnel could be divided into two groups. The first group of personnel, comprising those with skills in science, technology, engineering, and mathematics, should have knowledge about blockchain technology. They would be responsible for laying down the infrastructure for adopting blockchain technology and developing and operating its system for business operations. The second group of personnel comprised those with technological literacy of blockchain and its adoption for the organization. This group did not necessarily have to possess the ability to develop a blockchain system. Still, it must possess knowledge and understanding about operating the organizations' blockchain system, for example, financial management system or customer data management system, which depends on the security feature of blockchain technology. Therefore, companies that wanted to introduce blockchain technology into their organizations needed to provide their personnel with basic understanding and knowledge about blockchain technology in the service sector, as well as how to operate it.

3.2 Business infrastructure: businesses in the service sector should lay down the system for developing blocking technology for managing work within their organizations. To reduce cost, companies should invest in creating a good infrastructure that would increase the efficacy of their internal blockchain systems and build a blockchain ecosystem. The ability to push forward and further develop blockchain technology concretely and sustainably depends on an enabling blockchain ecosystem. Like businesses and start-up companies in the industrial sector, businesses in the service sector must create an ecosystem or atmosphere that enables the adoption of blockchain technology in their organizations.

Conclusion

The researcher proposes two main recommendations as follows:
1) Presently, Thailand's national development policy is the Thailand 4.0 policy, which emphasizes digital technology and innovation in national development. Blockchain technology is a very influential technology. It features very high security for data storage, and as such, the concept of blockchain technology is being applied to other digital technologies. Government agencies and other relevant organizations should promote the use of blockchain technology beyond the financial sector and have a clear policy and guidelines for promoting blockchain applications. The service sector should also have the policy to guide the adoption of blockchain, such as the promotion of "smart contracts" for hotel and tourism businesses that can cut out the third party when making contracts or buying products and services.

2) Government agencies do not necessarily have to implement blockchain policy themselves, but they should seriously support other agencies, organizations, or task forces that play a role in promoting and supporting blockchain technology applications. Government agencies can support organizations specializing in blockchain technology, such as Blockchain Centre Bangkok, the first non-profit institution for studying blockchain globally. The Centre was founded by an alliance of public and private agencies that invested in blockchain education, research and curriculum development. In order to drive blockchain policy towards a concrete outcome, Thai governmental agencies should promote and support the Centre's work in educating, organizing activities, and its role as the source of blockchain technology knowledge.

3) The research result for the technological literacy level of blockchain in the sample group has shown that it is at a low level. As the world economy enters the digital age, developing the population's digital skills is a goal of national development. The public should be aware of the importance of blockchain technology because several businesses have started to adopt it for work operations and customer service. In order for the public to keep up with the current technology and its inevitable influence on daily life, they should be educated in the basics of blockchain such that they have a good understanding of it and become capable of efficiently accessing and using it.

4) The government should have a policy for Thailand to become a leader in blockchain technology. The government should recognize the important role of educational institutions or universities, which can produce curriculum and training programs for national blockchain technology development. Emphasis should be given to developing a curriculum of the basics of blockchain, analysis of the technical architecture of blockchain platforms, such as Ethereum and Hyperledger, case studies of the adoption of blockchain technology in various sectors, as well as human resource development for blockchain specialists. Moreover, educational institutions should cooperate with the industrial sector in blockchain research and development so that the studies can have practical applications.

Actionable recommendations

1) Service businesses should be aware of adjusting and keeping up with digital technology. Blockchain can be considered an important technology for data management. The important data for businesses in the service sector is customer data. If customer data could be efficiently managed, it could increase the APA capacity of businesses. However, when adopting blockchain technology, businesses should consider its appropriateness to their business models. As such, they should study the benefits and limitations of blockchain in the context of their businesses and the surrounding environment before developing a system to support business operations. Nevertheless, technology adoption does not concern only system development but also organizational strategy to develop the organizational capacity efficiently.

2) Businesses and organizations should educate their personnel/staff because they are the important business drivers. There should be training sessions or workshops

by experts, prioritizing staff that need to be familiar with blockchain systems. Further training sessions could be held, or they could be in the form of internal knowledge transfer. Overall, staff must have basic knowledge about blockchain technology that is relevant for their work to provide advice and solution.

Acknowledgement

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WYTYCZNE DOTYCZĄCE PROMOWANIA ZROZUMIENIA WPŁYWU BLOCKCHAIN NA DZIAŁALNOŚĆ BIZNESOWĄ W SEKTORZE USŁUG

Streszczenie Celem niniejszego opracowania jest zbadanie poziomu zrozumienia technologii blockchain dla przedsiębiorstw w sektorze usług oraz poziomu wpływu technologii blockchain na działalność biznesową w sektorze usług, z dalszym celem rekomendacji planowania gotowości na wpływ technologia blockchain w działalności biznesowej w sektorze usług. Wyniki badania wykazały, że uczestnicy postrzegali ogólny poziom wpływu technologii blockchain na działalność biznesową w sektorze usług jako średni. Jednak prawie połowa uczestników nie była pewna poziomu wpływu technologii blockchain na działalność biznesową w sektorze usług. Kwestią, co do której większość uczestników była niepewna, było to, czy zastosowanie technologii blockchain w firmach z sektora usług może ułatwić im pracę lub koordynację z dostawcami. 58,40% uczestników było niepewnych tego problemu. Ponadto wyniki badania wykazały, że zrozumienie technologii blockchain wpłynęło na wpływ technologii blockchain na działalność biznesową w sektorze usług i może prognozować 61,4% wpływu. Jeśli chodzi o planowanie gotowości na wpływ technologii blockchain na działalność biznesową w sektorze usług, można rekomendować, aby operatorzy przygotowali swój personel i zasoby ludzkie, zarówno pod względem liczebności, jak i zdolności, do reagowania na zmieniające się trendy na rynku, a także podstawowe zrozumienie technologii blockchain. Operatorzy powinni również przygotować swoją infrastrukturę biznesową, tworząc system do rozwijania technologii blockchain do prac zarządczych w ich organizacjach.

Słowa kluczowe: Technologia Blockchain, Biznes w sektorze usług, Wpływ technologii Blockchain

促进理解区块链对服务业业务运营影响的指南

摘要 本研究的目的是调查服务业企业对区块链技术的理解程度，以及区块链技术对服务业企业运营的影响程度，进一步的目的是针对区块链技术的影响提出准备计划。服务业业务运营的区块链技术。研究结**果**显示，参与者认为区块链技术对服务业业务运营的整体影响处于中等水平。然而，几乎一半的参与者不确定区块链技术对服务业业务运营的影响程度。大多数参与者不确定的问题是，区块链技术在服务业企业中的应用是否可以促进他们的工作或与供应商的协调。 58.40% **的参与者**对此问题不确定。此外，研究结果表明，了解区块链技术会影响区块链技术对服务业业务运营的影响，可以预测 61.4% **的影响。关于区**块链技术对服务业业务运营影响的准备规划，可以建议运营商在数量和能力方面准备其人员和人力资源，以应对市场变化的趋势以及对区块链技术的**基本了解。运营**商还应通过建立一个系统来开发区块链技术以用于其组织内的管理工作，从而准备其业务基础设施

关键词：区块链技术/**服务业业务/区**块链技术的影响