International Journal of Development Administration Research

Marketing Mix Factors Relating the Selective Decision making on Technology Smart Farmer in Agriculture of Thailand

Parita Chaipattarawong
Suan Sunandha Rajabhat University, Bangkok, Thailand
Email: parita.cnorth@gmail.com[1]
Received December 15, 2021 & Revise December 28, 2021 & Accepted December 30, 2021

Abstract

The research objectives represented 1) to study the marketing mix and the selective decision-making on technology smart farmers. 2) to study the relationship between the marketing mix and the selective decision-making on technology smart farmers. The population was the service recipients of Smart Farmer, the 384 samples size of service recipients were determined by the W.G. Cochran formula with 95 percent of confidence. The research instrument represented the questionnaire and collecting data from the sample that was the service recipients of Smart Farmer on the weekend day only. The data analysis statistical approach by percentage, mean and standard deviation, the statistical correlation analysis represented the correlation coefficient. The finding found that marketing mix factors related to the selective decision making on Smart Farmer, in addition, the marketing mix factors focused on the seven factors of the marketing mix as following 1) product 2) place 3) promotion 4) price 5) people 6) process and 7) physical environment.

Keywords: Marketing Mix Factors, Selective Decision making, Smart Farmer

Introduction

The Internet of Things: IoT is a collection of smart devices that are connected to the Internet-capable to play a role as a single unit or as a swarm of heterogeneous devices. The Internet of Things is used in various applications including Smart Cities, Smart environments, Industrial Control, Home Automation, Smart Healthcare, Smart Agriculture, and Smart Farmer. Agriculture is one of the domains that is highly affected by the advancement in the Internet of Things. Agriculture is basic for all humans because it is the primary source of food and plays a critical role in the country's economic growth. Farmers are using traditional techniques, which result in low production and weak decision-making. Therefore, agriculture requires modern technologies like blockchain to increase the production rate. By integrating smart agriculture with low-cost blockchain technology, we can greatly improve monitoring, data sharing, data storage, decision making, and fertilizers efficiency. The Food and Agricultural Organization of the United Nation has predicted that the global population including farmers will reach 9 billion people by 2035 and approximately 9.7 billion people by 2050 (Tzounis et al., 2017). This huge increase in the global population has demanded the provisioning of scalable Block-chain based solutions because traditional techniques cannot fulfill the needs of people. Smart Farming requires the integration of communication and information technologies into sensors and other equipment that are used in agriculture.

Different suppliers produce and manage data according to their needs and requirements. The use of the Internet of Things and modern data collection and analysis techniques further enhance the operations of smart agriculture. However, existing infrastructure needs to address critical challenges such as data sharing to allow the sharing of sensitive agriculture data in a privacy-preserving manner (Chen et al, 2017). Traditional techniques exploit a central server, which is vulnerable to a single point of failure and security breaches. Scalability remains the fundamental challenge with Nakamoto-consensus block-chain platforms. As the number of users increases, the value of the network improves, but still, the scalability problem is unsolved in smart agriculture (Lin et al., 2017). In addition, existing blockchain platforms are not suitable for IoT due to higher cost, higher block generation time, increased transaction latency, and high processing overhead.

Blockchain is a distributed ledger technology that accepts transactions from the users and organizes these transactions into blocks. Each block contains a set of transactions.

The researcher was interested in studying the marketing factors that affected the selective decision making on Smart farmers and expected the finding were the guidelines for planning, improvement, and managerial development for smart farmers with business success, competitive advantage, and survival on the expansion of private agriculture.

Research Objectives

1. To study the marketing mix and the selective decision-making on technology smart farmers.
2. To study the relationship between the marketing mix and the selective decision-making on technology smart farmers.

Literature Reviews

Technology Smart Farmer

Hang et al. (2020) recently proposed a fish farming platform using blockchain for agriculture data integrity. IoT devices are used to remotely monitor the fish farms. The data collected from IoT sensors can be used for analysis and decision-making. They argue that blockchain technology provides various advantages to reduce costs and improve efficiency, there are still some challenges that need special attention. For instance, the consensus algorithms in existing platforms require high computing power which leads to higher transaction confirmation time. Blockchain needs to be connected with the existing legacy system to reduce cost rather than implementing a new system. New data storage mechanisms are necessary to cope with a high volume of agriculture data collected from sensors. In addition, they argue that a custom block-chain implementation is necessary to solve the performance problem. To this end, they propose a public key infrastructure (PKI-based) solution using the hyper ledger Fabric Platform to guarantee agriculture data integrity. They also discuss the limitations of their work including higher implementation and evaluation costs due to PKI and threats to validity.

Jakku et al. (2019) conducted a semi-structured interview with farmers and stakeholders to know their opinions about data usage in smart farming. Results of the analysis reveal that trust and transparency were the critical issues for many participants. These include concerns about the lack of trust in data ownership regulation. Farmers should be able to control their data on their own and make it unavailable to anyone except a limited range of stakeholders. Thus, trust and transparency are the main factors that prevent farmers to participate in traditional smart farming technologies. Nonetheless, block-chains can support the transparent and distributed storage and management of agriculture data to achieve trust and sustainable development in agriculture.

Chen et al. (2017) argue that agriculture and forestry data are the basis for monitoring agriculture and forestry. They propose a data-sharing system for sensors' data of agriculture and forestry. Their centralized data sharing platform is divided into five parts, i.e., data center subsystem, data adapter subsystem, data storage subsystem, data publishing subsystem, and data transmission system. The data center subsystem performs the tasks of registering basic information of the sensor nodes. The data adapter subsystem performs the tasks of collecting and analyzing data from various sensors. The storage subsystem performs the task of data storage while the publishing subsystem provides interfaces to query data. Finally, the transmission system performs the transmission of sensor data. However, this server-type system is based on costly subsystems not suitable for resource owners.

Marketing relate the selective decision making

The consumer purchasing processes were based on the consumers' behavior, sometimes the consumer thinking and acting remained not the similar things, therefore, the analysis of consumer decision-making processes started to begin, the steps of purchasing on products or services selection were the consumer decision making processes as the following steps; 1) the problem recognition 2) the information searching 3) the alternative evaluation 4) the making decision to purchase and 5) the post-purchase behaviors. (Kotler & Armstrong, 2014; Kotler & Keller2016; Chomrat, 2016).

The marketing promotion represented to communicate the product information between buyers and sellers to promote the attitudes and purchasing behavior. Communication may be managed with personal selling by sales personnel or non-personal selling by the media as a communication tool that could be divided into six categories as follows: 1) the advertising 2) the personal selling 3) the sales promotion 4) the publicity and public relations 5) the direct marketing and 6) the events, all of six categories affected the decision to select five-star hotels service. (Kotler & Armstrong, 2014; Kotler & Keller2016; Chomrat, 2016)

The decision-making process of consumers comprised five steps

1. Problem or need recognition occurred from the sole difference of the ideal and the reality which should be fulfilled as following (1) the new needs were happened when the former needs fulfilled (2) the former solutions led to be new problems (3) the personal change both of the physical and qualification maturity (4) the change of family status (5) the change of positive and negative financial status (6) the result of reference group on the cycle life (7) the marketing promotion efficiency

2. Information searching represented the consumers searched the solutions to illustrate their problems from these sources (1) personal searching (2) commercials searching (3) publics searching (4) experimental searching

3. Alternatives evaluation represented the consumers evaluated the information of the second step and made the decision on the best alternative by preparing the specification of each brand and selecting the previous one. The idea of evaluation in alternatives as following (1) attributes and benefit (2) degrees of importance (3) brands believing (4) functional utilizations (5) evaluation procedures

4. The buying decision making represented the individual needed the difference of time and information for decision making

5. The post-purchase behavior represented the consuming experience that could satisfy or un satisfy the consumers, the satisfying resulted in the recommendation to new customers but the unsatisfying affected with the order canceling.

Conceptual framework

Literature reviewing contributed the conceptual framework as bellow.

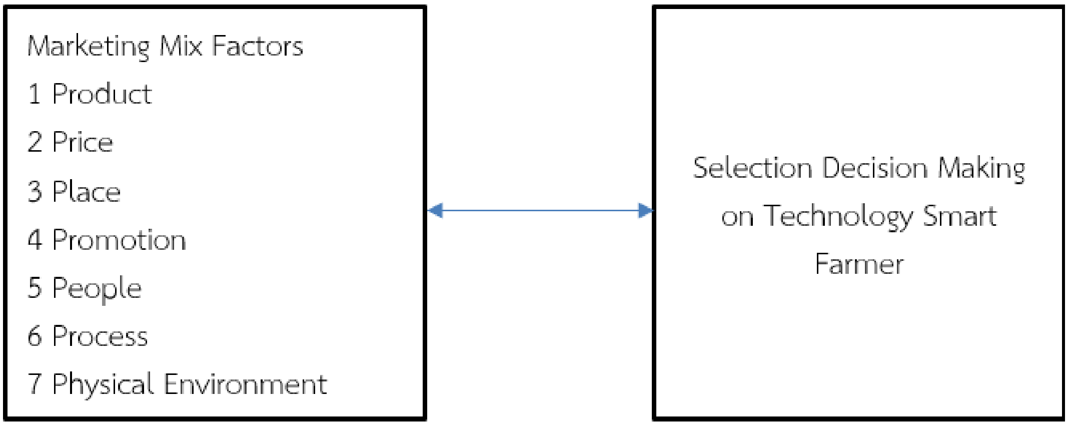

Figure 1 Conceptual Framework

Research Methodology

This research represented the quantitative approach. The population was the service recipients of Smart Farmer. Because of the unknown population, the 384 sample sizes of service recipients were determined from the unknown number of population by W.G. Cochran formula with the 95 percent of confidence. The research instrument represented the questionnaire and collecting data from the samples that were the service recipients of Smart Farmer. The data analysis represented descriptive statistical approach by percentage, mean and standard deviation, the statistical correlation analysis represented the correlation coefficient.

Research results

The research finding found that: 1) the marketing mix and the selective decision making on Smart Farmer of service recipients had moderate to high statistical levels, and 2) the studying of marketing mix relating to the selective decision making on the Smart Farmer was found that both factors were indeed related with the high statistical level with crucial factors including as following 1) product 2) price 3) place 4) promotion 5) people 6) process and 7) physical evidence that indicated the implementation of the marketing mix was necessary for Smart Farmer to stimulus the service recipients.

Conclusion

This paper investigated the major challenges faced by IoT-based smart agriculture and proposes a scalable and distributed data sharing system using a high-performance smart contract platform to meet stakeholders' expectations. The design of our system consists of four tiers: smart agriculture, smart contract, Interplanetary File System (IPFS), and agriculture stakeholders. Unlike the client-server model, IPFS ensures secure data transfer among peers due to a secure and encrypted file- sharing mechanism. The resource owner uses the data sharing smart contract to create, update or revoke data sharing policies in the blockchain. Remote users perform operations on the shared data using smartphones, laptops, or computers. Our approach uses anonymous identities to ensure users' privacy. Our system successfully achieves major security requirements like confidentiality, integrity, and availability.

References

Chen, D. et al. (2017). Development of distributed data sharing platform for multi-source IOT sensor data of agriculture and forestry, Transactions of the Chinese Society of Agricultural Engineering, 33(1), 300–307.

Chomrat, U. (2016). Factors Affecting Workers Purchasing Decisions of Supplementary Food Capsule in Bangkok. Independent Study of Master of Business Administration. Bangkok University.

Cochran, W. G. (1977). Sampling Techniques (3rd ed.). New York: John Wiley& Sons

Eaknarajindawat, N. (2021). Supporting Factors Affecting Area Development at the Special Economic Zone Border, Mukdahan Province. Psychology and Education, 58(4), 2449-2459.

Hang, L. et al. (2020). A Secure fish farm platform based on blockchain for agriculture data integrity. Computers and Electronics in Agriculture, 170, 105-251.

Jakku, E. et al. (2019). If they don't tell us what they do with it, why would we trust them? trust, transparency and benefit-sharing in smart farming. NJAS-Wageningen Journal of Life Sciences, 90, 100285.

Kotler, P., & Armstrong, G. (2014). Principles of Marketing. (15th ed.). Toronto: Pearson Prentice Hall.

Kotler, P., & Keller, K.L. (2016). Marketing management. (15th ed.). Upper Saddle River, New Jersey: Pearson Education.

Lin, Y. P. et al. (2017). Blockchain: The evolutionary next step for ICT e-agriculture. Environments, 4(3), 50.

Tzounis, A. et al. (2017). Internet of things in Agriculture, recent advances and future challenges, Biosystems Engineering, 164, 31–48.