

# Factors influencing the adoption of Agricultural Management Information Systems in Thailand

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**Abstract**—In order to implement information and communication technology (ICT) successfully, it is important to understand the underlying factors that influence Agricultural adoption. Therefore, this research intends to study this perspective of factors that influence and impact successful ICT adoption and related agricultural performance. Case study and survey methodology was adopted for this research. Case studies in two Thai- organizations were carried out. The results of the two main case studies suggested 22 factors that may have an impact on ICT adoption in agriculture in Thailand, which led to the development of the preliminary framework. Next, a survey instrument was developed based on the findings from case studies. Survey questionnaires were gathered from 481 respondents from two large-scale surveys were sent to selected members of Thailand farmer, and Thailand computer to test the research framework. The results indicate that the top five critical factors for ensuring ICT adoption in agricultural were: 1) cost of ICT 2) software 3) training and education 4) farmer attitude to the use of IT, and 5) skill development in ICT. Therefore, it is now clear which factors are influencing ICT adoption and which of those factors are critical success factors for ensuring ICT adoption in agricultural organization.

**Index Terms**—information and communication technology, information and communication technology adoption, factors influencing ICT adoption, agricultural management information systems

## I. INTRODUCTION

In Thailand, agricultural activities such as crop cultivation, livestock, fishery, and forestry are important to the national economy. Thailand's military government in 2016 introduced "Thailand 4.0", an economic model designed to break Thailand out of the middle income trap. For agriculture, Thailand 4.0 aims at a seven-fold increase in average annual income of farmers from 56,450 baht to 390,000 baht by 2037. In the past, Thai farmers have been receptive to technologies and innovations. By the late 20th century, Thailand had progressed from subsistence agriculture to agribusiness, and then to an industrializing economy. Manned by surplus labour and abundant land in rural regions, industrial agriculture took a turn and employed new crop varieties, non-organic fertilizers, and machinery to increase farm productivity and yields [1].

Besides, Thai government could use information technology to better support the Thai farming community. As a tool

for communication with and from farmers (ie. agricultural cooperatives), the government could be better

informed of farmers' needs, and so provide better and more useful services. Information technology could reduce the communication gap between rural communities and the cities. Despite the apparent advantages, Thai agriculture has been slow to introduce and exploit information technology and this is basis of our research project.

Thus, this study aims to investigate factors affecting the adoption of ICT in agricultural in Thailand to enhance firm performance. This paper is structured as follows. The first section provides research methodology and research design. The second section is research reviews and the third is the main focal point in presenting research findings in factors influencing the adoption of agricultural management information systems in Thailand. Finally the paper draws conclusions from the study.

## II. RESEARCH QUESTIONS

The goal of this research is to develop a framework for Factors influencing the adoption of Agricultural Management Information Systems in Thailand. In terms of achieving this objective, the following questions were investigated:

*What factors affecting the adoption of information and communication technology in agricultural in Thailand?*

This research was conducted in agriculture firms in Thailand, which have adopted and implemented information and communication technology.

## III. RESEARCH OBJECTIVE

This research will be conducted of Thai agricultural.

- 1) To study the relationship between factors influencing the use of information technology in agricultural in Thailand.
- 2) To study the critical success factors that could influence the use of information technology in agriculture effecting.
- 3) To provide the substance of knowledge related to information systems management for agricultural.

## IV. LITERATURE REVIEW

This section discusses the theoretical foundations upon which this research is built.

### A. Importance of ICT in Agriculture

The application of ICT in agriculture is increasingly important. E-Agriculture is an emerging field focusing on the enhancement of agricultural and rural development through improved information and communication processes. More specifically, e-Agriculture involves the conceptualization, design, development, evaluation and application of innovative ways to use ICT in the rural domain, with a primary focus on agriculture. E-Agriculture is a relatively new term and we fully expect its scope to change and evolve as our understanding of the area grows [2].

ICT is already displaying the potential to play an essential position within the delivery of this facts to this region in both developed and growing countries [3]. In most cases the base technology is universal, rather than being specific to agriculture [4], and hence usage evolves from existing designs and practices. The FAO distinguishes five broad categories through which ICT are used in the agricultural sector. These are technical and economic development for agricultural producers; community development; research and education; small and medium enterprise (SME) development; and media networks [5, 6, 7]. In the context of agriculture, the potential of information technology (IT) can be assessed broadly under two heads: a) as a tool for direct contribution to agricultural productivity and b) as an indirect tool for empowering farmers to take informed and quality decisions which will have positive impact on the way agriculture and allied activities are conducted. Precision farming, popular in developed countries, extensively uses IT to make direct contribution to agricultural productivity.

The techniques of remote sensing using satellite technology, agronomy and soil sciences are used to increase the rural output. This method is capital intensive and useful in which huge tracts of land are concerned. consequently it's far more suitable for farming taken up on company strains. A benefit of IT is embedded in the organization's products by turning capital and information inputs to higher-value outputs [4]. The general approach is that information technology can be defined as a managerial resource similar to other resources [6]. However, focusing exclusively on information technology or an information system is a supply perspective that assumes that if information is made more easily available and accessible people will use and share it. This is a doubtful assumption. As a result the existence of IT does not assure successful adoption or adoption at all. Different, yet important constraints that are relevant to agricultural production are derived from the characteristics of farm management. The owner has to control production while dealing with all management aspects, mainly on his own. Operating and managing the farm leaves the farm operator little time to adopt computerized information management, let alone acquire proficiency in it. The adoption process itself will depend to a large degree on the farmers' absolute conviction of the benefits from implementing information technology. To all these should be added traditional conservatism, lack of infrastructure, difficulties to access technical support,

and more.

### B. Factors Affecting the Adoption of ICT in Agricultural

Limitations in implementation of ICT and possible solutions include lack of awareness about benefits of ICT - Many people in rural areas have no computer and net get admission to. This contributes to their lack of information of the advantages from using ICT. On the other side, providers of ICT and policymakers are sceptical about ability and willingness of the rural population to accept and use of ICT. Thus, there are small number of projects that improve implementation and use of ICT in agricultural sector and rural areas [7, 8].

*Uncoordinated and chaotic development of systems* - If we take into account huge volume of work related to information systems (IS) improvement for improvement of agriculture, co-ordination mechanism in shape of specialized enterprise need to be created. Easiness of system use and language barriers - success of strategy of ICT implementation in agriculture relies upon on easiness of machine use via rural population. In many instances, information system supporting agriculture are not easy to use and there is lack of appropriate internet information contents suitable to needs and abilities of rural population [7].

*Connectivity* - cost of computers and charges for internet get entry to are nevertheless high for the maximum rural population that is poor in developing countries. Also, availability of internet access is low in rural areas because Internet Service Providers (ISP) delivers services mainly in urban centres [9]. Bandwidth of network - even where cellphone and the alternative communique offerings exist, to be had bandwidth may be problematic for powerful use of networks. Whereas internet services for rural and agricultural areas require intensive use of graphics, low bandwidth of community may be the most important limitation for presenting of electronic offerings to farmers. Storage of static information with software and transfer dynamic information from remote locations could be solved for the limitation.

## V. RESEARCH METHODOLOGIES

In addition, lack of motivation to use computers and internet - despite internet access, users in rural areas have to be motivated for internet use. In order to use internet, farmers and the other individuals in rural areas must have adequate level of competence and skills. Besides explained engagement of unemployed rural agricultural graduates as computer educators in rural areas, the other methods of computer literacy improvement of farmers could be used. Furthermore, lack of online government information - much of potentially vital government information is not available online. Governments in many developing countries do not focus on the poor population in rural areas and do not give them appropriate information and services through internet that could be used for improvement and development of agriculture [9, 10].

This research was conducted in Thai listed agricultural firms, which have adopted and implemented agricultural management information systems. In this study used quantita-

### Internal factors influencing the adoption of agricultural management information systems in Thailand

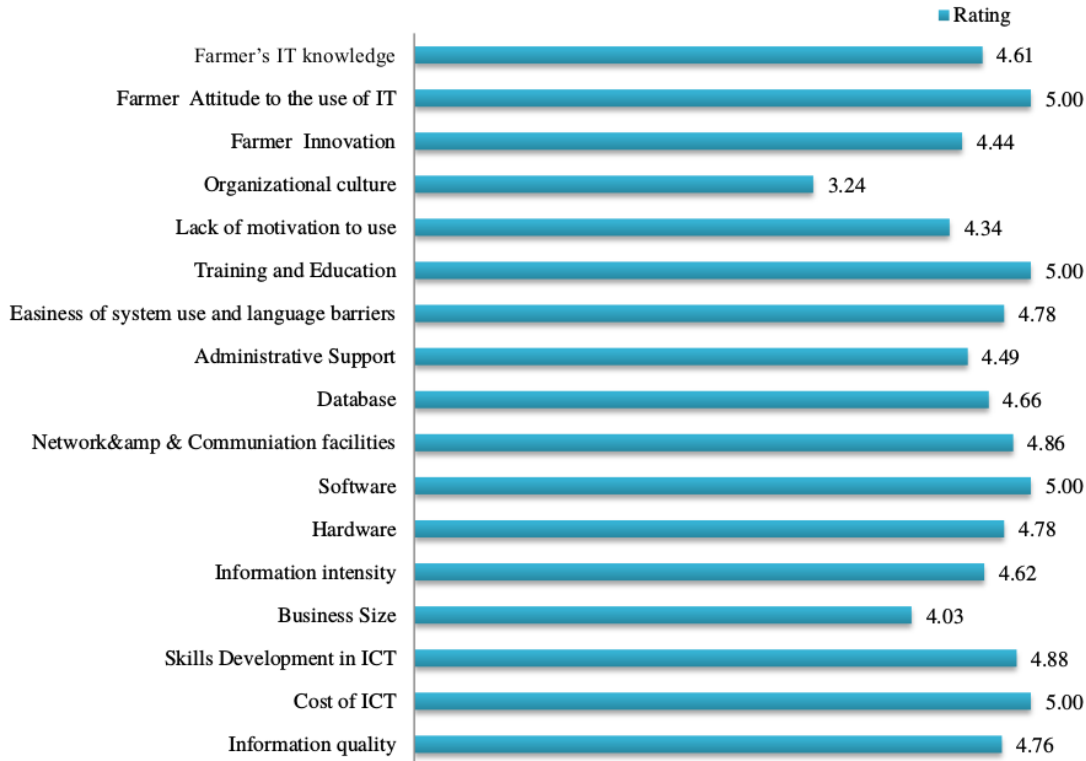


Fig. 1: Internal factors affecting the adoption of ICT in agricultural.

tive and qualitative research approach. In order to achieve the research objectives this research comprised three phases. The first stage involved a detailed and focused literature review, which led to the development of the preliminary research model representing a proactive factors influencing IT competency in Thai agricultural success. The second stage involved verifying the model by pilot case studies in which 25 respondents in smart farm use to provide useful insights into the nature of factors influencing IT competency related to in Thai agricultural. Finally, survey questionnaires were gathered from 481 respondents from two large-scale surveys were sent to selected members of Thailand farmer, and Thailand computer to test the research framework.

## VI. RESEARCH FINDING

### A. Internal influencing the adoption of agricultural management information systems in Thailand

Fig. 1 shows the results of internal factors affecting the adoption of ICT in agricultural from 481 respondents. The majority of the respondents agreed that affecting the adoption of ICT in agricultural are necessary to improve the quality of their work. Fig. 1 shows the ranks and types of affecting the adoption of ICT in agricultural by farmers and IT society in

ascending order of response. They identified all affecting the adoption of ICT in agricultural which are being important.

Respondents were asked to indicate on a scale of five choices consisting of not important agree, little important agree, average important agree, very important agree, and extremely agree. Thai listed agricultural firms have average scores of 5 (extremely agree) addressed factors including cost of ICT, software, training and education, farmer attitude to the use of ICT, information quality, skills development in ICT, information intensity, hardware, network & communication facilities, database, easiness of system use and language, farmer's IT knowledge; an average score of 4 (very important agree) was achieved for farmers including business size, administrative support, lack of motivation to use and farmer innovation. In additionally, firms with an average score of 3 (average important agree) addressed is organizational culture. An average score of less than 3 (little important agree) for any factor was not revealed by the results.

### B. External factors affecting the adoption of ICT in Agricultural

External factors affecting the adoption of ICT in agricultural show in Fig. 2. Respondents were asked to indicate on a scale

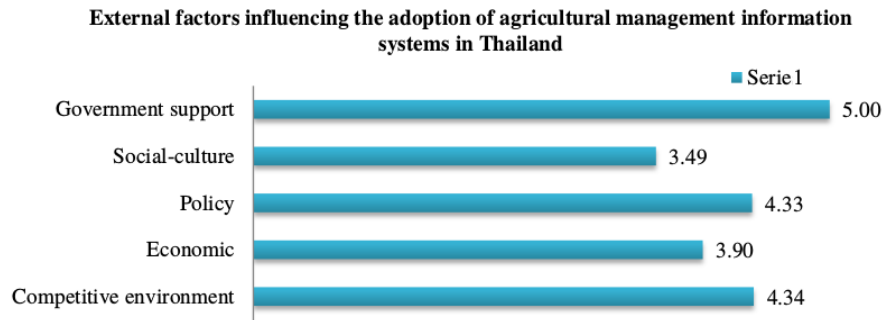


Fig. 2: External factors affecting the adoption of ICT in agricultural.

of five choices consisting of not important agree, little important agree, average important agree, very important agree, and extremely agree. Thai listed organization firms.

have average scores of 5 (extremely agree) referred to the most critical factor was government support; an average score of 4 (very important agree) was achieved for external factors affecting the adoption of ICT in agricultural including competitive environment, economic, policy. Moreover, firms with an average score of 3 (average important agree) addressed is social-culture. A score of less than 3.00 for any factor was not revealed by the results.

## VII. CONCLUSION

Information Technology (IT) has a major role to play in all factors of Thai agriculture. In addition to facilitating farmers in improving the efficiency and productivity of agriculture and allied activities, the potential of IT lies in bringing about an overall qualitative improvement in life by providing timely and quality information inputs for decision making. It was clear that factors affecting the adoption of ICT in agricultural in Thailand and agriculture performance evidently indicate the importance of these 22 factors in ensuring ICT adoption performance.

If organizations focus on those critical success factors, they may be able to evaluate the perception of ICT adoption management in their organizations' agricultural, and ensure the quality of the agricultural information. In addition, they will be able to identify those areas of ICT adoption management where improvements should be made, and improve overall ICT adoption in the future.

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