Kasetsart Journal of Social Sciences 38 (2017) 196–203

Contents lists available at ScienceDirect

Kasetsart Journal of Social Sciences

journal homepage: http://www.elsevier.com/locate/kjss

Information orientation of small-scale farmers' community enterprises in Northern Thailand

Voraphaan Raungpaka, Phannaphatr Savetpanuvong*

College of Management, Mahidol University, Bangkok 10400, Thailand

ARTICLE INFO

Article history:
Received 5 June 2016
Received in revised form 25 August 2016
Accepted 26 August 2016
Available online 4 September 2017

Keywords:
agricultural information,
agribusiness performance,
information management,
information orientation,
small-scale farming

ABSTRACT

Small-scale farmers contribute between 50 and 70 percent of the global food supply; however, in rural areas, small-scale farmers who own factors of production, ineffectively use information in their agribusiness and have inadequate information for decision making as a result of the digital divide and information asymmetry in the agricultural sector. Such phenomena can be attributable to the lack of the application of an information orientation (IO) model in the field of agricultural information management under a developing country context. This paper identified issues on information technology (IT) for agricultural development in rural northern Thailand and explored the agribusiness performance of small-scale farmers' community enterprises based on their IT capabilities. In-depth interviews with 15 experts and focus group discussion with 55 small-scale farmers in rural northern Thailand were employed in this study. By evaluating three IO capabilities of small-scale farmers' community enterprises, the results revealed that they possess a low-to-medium level of information behavior and values (IBV), a low level of information management practices (IMP), and a low level of information technology practices (ITP). The IO study sheds light on the actual issues of the IT capabilities of small-scale farmers' community enterprises that have been ignored in rural Thailand for a long time. The results suggest that there is ability to: (1) develop their agribusiness acumen; (2) detect and identify relevant information; (3) dynamically seek and respond to the changes in their competitive environment; (4) effectively manage their information over the life cycle of information use; and (5) proactively share information and knowledge with peers, local elites, experts, and government officials without language barriers. Achieving these outputs will be the key success factors in leveraging Thai agriculture in rural areas. The work calls for a bold new role for IT in agricultural development with the development of rural areas beyond being merely techno-centric but rather incorporating a human-centric element.

Introduction

The agricultural sector is the upstream part of agricultural and food value chains. The increasing integration of geographical agribusiness chains can be considered both a threat and a challenge for rural development (Trienekens, 2011). Poor small-scale farmers in developing countries who have limited resources and scarce access to markets and information meet major constraints in the adoption of technological innovations and may therefore, be excluded from trade (Ruben, Slingerland, & Nijhoff, 2006). Throughout Thailand, information communication technologies (ICTs) have become increasingly integrated into the dissemination of information to farmers. For decades

* Corresponding author.
E-mail addresses: phannaphatr.sav@mahidol.ac.th, phannaphatr@gmail.com (P. Savetpanuvong).
Peer review under responsibility of Kasetsart University.

http://dx.doi.org/10.1016/j.kjss.2016.08.018

"traditional" forms of ICTs have become more prevalent in advisory service provision. Radio and TV programs feature agricultural information (Sylvester, 2013). However, rural ICTs related to agriculture in Thailand are not well developed compared to developed countries such as Japan, which efficiently utilizes its agricultural resources to expand its manufacturing and research foundation (JFIR, 2009). Furthermore, in remote northern Thailand, small-scale farmers have inadequate information for decision making regarding their agribusiness as a result of the digital divide and information asymmetry in the agricultural sector (Kahan, 2011). Thailand, being an agricultural country, needs to sustain agricultural development for economic growth. One of the policies of the Thai government on agricultural development in the past few years has been to emphasize IT infrastructure investment on hardware, software, and databases (NLA, 2015). However, the key success factors to create conditions for better agribusiness performance are to develop the mindset of small-scale farmers regarding effective information use in their agribusiness, as well as to educate and train them to embrace the right behavior and values for working with relevant information (Marchand, Kettinger, & Rollins, 2000). The information orientation (IO) model of Marchand et al. (2000) was selected to address these IT-related problems affecting the economic agribusiness performance of small-scale farmers' community enterprises in rural northern Thailand, because it demonstrates a distinctive human-centric view in IO. In addition, the model suggests an interaction among humans, technology, and management capabilities to improve business performance (Marchand et al., 2000). To the best of our knowledge, this IO model has never been applied to small-scale farmers in Thailand. The objective of this research was to explore small-scale farmers' community enterprises, based on their IT capabilities. Therefore, the central research question is posited as "To what extent do small-scale farmers' community enterprises perform with regard to information orientation capabilities?"

Literature Review

IT and its business value started to appear in information systems (IS) research in the mid 1990s (Barua, Kriebel, & Mukhopadhyay, 1995; Mukhopadhyay, Kekre, & Kalathur, 1995). Ross, Beath, and Goodhue (1996) identified three key IT assets which together with IT processes would contribute to business value. These three key IT assets were categorized into human assets, technology assets, and relationship assets. Much of this work (Barua et al., 1995; Mukhopadhyay et al., 1995) has attempted to examine the direct connections between IT assets and business performance (for example, creating competitive advantage, lowering cost, enhancing differentiation, and spawning new businesses). Bharadwaj (2000) altered categorization of IT assets to include IT infrastructure, human IT resources, and IT-enabled intangibles. Bharadwaj, Sambamurthy, and Zmud (1999) empirically verified the IT capability and provided a useful tool for benchmarking IT capability and it serves as a foundation for operationalizing a key dependent variable in IT-business value research. Later Bharadwaj (2000) suggested a measurement of IT assets that contribute to firm performance and the future growth potential of firms, with the following dimensions: IT/business partnerships, external linkages, business IT strategic thinking, IT business process integration, IT management, and IT infrastructure. Wade and Hulland (2004) have reviewed many previous IS studies and offered a categorization scheme by developing the following eight key constructs: IS planning and change management, IS infrastructure, IS technical skills, IS development, cost effective IS operation, IS-business partnerships, management of external relationships, and market responsiveness. The link between IT resources and firm performance has been investigated by a number of researchers (Nevo & Wade, 2011; Wade & Hulland, 2004). Marchand et al. (2000) have elaborated the link between IT capability and firm performance and found empirical evidence to support the IO model and showed three separate dimensions of the IO construct. Their study found that information operation, which measures an organization's capabilities to effective manage and use information, influences business performance.

Information Orientation (IO): Objective and the Research Framework

Marchand et al. (2000) proposed the IO model to examine how the interaction of people, information, and technology establishes an orientation towards the use of information and business performance at the organization level. They developed 15 competencies or measures associated with effective information use. These factors were validated using data from a large-scale, cross-sectional survey in 22 countries and 25 industries. The measures were classified into three indicators. The dimensions within each information capability influence an orientation toward information use that is measured as the interaction of the three distinct information capabilities as follows. *Information behavior and values (IBV)* covers the capability of a company to instill and promote behavior and values in its people for effective use of information. This includes integrity, formality, control, transparency, and proactiveness. *Information management practices (IMP)* involves the capability of a company to manage information effectively over the life cycle of information use including sensing, collecting, organizing, processing, and maintaining information. *Information technology practices (ITP)* covers the capabilities of a company to effectively manage IT applications and infrastructure to support operations, business process, innovation, and managerial decision-making. In this empirical investigation, they found that IBV, IMP, and ITP capabilities are critical in determining the performance of an organization. The study indicated that an organization must excel at all three capabilities (in essence, having "high" IO) to achieve superior business performance. Being high in this orientation (IO), predicts higher business performance. Each of the capabilities alone is necessary but not sufficient for higher business performance.

The findings of Marchand et al. (2000) imply that without a solid understanding of the effective use of information and its relationship to business performance, the organization could not identify the information system for

productivity improvement that maximizes IT investment. The IO model provides the theoretical foundation for linking IO and organization performance. While many of the studies (Hsieh, Lai, & Shi, 2006; Kettinger & Marchand, 2011; Marchand et al., 2000; Mithas & Rust, 2016; Peppard & Ward, 2004; Sunil, Ramasubbu, & Sambamurthy, 2011) in IO were carried out in firm settings, they very limited in the context of small-scale farmers' organization or community networks. Due to the fact that small-scale farmers are sharing information based on their common interest without formal commitment with their network fluidity and heterogeneity, the small-scale farmers' community enterprise has its idiosyncrasies. Therefore, the IO model can provide the theoretical foundation for linking IO and agribusiness performance because it demonstrates not only a techno-centric view but also a distinctive view on human centricity in a small-scale farmers' community enterprise. Since the present study focused on small-scale farmers in rural northern Thailand, the following case background is provided.

Case Background: Small-Scale Farmers in Rural Area of Northern Thailand

Thailand at present still confronts multi-dimensional, socio-economic problems especially in rural northern Thailand where farm productivity remains low, and small-scale farmers have been facing a vicious cycle for several decades (Avery, 2016). The vicious cycle of small-scale farmer's poverty at the local and community levels begins with intermediaries and big businesses encouraging small-scale farmers to grow more mono-crops and buy seeds, crop protection, fertilizers, and cultivation equipment from input companies or intermediaries in advance. For decades, intermediaries have given misleading investment advice to low-budget, small-scale farmers who have low agricultural information literacy. Monoculture farming for animal feed and high chemical pesticide usage has led to higher production costs and a high transaction cost which is incurred when buying the above-mentioned factors of production from brokers in advance through debt financing. All factors—including the lack of effective agricultural IO capabilities, mono-crop agriculture, pests, irreversible soil degradation, erosion and overuse of toxic chemicals—contribute to small-scale farmers continually failing to produce successful yields. Brokers then purchase the produce directly from the small-scale farmers, who have weak market IO and little bargaining power. Unfortunately, prices are volatile and crop yields can be unreliable. For many small-scale farmers, the more they produce with low value addition from mono-crop agriculture, the lower their margin and the higher their debt becomes. As information asymmetry and transaction cost issues in agricultural sectors are not solved, this will impair small-scale farmers' well-being and happiness. Previously, low-budget, small-scale farmers had focused on growing crops to sell, but doing so led many into debt. However, after living through a vicious cycle for many years, recently small-scale farmers in the community have begun to cooperate and to help each other by forming a group or organization with an informal structure like small-scale farmers' community enterprises. A small-scale farmers' community enterprise is a collaborative agribusiness arranged as a profit-making, informal organization without legal registration as a juristic person. Its business functions are similar to the value chain of a profit-making enterprise with marketing, production, sales, logistics, finance, and accounting.

Methods

Participants and Data Collection

This was the initial step of the research program, which would pinpoint key issues in IT of agricultural development in rural area of Thailand and explore the agribusiness performance of small-scale farmers' community enterprises based on their IT capabilities. Based on the research framework, a multi-data collection approach was adopted to collect data to explore the research proposition. A qualitative approach with expert, in-depth interviews from multiple fields, focus group discussion, and non-participant, semi-structured interviews were chosen because they can shed light on how the issues of small-scale farmers with regard to IO can be addressed holistically using the dimensions of people, management, and technology. Our research teams collected data in 2016. First, in-depth interviews were held with 15 experts who were selected based on the databases of the Thailand government agencies, NGOs, and universities, which were related to the agricultural sector. Our research teams established the following qualifications as selection criteria for an expert: (1) hold advanced graduate degrees with concentration on agricultural economics, agricultural development, management information systems, or sustainable development; (2) have at least 10 years of experience in agriculture-related areas; (3) work in government agencies or universities in a position to influence national policy and system implementation. Second, focus group discussions were administered with 55 small-scale farmers (local elites, village leaders, community leaders, and villagers in the community) from 10 villages in rural northern Thailand. To record responses to interview questions during the in-depth interview and focus group discussion, note-taking and tape recording techniques were employed. In addition, a critical incident technique was used during the interviews to generate qualitative data (Collis & Hussey, 2003).

Data Analysis

Results were analyzed according to the research model of Marchand et al. (2000). Each IO element was rated using an ordinal scale. The extent of conformity with the elements of Marchand et al. (2000), based on the data, were classified as “low evidence”, “medium evidence” and “high evidence”.

Results

To address the research question on IO assessment for small-scale farmers' community enterprises, the study was carried out by rating IBV, IMP, and ITP. From the focus group discussions and in-depth interviews, small-scale farmers'

community enterprises appeared to have low to medium evidence regarding conformity with the research framework using the three core IO capabilities discussed above. Findings for each core IO capability are shown below in Figure 1.

The results indicated that small-scale farmers' community enterprises with low to medium IO maintained low to medium IBV capabilities, low IMP capabilities and low ITP capabilities. These are discussed below.

Information Behavior and Values (IBV)

The IO model identified six IO components: proactiveness, sharing, transparency, control, formality, and integrity. The IO of small-scale farmers' community enterprises pertaining to effective information use ranked at the low to medium level. Our field data indicated small-scale farmers' community enterprises showed a relatively high ranking for transparency and control but ranked relatively low for the other behavior and values (sharing, pro-activeness, formality, and integrity). Clearly, small-scale farmers' community enterprises with low to medium IO such as the ones in rural northern Thailand may still in some, but not all, have requisite behavior and values as discussed below.

Integrity

In some situations, information was spread in a rumor fashion posing inaccurate information to peers in their group or community enterprise without intention to deceive. This information included market price and demand volume. Moreover, information-receiving farmers were unable to validate the information's integrity because they had low IT accessibility and low official language literacy. One of the experts commented:

> "*Forecast data on agricultural productivity still heavily relies on human judgment, which induces inaccuracy, which affects profit margins of the small-scale farmers.*" (Comment from an expert).

Formality

Informal sources of information from local elites, peers, village leaders, and community leaders are highly trusted in rural areas. Local small-scale farmers normally trust their successful peers in farming groups or the community enterprise. When the farmers perceived that someone else had successful tangible production, this encouraged their eagerness to learn and to apply the knowledge to their own crop areas. The majority of villager leaders commented with the following response:

> "*The knowledge transferors should be residential farmers because they can communicate to the receiving farmers with fewer barriers in the local dialect. Learning from practice and evidence with their own eyes increased their trust in that knowledge body.*" (Comment from village leaders).

Control

The production performance of each small-scale farmer in the group was revealed during the monthly village

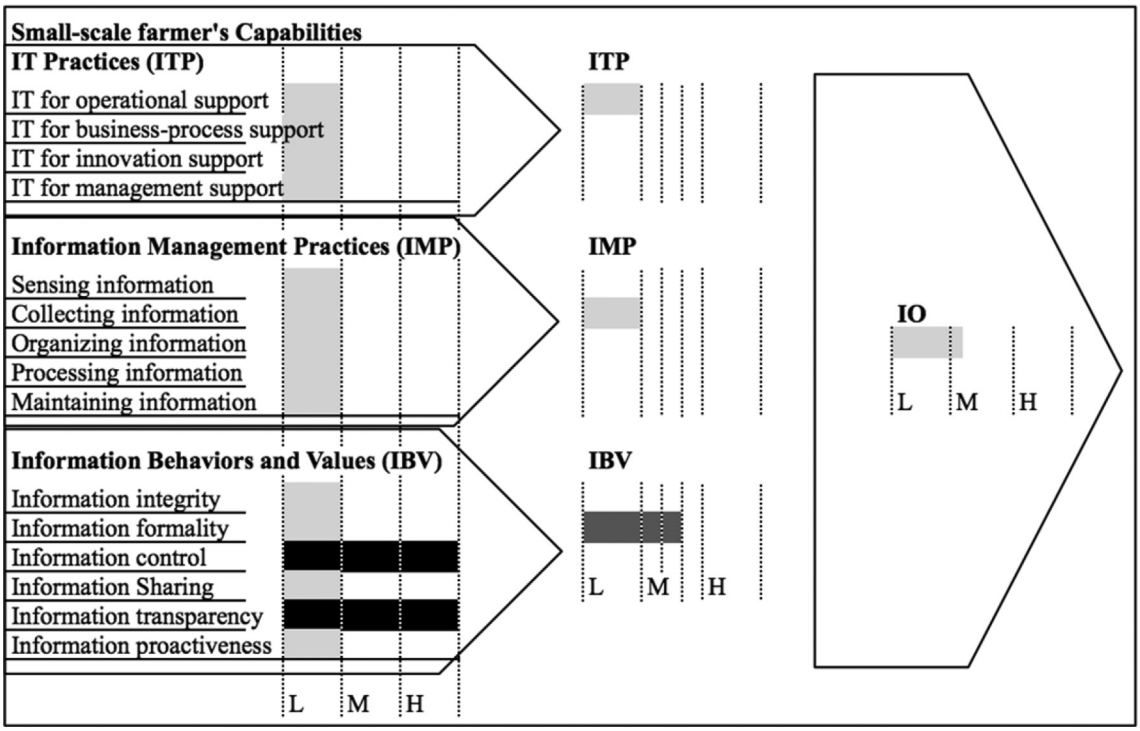

Figure 1 Capabilities of small-scale farmers' community enterprises showing evidence of the three core information capabilities and information orientation measurement
Source: Based on Marchand et al. (2000)

meeting. The aggregation of small-scale farmers is linked in a network fashion attributed to their common interests, also known as local cooperative or community enterprises. Collective information is calculated to assess their bargaining power toward distributors. Increasing the actors in the network is undertaken to ensure economies of scale and scope; increasing the quantity and variety of their agricultural outputs. The majority of interviewees commented that:

"*A meeting is held to address problem-solving informally. There is no fixed schedule like a monthly meeting. The meeting calls on every group for a collaborative effort*." (Comments from village leaders).

Sharing

In rural areas where natural resources (such as land and water) seemed to be scarce, the small-scale farmers' willingness to share knowledge and/or information among their peers in their group or community enterprise was abundant. Knowledge-sharing activity was not regarded as high because the knowledge sharing from local elites was passive. For example, local elites will not go outside their farmland to share their practical knowledge or innovative agricultural methods, but they will await visits by curious farmers who make inquiries. Furthermore, knowledge sharing was active if, and only if, the meeting is organized monthly by their group leader. There was general reciprocation of the contents in knowledge sharing sessions on productivity improvement, tips, and techniques in cultivation from others undertaking best practices, including those in the agricultural extension service department, suppliers, and partners. An example of a relevant comment given by an interviewee is shown below:

"*Knowledge sharing is undertaken in a group-based approach with regard to any innovative agricultural methods. For example, excrement from pig farming can be utilized as biogas to save household expense*." (Comment from a local elite).

Transparency

Within their own groups or community network, members of the small-scale farmers' community enterprises have high trust in each other. Failure from cultivation in the off-season period is something all members can experience even though some farmers feel embarrassed to share their failures, errors, or mistakes. Nevertheless, outside the group, only some unethical intermediaries provide distorted data for their own benefit. The majority of villager leaders commented with the following response:

"*In a situation with production crop failure, a brainstorming session will be conducted to identify the root cause of such deficiency. Every member of the farming community investigates how to continually survive*." (Comments from village leaders).

Proactiveness

The small-scale farmers in their group or community enterprise are normally not exposed to other new environments, which leads to inactivity with regard to external changes. The poor communication skills of small-scale farmers limit their interaction with commercial partners. Some small-scale farmers encountered failure in selling their products directly to market. Thus, they become passive in searching for market signals and depended on information from active intermediaries. Low budget, small-scale farmers place emphasis on their daily earnings and are not proactive in enhancing existing or new products. One of the local elite commented with the following response:

"*Marketing information is essential. Pig farming cannot be financially viable lest a government agency provides us with captive market access. However, the NGO staff facilitate the networking to a commercial entity for our community*." (Comment from a local elite).

However, the formal source of information was usually from government officials and this was often too technical for small-scale farmers; therefore, they depended on local community leaders as a communication bridge between government officials and themselves. The majority of farmers and village leaders who had had miserable experiences with some government agencies commented with the following response:

"*Some government agencies encouraged us to grow macadamia and coffee, but it seems that they did not have the authority to make the subsequent procurement from us. When our coffee produce was rejected, it was kept in storage until it perished*." (Comment from farmer and village leader).

Information Management Practices (IMP)

The IO model identified five IO components: sensing, collecting, processing, organizing, and maintaining. The IMP of small-scale farmers' community enterprises ranked at the low level. Clearly, small-scale farmers' community enterprises have a low information management capacity, as they cannot manage information effectively over the life cycle of information use, as discussed below.

Sensing

As small-scale farmers in the community enterprise are often overburdened with their routine tasks, they spend less time focusing on identifying issues concerning market shifts, customer demands for new products, anticipated problems with suppliers, and competitors' innovations. The low proficiency of small-scale farmers regarding smartphone usage obstructs their access to available agricultural information on the Internet; therefore, they spent some effort on data access via traditional channels such as the telephone and television for information on market prices and demand and supply information. One of the government officers commented with the following response:

"*Information related to agriculture is not inadequate but overloaded. Although there are multiple channels including TV, radio, newspaper, e-mail, websites, and so on, TV is still considered as the highest impact channel in rural areas. However, a TV channel that is dedicated to*

agriculture has not been fully implemented yet." (Comment from an expert).

Currently, the existing information available to small-scale farmers only focuses on the final pricing of economic crops and related raw materials in the mass market and does not cover other aspects of agriculture such as forward prices and the purchase price in niche markets. Furthermore, the demand and production information that is available to farmers is not extensive enough to improve the farmers' planning effectiveness. Our field data indicated that small-scale farmers' information usage and the understanding levels of farmers compared to other parties in the supply chain was very asymmetric. Therefore, this inequality reduced rice market efficiency and adversely affected marginal farmers and small-scale farmers. The majority of experts commented that:

"*There is a lack of insight and information to make informed decisions that can help marginal farmers to plan for their cultivation, marketing and make decisions for trading*." (Comment from an expert).

Collecting, Processing, Organizing, and Maintaining

Our field data indicated that small-scale farmers' time is mainly spent on their overloaded routine tasks and they have limited understanding of information management. As a community enterprise, small-scale farmers still perceived low benefit from the five phases of IO: sensing, collecting, processing, organizing, and maintaining. Hence, inadequate time was reserved for effectively managing operational field or site-specific data over the life cycle of their agricultural production. Our field data indicated that the low level of computer literacy in some rural areas makes data recording at a fundamental level problematic. The majority of experts commented that:

"*There are government-owned, agriculture-related information systems aimed at collecting, analyzing, and disseminating information, but there is just a little input data from marginal farmers*." (Comment from an expert).

Information Technology Practices (ITP)

The IO model identified four levels of IT support: IT for operational support, IT for business processing support, IT for innovation support, and IT for management support. The IO rating of small-scale farmers' community enterprises in rural northern Thailand ranked at the low level. Clearly, small-scale farmers' community enterprises demonstrated low IT capacity as discussed below.

IT for Operation and Business Process Support

Most software/applications which could be utilized to collect and process data on the usage of business processes and the operations of the farm have been developed in the English language and are not available in the local language. There is a lack of user-friendly software/applications in the Thai language for small-scale farmers. Low budget, small-scale farmers' community enterprises did not invest in any software nor did they excel at IT for operational support. The majority of experts commented that:

"*The information system in agricultural sectors has multiple issues from the beginning to the end of the business process*." (Comment from an expert).

IT for Management Support

"*Small-scale farmers adapt their farm management practices and actively enhance agrobiodiversity to suit changing conditions. With intimate knowledge of their natural landscape, small-scale farmers continually conduct experiments and observe subtle changes over time. They integrate new varieties and technologies into their management practices, blending knowledge systems and make decisions based on cultural preferences and local contexts*" (Bragdon & Smith, 2015, p. 3). In Thailand, the current information management systems in the agricultural sector are in silo fashion and not centralized to provide a single view of useful information to farmers; therefore, the available data does not directly benefit farmers. However, future systems should incorporate the forward price of foreign markets and climate and soil conditions in specific areas. For example, data related to rice production and distribution is fragmented and disparate; non integration of data hinders data insight. The majority of experts commented that:

"*The low level of collaboration and integration within and among government agencies and industries gives rise to database islands, disparities, and inconsistencies. In addition, the data is redundant from the different forecast methods; therefore, its accuracy can neither be verified nor traced*." (Comment from an expert).

The inhabitants of cities in Thailand nowadays already have generally available, fast Internet, which is often in a number of variants and from several providers. On the contrary, our field data indicated that rural northern Thailand residents have only very limited Internet connection or in some cases none at all. In fact, there are many houses in rural northern Thailand that have no computer or smartphone. Small-scale farmers in the community enterprise who do not have an Internet-ready smartphone do not access market information, which is most commonly posted on websites and on social networking media. Recently, data have not been accessible by small-scale farmers who have encountered the digital divide. The majority of experts commented that:

"*The digital divide happens between the implementation level and the policymaking level*." (Comment from an expert).

IT for Innovation Support

Innovation systems take different forms depending on a variety of factors including, for example, the country in which it is located, whether agriculture is capital intensive and there is high consumption of inputs, and whether farmers have access to such resources (Coudel, Devautour, Soulard, Faure, & Hubert, 2013). However, an innovation-support system (software) for a small-scale farmers' community enterprise (which can allow them to track potential new customers, identify internal business opportunities, and keep abreast of trends for production innovation and

segment marketing) has not yet been developed in local languages. Furthermore, structurally, there is no centralized agricultural information service center to integrate the demand and production information; therefore, there is a lack of relevant, holistic agricultural information services available directly to farmers. The majority of experts commented that:

> "*Government agencies lack state-of-the-art business intelligence tools to analyze and gain insight into better policy intervention*." (Comment from an expert).

Discussion

The IO model of Marchand et al. (2000) enables some understanding of human development in a farmer's agribusiness community enterprise of IBV. Information sharing is mentioned as one of the measures in IO; however, our results showed that information sharing is essential in creating knowledge and leveraging grass root people's quality of life. In an organization with an informal structure like a small-scale farmers' community enterprise, formal sharing is very important. The knowledge base is neither systematically recorded in books nor in electronic records because the majority of agricultural-knowledge is tacit knowledge, skills, and experience from local elites, which is difficult to transfer. In our settings, ITP, which includes rural ICT infrastructure, cannot be easily improved as is possible in private firms because small-scale farmers' community enterprises and farmer agricultural networks depend on the government for ICT investment. Even though there are plenty of computer software/mobile applications available in agricultural management, none are available in a local language nor do they contextually fit with the IO. Such systems are mainly designed for large agricultural enterprises and not for small-scale farmers' community enterprises. The model of Marchand et al. (2000) describes IT capabilities comprehensively; however, localization of languages and cultural context are not emphasized. In addition, the low level of IMP in farmers' agricultural networks can be improved with the investment of IOT and smart farm management solutions, which will facilitate the sensing, collecting, organizing, processing, and maintenance process in farming.

Conclusion and Recommendations

In rural northern Thailand, small-scale farmers exhibit all of the 15 elements of Marchand et al. (2000) characterizing IO capabilities, but to varying degrees. Evaluation of the three IO capabilities of small-scale farmers' community enterprises revealed that they have a low to medium IO level, possess a low to medium level of IBV, a low level of IMP, and a low level of ITP capabilities. These gaps in people's mindsets and behavior—when paired with the additional deficiencies in IMP and ITP—may result in lower agribusiness performance in small-scale farmers' community enterprises. Government, the public/private sectors, and NGOs can play an important role in accelerating the IMP and ITP capabilities of small-scale farmers' community enterprises and lift their overall IO capabilities and improve their agribusiness performance. A country which incorporates a people-centric rather than merely a technocentric view of information use and is good at all three IO capabilities will improve its agribusiness performance. Leading small-scale farmers to achieve higher IO and attaining superior agribusiness performance takes hard work, persistence, and personal commitment.

Managerial Implications

Our research suggests that the way to help small-scale farmers' community enterprises escape from a vicious cycle to a virtuous cycle and stay sustainably competitive is to concurrently develop all three dimensions of IO. However, information behavior and values (IBV) or human capital is frequently overlooked. The government should play a major role in promoting small-scale farmers' responsibility for all information related to their farms to improve their planning accuracy. IT infrastructure investment can be viewed as a complementary investment to social assets where their value will be maximized if and only if they act as common goods shared with the community and even with the nation. Economy of sharing would result in the digital divide being lessened; therefore, small-scale farmers' competitiveness would be improved due to their increasing accessibility to supply variability and the market dynamics associated with price and volume. This paper recommends that small-scale farmers' community enterprises in Thailand seeking to improve their agribusiness performance could usefully adopt all of the competencies in Marchand et al. (2000) with the two basic information capabilities (IBV and IMP) that small-scale farmers can associate with effective information use and use to develop their mindset regarding effective information use in their agribusiness. Based on our findings, the IO guidelines of Marchand et al. (2000) suggest the following actions can help small-scale farmers think about how to develop themselves and their community enterprise toward better ITP and IO outcomes from working with information. First, small-scale farmers' community enterprises need to understand the importance of each phase of the information life cycle (sensing, collecting, organizing, processing, and maintaining) and know that inadequate attention to one practice can disrupt the cycle. Second, small-scale farmers' community enterprises need to understand their agribusiness acumen well enough and know all about their performance in order to be actively sought out and respond to changes in their competitive environment. Moreover, they should think about how to use this information to enhance their existing products and create new products. Third, small-scale farmers in the community enterprise should be trained to evaluate the information's relevance to their agribusiness needs and determine which information has high value in planning and decision making; then their information practices must permit easy collection and organization for their decision making. However, data should be verified, organized, filtered, and selected for a particular use. Fourth, "information responsibilities" (Marchand et al., 2000) should mean information accountability for every small-scale farmer in the community enterprise. Fifth, small-scale farmers in the

community enterprise should create team-based activities to encourage openness and improve information exchange and sharing among the community enterprise or partnership network. Sixth, information exchange among small-scale farmers' community enterprises and key stakeholders should be enhanced through mobile and social network technologies given that real experts should help facilitate and diffuse such things into the daily use of small-scale farmers. Seventh, tacit knowledge within human capital should also be linked among small-scale farmers' community enterprises, government agencies, NGOs, universities, and industries. However, these can best be achieved through multidisciplinary research efforts among government institutes, industries, and universities.

Future Research

Future research can include multiple perspectives to increase our understanding as follows. First, a longitudinal study of small-scale farmers' community enterprises IO should be implemented to understand how the IO level correlates with sustained competitive advantage. Second, the application of IO to fill the gap from a resource-based view in search of sustained competitive advantage is required to shed light on how IO capabilities can be sources of competitive advantage under agribusiness settings and a sharing economy philosophy. Third, understanding is limited of how agribusiness actors in the community networks collaborate and exchange information according to the IO model. Through this study, we hope to call for the design research of a sustainability information networking platform with a sufficiency economy philosophy as well.

Conflict of Interest

There is no conflict of interest.

References

Avery, G. C. (2016). *Sufficiency thinking: Thailand's gift to an unsustainable world*. Bangkok, Thailand: Allen & Unwin.

Barua, A., Kriebel, C. H., & Mukhopadhyay, T. (1995). Information technologies and business value: An analytic and empirical investigation. *Information Systems Research, 6*(1), 3–23.

Bharadwaj, A. S. (2000). A resource-based perspective on information technology capability and firm performance: An empirical investigation. *MIS Quarterly, 24*(1), 169–193.

Bharadwaj, A. S., Sambamurthy, V., & Zmud, R. W. (1999). IT capabilities: Theoretical perspectives and empirical operationalization. *Management Science, Charlotte*, 378–385.

Bragdon, S. H., & Smith, C. (2015). *Small-scale farmer innovation*. Retrieved from www.quno.org/sites/default/files/resources/SSF Innovation WEB.pdf.

Collis, J., & Hussey, R. (2003). *Business research: A practical guide for undergraduate and postgraduate students*. London, UK: Palgrave Macmillan.

Coudel, E., Devautour, H., Soulard, C., Faure, G., & Hubert, B. (2013). *Renewing innovation systems in agriculture and food: How to go towards more sustainability?* Wageningen, the Netherlands: Wageningen Academic Publishers.

Hsieh, C., Lai, F., & Shi, W. (2006). Information orientation and its impacts on information asymmetry and e-business adoption: Evidence from China's international trading industry. *Industrial Management & Data Systems, 106*(6), 825–840.

JFIR. (2009). *Japan' s strategy for its agriculture in the globalized world*. Retrieved from http://www.jfir.or.jp/e/pr/pdf/31.pdf.

Kahan, D. (2011). *Market-oriented advisory services in Asia: A review and lessons learned*. Retrieved from www.fao.org/3/a-i2324e.pdf.

Kettinger, W. J., & Marchand, D. A. (2011). Information management practices (IMP) from the senior manager's perspective: An investigation of the IMP construct and its measurement. *Information Systems Journal, 21*(5), 385–406.

Marchand, D. A., Kettinger, W. J., & Rollins, J. D. (2000). Information orientation: People, technology and the bottom line. *Sloan Management Review, 41*(4), 69–80.

Mithas, S., & Rust, R. T. (2016). How information technology strategy and investments influence firm performance: Conjecture and empirical evidence. *MIS Quarterly, 40*(1), 223–245.

Mukhopadhyay, T., Kekre, S., & Kalathur, S. (1995). Business value of information technology: A study of electronic data interchange. *MIS Quarterly, 19*(2), 137–156.

Nevo, S., & Wade, M. (2011). Firm-level benefits of IT-enabled resources: A conceptual extension and an empirical assessment. *Journal of Strategic Information Systems, 20*(4), 403–418.

NLA. (2015). *Gist of policy statement delivered by PM to National Legislative Assembly*. Thailand Today. Retrieved from http://www.thaigov.go.th/en/component/k2/item/85892-id85892.html.

Peppard, J., & Ward, J. (2004). Beyond strategic information systems: Towards an IS capability. *Journal of Strategic Information Systems, 13*(2), 167–194.

Ross, J. W., Beath, C. M., & Goodhue, D. L. (1996). Develop long-term competitiveness through IT assets. *Sloan Management Review, 38*(1), 31–42.

Ruben, R., Slingerland, M., & Nijhoff, H. (2006). Agro-food chains and networks for development: Issues, approaches and strategies. *Frontis, 14*, 1–25.

Sunil, M., Ramasubbu, N., & Sambamurthy, V. (2011). How information management capability influences firm performance. *MIS Quarterly, 35*(1), 237–256.

Sylvester, G. (2013). *Information and communication technologies for sustainable agriculture indicators from Asia and the Pacific*. Retrieved from www.fao.org/docrep/019/i3557e/i3557e.pdf.

Trienekens, J. H. (2011). Agricultural value chains in developing countries a framework for analysis. *International Food and Agribusiness Management Review, 14*(2), 51–82.

Wade, M., & Hulland, J. (2004). Review: The resource-based view and information systems research: Review, extension, and suggestions for future research. *MIS Quarterly, 28*(1), 107–142.