

An Overview of Acceptance and Adoption of Agricultural Innovation and Technology for Sustainable Palm Oil Industry

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Abstract

Oil palm was planted commercially in Malaysia about 100 years ago. Today, palm oil industry is one of National Key Economic Areas (NKEA) under The Economic Transformation Programme (ETP), a comprehensive programme to assist Malaysia in achieving its goal of achieving high-income status by 2020. The Malaysian Sustainable Palm Oil (MSPO) certification compliance will be made mandatory by the end of 2019 to elevate the industry to global standards and sustainable. Technology is one of the strategic tools in enhancing the economic competitiveness of a country. In oil palm industry, many types of technology were invented to assist workers to perform their work process. The example of innovation and technology introduced in Malaysia includes the use of a motorized harvesting pole, CantasTM, to improve harvesting productivity, a diamond sharpening tool, and the use of buffalo-assisted collection of FFBs. However, the acceptance and the adoption of all these technologies are still low and the industry depends highly on the human labour.

Keywords: Agricultural Technology, Agricultural Innovation, Acceptance and Adoption of Innovation, Agricultural Sustainability, Palm Oil Industry

Introduction

On 18 May 2017, Malaysian Prime Minister YAB Dato' Seri Najib Tun Abdul Razak officiated the 100 Years Celebration of the commercial oil palm planting in Malaysia at Sime Darby's Tennamaram Estate in Bestari Jaya, Selangor. The theme for this celebration is "Malaysian Palm Oil: Our Pride, Our Achievement" and this is a proud achievement indeed. However, based on the latest report in The Star, Plantation Industries and Commodities Minister Datuk Seri Mah Siew Keong said that the palm oil industry is highly labour intensive. Malaysia Palm oil industry depends on about 431,357 workers work in the estates and from that huge numbers, 77 per cent or 332,135 were foreigners' workers (The Star Online, 2017).

It is important to reduce the dependency towards foreign labour in the long run. One way to reduce foreign labour dependency is by using more efficient technology and equipment. Proactive action made by The Malaysian Palm Oil Board (MPOB) by set up an oil palm mechanisation fund with an initial investment of RM30 million in order to support further research and technology for the palm oil industry (The Star Online, 2017). The next important step is to make sure the investment gave the good return, which is when the industry accept and adopt the technology. Even though there are numbers of technology to support the palm oil industry, for example in harvesting process in oil palm plantation, but the industry still implement manual harvesting process which highly labour intensive.

Sustainable palm oil industry

The palm oil industry is one of National Key Economic Areas (NKEA) under The Economic Transformation Programme (ETP) a comprehensive programme to assist Malaysia in achieving its goal of achieving high-income status by 2020.

The Ministry of Plantation Industries and Commodities (MPIC) has recently announced that Malaysia's certification scheme for sustainable palm oil will now be made mandatory (Sivanandam, 2019). The scheme, known as the Malaysian Sustainable Palm Oil (MSPO) was first launched in 2015, based on the MSPO standards (MS2530:2013 series), and provides general principles for the production of sustainable palm oil that covers the 3Ps (People, Planet, Profit) in Malaysia. Key sustainability issues faced by the industry, such as environment and biodiversity, best practices and social responsibilities are embedded in MSPO's seven principles.

The timeline for Malaysian oil palm planters to comply would comprise three stages. The mandatory timeline for plantation industries that already have the Roundtable on Sustainable Palm Oil (RSPO) certification is December 31, 2018, while the timeline for those without certification is on June 30, 2019. Smallholders would have to get their certification done by December 31, 2019 (Sivanandam, 2019). Currently, the implementation of the MSPO scheme, which started on January 1, 2015, is on a voluntary basis.

MSPO is one of the certification schemes for sustainable palm oil that is currently available in Malaysia. Other major certification schemes include RSPO and International Sustainability and Carbon Certification (ISCC), amongst others. Effective technology and innovation will help the industry players to implement any required policies and sustain in the industry.

Agricultural innovation and technology

Agricultural land becomes increasingly scares in Malaysia, there is a greater push to increase productivity and yields on existing plantation land. Therefore, there is a need to foster deeper collaboration between public agencies and private institutions in order to develop innovative products to increase upstream productivity and bring down labour costs.

Nowadays, technology has been recognized as one of the strategic tools in enhancing the economic competitiveness of a country. In oil palm industry, many types of machinery were invented to assist workers to perform their work process.

The innovation and technology that promoted by Malaysian Palm Oil Board includes the use of a motorized harvesting pole, Cantas™, to improve harvesting productivity, a diamond sharpening tool, and the use of buffalo-assisted collection of FFBs.

However, manual methods still remain as the most effective way of harvesting fresh fruit bunches (FFB) in oil palm industry (Syazwani et al., 2014). This situation may give negative impact to the Malaysian economy especially in terms of upstream productivity and sustainability.

Factors of acceptance and adoption of technology

Rogers (1995) defined an innovation as “an idea, practice or object that is perceived as new by an individual or other unit of adoption”. Adoption theory examines the individual and the choices an individual makes to accept or reject a particular innovation.

Diffusion theory takes a macro perspective on the spread of an innovation across time. The adoption decision process describes five stages that individuals go through during their evaluation of an innovation.

Stage one is when an individual becomes aware of an innovation. Stage two, persuasion, is when an individual gains enough knowledge about the innovation’s salient characteristics to make a personal judgment, the outcome of which is a favorable or unfavorable view of the innovation. Stage three, decision, has an outcome of an individual’s choosing to adopt or reject an innovation. Stage four, implementation, is when an individual acts on his or her decision. Finally, in stage five, confirmation, an individual reflects on his or her decision and implementation process and re-evaluates whether to continue or discontinue with the innovation adoption (Rogers, 1995).

Rogers defined diffusion as a “special form of communication” where new ideas are spread from individual to individual over time. The Innovation-Decision process describes a model for how an individual makes a choice to adopt or reject a technology. The four primary components of diffusion theory are discussed the innovation itself, communication channels, social system, and time.

Individual factors are one of the most important determinants of adopting innovation. It refers to individuals’ cognitive interpretations of innovation and themselves. Several studies found that individual factors such as perceived usefulness, personal innovativeness, prior experience, image and enjoyment with innovation have stronger influence on an individual’s adoption of innovation. Employees’ adoption of innovation is driven by their social environment. Innovation used by others in employees’ social environment is likely to play an important role in adoption of innovation.

Studies have indicated that an individual’s adoption of innovation not only depends on individual attitudes but also on organizational policies, approaches and actions. Organizations need to provide facilitating conditions, which include the extent and type of support provided to individuals that would influence their use of innovation. Facilitating conditions are believed to include the availability of training and provision of support. Organizational factors include

training, managerial support and incentives. Organizational influences can motivate employees to adopt an innovation.

Social influence is the extent to which members of a social group influence one another's behavior in adoption. Employees may adopt an innovation not because of its usefulness but because of perceived social pressure. Such pressure may be perceived as coming from individuals whose beliefs and opinions are important, including peers and people who are in social networks. There have been conflicting opinions in regard to whether men use innovation more than women (Talukder, 2012).

Muzari, Gatsi, and Muvhunzi (2012) found that the factors affecting technology adoption are assets, income, institutions, vulnerability, awareness, labour, and innovativeness by smallholder farmers. The technologies that require few assets, have a lower risk premium, and are less expensive have a higher chance of being adopted by smallholder farmers (Muzari, Gatsi, & Muvhunzi, 2012).

The study by Williams (2015) was to determine the factors affecting farmers adoption of innovation in Delta State of Nigeria. The results shows that the most prominent factors that hinder the adoption of agricultural innovation by farmers in Delta State are poor extension services from change agents, climatic, fund or incentives and fear of loss and cost of innovation while factors such as superiority, profitability, simplicity and compatibility of an innovation promote its adoption (Williams, 2015).

Model and Strategies to Improve Acceptance and Adoption of Technology

Firstly Rogers's theory of innovation diffusion provides a foundation understanding of adoption theories. Rogers's theory has been used broadly across disciplines to comprehend and predict change. Although Rogers's theory is a critical foundation, it is not always easily applied to understanding adoption. Although several research studies seek to understand adoption process, only a few theories are widely used in the current literature. A review of the research in education revealed two primary theories of adoption applied in the current education literature.

First, the Concerns-Based Adoption Model (CBAM) has been used to understand change in terms of technology. The CBAM has been used to understand teacher change in curriculum change and adoption of a consulting teacher model as well as specifically technology change and adoption.

In contrast, the Technology Acceptance Model (TAM) and the Universal Technology Adoption and Use Theory (UTAUT) are originally based out of computer science specifically to answer questions about technology adoption. There is no one model for understanding the processes in which an individual engages before adopting a new innovation. Historically, adoption is understood in terms of some kind of behavior change (Straub, 2009).

Conclusion

As the conclusion, we need to make sure that the innovation and the technologies that we have in the industry must be accepted and adopted by the target group. The innovation and

technologies must suit to the target group needs and ability to adopt. The extension activities must be improved to deliver the knowledge and technologies to the farmers.

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