UNIVERSITI PUTRA MALAYSIA

COCOA FARMERS' PERCEPTIONS OF RELATIONSHIP BETWEEN TRANSFER OF TECHNOLOGY SKILLS, HUMAN RESOURCE DEVELOPMENT SKILLS AND EXTENSION AGENTS' WORK PERFORMANCE IN PENINSULAR MALAYSIA

MOHD MUSTAFA MUNIM BIN MOTOLANI

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By

MOHD MUSTAFA MUNIM BIN MOTOLANI

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfillment of the Requirements for the Degree of Master of Science

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July 2021

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The aim of this study to identify the relationship between extension agent's (EA) skill of transfer of technology (ToT) and human resource development (HRD) to the work performance (WP) that significantly contributed to the low productivity of cocoa bean from the Malaysian cocoa smallholders. The contribution of extension agents skills are considered crucial in transferring technology to the farmers. The study identify skill level of extension agents' on ToT and HRD and WP to productive cocoa farmers (PCFs) in Peninsular Malaysia. It's also determined the relationship between extension agents' skills and work performance and identifies the most important factor contributed to work performance. The study employed stratified random sampling technique. A total of 353 PCFs were sampled to evaluate the skills of the extension agents' through the use of structured questionnaires to elicit response from the farmers. The data were analysed using descriptive statistics and Pearson correlation analysis. The skill levels of cocoa extension agents' in Peninsular Malaysia in ToT and HRD have a high skill level. Based on high level skill in ToT and HRD, work performance was evaluated at high level also. Significant correlation ($p<0.01$) existed between competencies (ToT and HRD) and extension agents' performance. Multiple regression analysis results showed that technical skills ($p=0.030$), leadership skills ($p=0.005$), decision making support skills ($p=0.048$) and social skills ($p=0.000$) are positive and significant ($p<0.05$) determinants, while technology delivery skills ($p=0.424$) and technology evaluation skills ($p=0.063$) do not contribute significantly towards extension agents' performance. The result shows the social skills attributed the bigger Beta value (.266) and the most contribution to extension agents' work performance. Technical skills, leadership skills, decision making support skills and social skills are **f**our significance values from the competencies component interpreted the 63.0 percent (Adj. R^2 value) contributing to the extension agents' work performance. There is therefore needs to create future development plan to increase competency level of the extension agents', particularly in the area of transfer of technology skills. Function of

ToT and HRD reflected work performance achievement to increase the smallholder potential and be able to empower them to increase cocoa production.

Keywords: Extension agents, human resource development, transfer of technology, work performance

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

PERSEPSI PETANI KOKO TERHADAP HUBUNGAN KEMAHIRAN PEMINDAHAN TEKNOLOGI, KEMAHIRAN PEMBANGUNAN SUMBER MANUSIA DAN PRESTASI KERJA EJEN PENGEMBANGAN DI SEMENANJUNG MALAYSIA

Oleh

MOHD MUSTAFA MUNIM BIN MOTOLANI

Julai 2021

Pengerusi : Salim Hassan, PhD
Fakulti : Pertanian

Tujuan kajian ini bagi mengenalpasti hubungan diantara kemahiran komponen pemindahan teknologi (PT) dan pembangunan sumber manusia (PSM) kepada prestasi kerja (PK) ejen pengembangan (EP) yang menyumbang kepada produktiviti biji koko yang rendah daripada sektor pekebun kecil di Malaysia. Dalam pada itu, tahap kemahiran ejen pengembangan diklasifikasikan penting dalam melaksanakan pemindahan teknologi kepada petani. Kajian ini mengenalpasti tahap kemahiran ejen pengembangan dalam komponen PT dan PSM dan PK di kawasan petani koko produktif di Semenanjung Malaysia. Selain itu, kajian turut melihat hubungan diantara kemahiran ejen pengembangan dan prestasi kerja serta mengenalpasti faktor utama yang menyumbang kepada prestasi kerja ejen pengembangan. Kajian ini menggunakan teknik persampelan rawak berstrata. 353 sampel terlibat bagi menilai kemahiran ejen pengembangan menggunakan kaedah soal-selidik berstruktur yang melibatkan petani koko. Data dianalisis menggunakan statistik deskriptif dan analisis korelasi 'Pearson'. Kajian menunjukkan tahap kemahiran ejen pengembangan koko di Semenanjung Malaysia dalam komponen PT dan PSM berada pada tahap tinggi dan prestasi kerja juga turut diukur dengan tahap tinggi. Terdapat korelasi ($p<0.01$) yang signifikan diantara kemahiran (PT dan PSM) dan prestasi kerja ejen pengembangan. Keputusan analisis regresi berganda menunjukkan kemahiran teknikal ($p=0.030$), kemahiran kepimpinan ($p=0.005$), kemahiran membantu membuat keputusan ($p=0.048$) dan kemahiran sosial ($P=0.000$) adalah bersifat signifikan positif pada ($p<0.05$) manakala kemahiran penyampaian teknologi ($p=0.424$) dan kemahiran penilaian teknologi ($p=0.063$) menunjukkan hubungan yang tidak signifikan dengan prestasi kerja. Selain itu, kemahiran sosial menyumbang nilai 'Beta' terbesar (.266) kepada prestasi kerja ejen pengembangan. Kemahiran teknikal, kemahiran kepimpinan, kemahiran membantu membuat keputusan dan kemahiran sosial merupakan empat nilai signifikan menerangkan 63.0 peratus (nilai Adj. R^2) kepada prestasi kerja ejen pengembangan.

Pada masa akan datang dapatan kajian ini memerlukan fokus pembangunan untuk meningkatkan tahap kemahiran ejen pengembangan terutamanya komponen PT. Fungsi PT dan PSM memberi kesan langsung kepada pencapaian prestasi petani berpotensi untuk meningkatkan keupayaan untuk meningkatkan pengeluaran koko Negara.

Kata kunci: Ejen pengembangan, pembangunan sumber manusia, pemindahan teknologi, prestasi kerja

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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LIST OF ABBREVIATIONS

DV	Dependant Variables
EA	Extension Agent
GAP	Good Agricultural Practice
HRD	Human Resource Development
IV	Independent Variables
MCB	Malaysian Cocoa Board
MPIC	Ministry of Plantation Industry and Commodity
MP	Malaysian Plan
MOA	Ministry of Agriculture
PCF	Productive Cocoa Farmer
SD	Standard Deviation
ToT	Transfer of Technology
UPM	Universiti Putra Malaysia
WCF	World Cocoa Foundation
WP	Work Performance

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter explains the background of the study that focused on Malaysian cocoa extension agents on extension services by the Malaysian Cocoa Board (MCB). This research has to be conducted to confirm accurate information in relation to farmers' feedback on extension services of development activities that have been and are being led by the MCB in entire Malaysia. This study is essential to obtain the level of transfer of technology skill (ToT) and human resource development (HRD) and the performance of extension agents to enhance the extension services and development programs in the future. On the other hand, MCB can also utilize the study findings to reform, the future action plan strategy and redesign the new development program and research to outreach farmers in the state. This chapter explain the overall segment in the primary stage of the study. The segment consists of background of the study, statement of the research problem, research objectives, and research questions. It also followed by the limitation of the study and definition of relevant terms and concepts used.

1.2 Background of the Study

Malaysia consists of thirteen states and three federal territories, and it is located in Southeast Asia, made up of a total landmass of 330,803 square kilometres (127,720 sq mi), and separated by the South China Sea into two similarly sized regions, namely Peninsular Malaysia and East Malaysia (Sabah and Sarawak). Peninsular Malaysia (Peninsular) shares a land and maritime border with Thailand in the north; maritime borders with Singapore in the south; Vietnam in the northeast; and Indonesia in the west while East Malaysia shares land and maritime borders with Brunei and Indonesia and a maritime border with the Philippines and Vietnam. Kuala Lumpur is the capital city of Malaysia, while Putrajaya is the seat of the federal government. With a population of over 30 million, Malaysia is the 44th most populous country. Agriculture in Malaysia makes up twelve percent of the nation's GDP. Sixteen percent of the population of Malaysia is employed through some sort of agriculture. Large-scale plantations were established by the British colonists in the 18^{th} and 19^{th} centuries, introducing the opportunity for new crops such as rubber (1876), palm oil (1917), and cocoa (1950). Several other crops are still grown for domestic purposes such as bananas, coconuts, durian, pineapples, and rice.

This thesis is presented in five chapters, namely introduction, literature review, methodology, results and discussion, and the conclusion. The literature review and conceptual framework are discussed in chapter two; the data source and methods are

discussed in chapter three; results are discussed in chapter four, while summary, conclusion, recommendations, and implications are presented in chapter five.

1.3 Malaysian Cocoa Industry

The Asia-Pacific cocoa market is estimated to register a CAGR of 4.18% during the forecast period, 2021-2028 (Bloomberg, 2019). The progressive innovation in cocoa products in the region influences market growth. Also, Asia is one of the top markets for chocolate producers, given the increasing affluence and shifting lifestyles. Malaysia, China, India, Japan, Australia & New Zealand, Indonesia, Singapore, South Korea, and Rest of Asia-Pacific are analyzed for the Asia-Pacific cocoa market growth assessment. In Japan, chocolate is a standard sweet and very popular among people of all classes and professions. New trending, chocolatiers identify single-origin chocolates, sourcing locally from cocoa smallholder farms and then roasting and fermenting the beans to make premium beans. This trends also known as bean-to-bar concept. Asian countries was second largest world cocoa producer behind African, potentially producing purposely to exports to European country because local Asian consumptions still low. This opportunity should support by the ASEAN organization to maximize income and multiply innovation of products from Asian cocoa producer. The group ASEAN Plus Six with Australia, New Zealand, and India were aggressive economic path of Asia Pacific's economic, security, political, socio-cultural architecture, as well as the global economy. Cocoa is one of the major perennial crops around the world. It is considered as a cash crop for developing countries and a principal import commodity in some developed countries. Cocoa is a crop that has a global supply chain crossing countries and continents where the complex production process involves various stakeholders, including farmers, traders, logistic companies, grinders, chocolatiers, and distributors. The production at the farm level is often a delicate process as the crop is susceptible to various conditions and practices, which has an effect on output if not monitored and managed. The contribution of the Malaysian Cocoa Industry into the Malaysian economy is tremendous little. The total export earning of cocoa products is only up to 5.7 billion RM in 2016 (MPIC 2018).

Table 1.1: Cocoa Hectarage and Production in Malaysia 2000-2016

Year	Area (ha)	Production (T)	Grindings (T)
2000	75,765	70,262	139,443
2001	57,963	57,708	138,616
2002	48,631	47,661	117,586
2003	45,492	36,236	167,595
2004	42,207	33,423	229,649
2005	33,993	27,964	258,647
2006	31,740	31,937	270,261
2007	28,459	35,180	310,001
2008	21,411	27,955	323,653
2009	18,047	18,152	279,228
2010	20,083	15,654	302,366
2011	20,848	4,605	299,271
2012	11,748	3,645	299,525

Table 1.1: Continued

2013	13,826	2,809	285,608
2014	16,102	2,665	244,423
2015	18,122	1,729	187,695
2016	17,368	1,757	203,093

(**Source**: MCB, 2017)

Table 1.1 shows cocoa cultivation, production, and grinding trends in Malaysia from 2000-2016, indicating that cultivation and production trends had been declining while grinding trend had been increasing. The past trend indicated the imbalanced relationship between the downstream and upstream productions in the industry (MCB, 2017).

1.4 Agricultural Extension and Work Performance

The mission or passion of agricultural extension is to upgrade target groups' standard of living through extension agents who have a role as mediators to provide necessary information to government agencies and to encourage target groups to adopt relevant technology (Tiraieyari *et al*. 2014). Traditionally, the extension was closely related with the field of agriculture and rural community development. Moreover, contributions by extension agents (EA) are determining in transferring technology to the farmers. It was identified as a most important approach to promote the small scale agricultural development and agricultural-related enterprises in Malaysia (Sail, 2016). More than 90 percent of the Malaysian cocoa producers from the smallholder sector have depended on the competency of the EAs from the MCB to deliver the technical skills and knowledge to them, especially on new technological tools obtained from the latest research findings.

According to (Oluwatoyin *et al.*, 2020) better understanding of extension agents' work performance through cocoa growers, in which extension agents have a greater role to play; it will help them towards using knowledge and skills to develop cocoa farmers' capabilities and potential to increase their productivity by using the right techniques and skills for the technology available to them. Agricultural extension is the connecter and catalysts that links farmers with agriculture research centers to transfer information and agricultural techniques and teach them how to practice in their field. This study has proven that ToT contributes towards work performance of cocoa extension agents (Pakri *et al*., 2019). Latest findings determined cocoa technical skill was the most important factor that influence work performance followed by technology delivery skill and technology evaluation skill. Hence, technology transfer skills should be taken into consideration in enhancing work performance, especially among farmers and the extension agents who work with them for a continuous performance improvement in their work (Oluwatoyin *et al.*, 2021).

The EAs play a very important function in delivering their expertise. It is very critical to control the EAs' performance to ensure that cocoa is still considered as a relevant

and reliable commodity in Malaysian economy resources. In this scenario, smallholders are still depending on the extension agents to facilitate them in the management of the cocoa farms. Every technology must be adopted properly to make sure that the production of farms is increased. The challenge faced by the EAs is the farmers and their reluctant attitude to adopt the technical knowledge which has been provided by the EAs. Now, the EAs are required to not only particularly perform their expertise in technological advances but also prioritize the aspects of HRD. Worldwide, human resource development is a vibrant and optimistic tool for the development of any organization. HRD activities that are unproductive within organizations not only adversely affect the entire working pattern and practices of organizations but also are greatly responsible in the lag of the operational processes of any organizations (A. Mengal, 2016). The soft touch approach and emphasis on social skill activities may result in the improvement of understanding about the technology transfer on the subject matter. The combination of the technology transfer and the improved human resource development has tremendous potential in affecting changes in the farmers' attitude, which in turn will cause an increase in their effort in their cocoa farming and productivity.

Decision making support skill was identified as a most important factor that influenced work performance, and then followed by leadership skill and social skill. Hence, decision making support skill, leadership skill, and social skill should be taken into consideration in enhancing work performance, especially among farmers and the extension agents who work with them, for continuous performance improvement in their work (Oluwatoyin *et al*, 2019). Integration between ToT and HRD components supposed to implement to maximize cliental benefits impacts. The integration do not have specific formula but depending on situation, knowledge level, skills and attitude of the extension agent when fulfill their task (Sail *et al.*, 2021)

1.5 Productive Cocoa Smallholder in Peninsular Malaysia

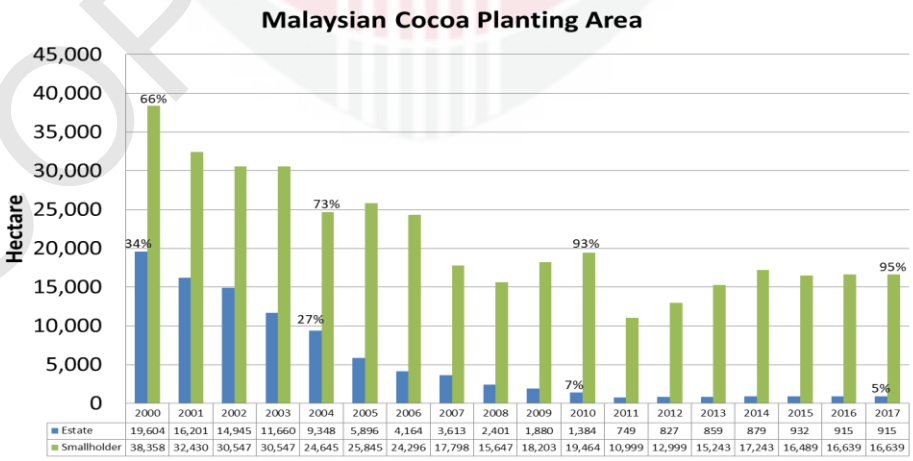
Contribution of cocoa bean production to the Malaysian economy was significance from the late1980s. Since that time, the contribution of the cocoa bean was a dominant major by plantation company with the support of favourable factor, which includes price (MCB, 2017). The phenomenon has also promoted cocoa planting by the smallholder sector because of stable commodity prices and a very high demand to fulfill the local grinding capacity. However, the unbalance demand between upstream and downstream sector was shows the trend lately, it may face a bigger challenge in the future to cocoa industry in Malaysia (Ramle *et al*., 2012). A little involvement of plantation companies in the cocoa industry was contributed to the scenario. The plantation companies have prefer involved in other crops with uncertain reason including work force, national industrial facilities and related regulation support (MPC, 2014).

This accidentally makes the cocoa smallholders the major contributors to Malaysia's cocoa beans supply because, according to the trend of the plantation company, there have been limited resources and land. Thus, smallholders' participation has been

explored by the Malaysian government in order to meet the supply and demand for cocoa production and look after the cocoa commodity as one of the economic resources, especially for the rural people. This policy was carried out through the planning and implementation of smallholder programme to increase the household income of the cocoa smallholders. The outcome of the implementation was good even though some challenges have reduced the productivity of the smallholder to at least 50 percent of the required target by the government. This current study focuses on productive cocoa farmers who are in the range of matured planting periods of the crop. Cocoa trees are perennial crops that can be last at the 30th of ages. The success of cocoa planting in the range one to three years planting period and will start fruiting after two and a half years after planting. The focus of this current study intends to take into account the smallholders who have operated cocoa plantations that are considered as matured or productive between five to ten years (MCB, 2017). This group of farmers is mostly facilitated by the MCB's EAs, who make sure that all the technologies and plant materials that are provided are of the same quality.

Due to the hurdle to maximise expansion of the cocoa plantation in Peninsular Malaysia, new approach that was done promoted to the indigenus people as alternative takers. Previously, only rubber commodity was promote to this community followed by the oil palm with varies package. Late 2008, MCB was engaged with Jabatan Kemajuan Orang Asli (JAKOA) to introduced cocoa plantation to improve income and standard of living to the indigenous community. This succesfully implemented in Pahang, Perak and Negeri Sembilan. In this study also involve on this community as a respondent.

The productivity of cocoa beans production within this group identified 50 percent below the government target. There are several factors to answer the unachieved ultimate target. According to Ramle (2012), it was found that a significant factor that is related to the smallholder production is also closely related to the competencies of the EAs as well as their work performance.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Estate	19,604	16,201	14,945	11,660	9,348	5,896	4,164	3,613	2,401	1,880	1,384	749	827	859	879	932	915	915
Smallholder	38,358	32,430	30,547	30,547	24,645	25,845	24,296	17,798	15,647	18,203	19,464	10,999	12,999	15,243	17,243	16,489	16,639	16,639

Figure 1.1: The hectarage of smallholder and plantation sector of cocoa plantation area (MCB 2018).

1.6 Problem Statements

According to the National Commodity Policy 2011-2020 (MPIC, 2011), Malaysian cocoa industries are targeted to increase cocoa production to 40,000 metric tons in 2020. Since 2016, the national productions were only 1,757 metric tons, while the grinding consumptions were 203,093 metric tons, with the shortage of cocoa bean consumption at 201,336 metric tons (MCB, 2017).

Malaysian cocoa beans are produced in three major regions, namely Peninsular (Peninsular), Sabah, and Sarawak. Almost 95 % of Malaysian cocoa production comes from the smallholders' sector. Based on the evaluation of the performance of the industry, the productivity (kg/ha) of Malaysian cocoa production is considered lower from the targeted national productivity. In 2016, the productivity of Malaysian cocoa beans was only 0.7 mt/ ha/ year compared to 1.5 mt/ ha/ year (MPIC, 2017). These arguments considered as a practice gap that MCB faced along the way development process to empower smallholders. Determination knowledge gap of cocoa extension agents, the competent agents should include ToT and HRD skills to perform their work. As their knowledge are limited to the technical skills only. This study looks at the role of EA's competency factors in predicting the successful adoption of technology among productive cocoa farmers (PCF) reflecting to productivity of cocoa bean production.

The effort to increase the cocoa production, the MCB has implemented various development programmes to retain and sustain the existing cocoa farm and increase in new areas with new plantings of the cocoa development program. At the same time, the MCB keeps monitoring the productivity that produced when the crop matured but globally identified that many factors contribute to the decreasing productivity beyond the cocoa smallholders sector. The World Cocoa Foundation has highlighted the major contributing factors, including pests and diseases, environmental issues, and ageing crop trees. The major issues are found to be the lacks of latest technology know how and field management expertise among cocoa farmers (WCF, 2016).

Based on these facts, this study tries to focus on the factor of disseminating knowledge of cocoa technology to the farmers because other factors are from control and uncontrolled factors. Additionally, productive cocoa farmers have planted cocoa within two Malaysian Plan 9 (MP-9) and Malaysian Plan 10 (MP-10) that are below ten years of age (productive period) and are considered as matured. The population of this current study is under the services of the MCB EAs in the farmers' areas. Related to the gap of the theory, this study considers Iceberg Model discussed on the knowledge and skills. Contribution this theory supposed find from this study to filling up the gap of the theory.

The aims of the study is to determine the relationship between ToT and HRD competencies and work performance and also to find out the most important factor contributing to the extension agents' work performance for the cocoa smallholder

sector in the Peninsular state of Malaysia. These findings take consideration to filling up the research gap that obviously forms in the cocoa extension agent job routine.

1.7 Objectives of the Study

The main objective of this study is to determine the competency level of extension agent's skills in the transfer of technology (ToT) skills and human resource development (HRD) skills and its relationship to work performance among Peninsular cocoa smallholders'.

Specifically, the study will determine the following objectives.

I. To determine the level of competencies of the extension agents in relation to ToT and HRD skills and the extension agents Work Performance;

II. To determine the relationship between the competencies of the extension agents and the extension agents work performance;

III. To identify the most important factor contributing to the extension agents work performance.

1.8 Scope of the Study

The scope of this study is on work performance of the extension agents in relation to technology transfer skills and human resource development skills as perceived by productive cocoa smallholders in Peninsular Malaysia specifically. All the smallholders facilitated by the extension agents of MCB in all the three regions of Peninsular Malaysia cocoa production. The extension agents' performances were assessed from the perspective of smallholding cocoa growers in the three region of cocoa plantation in Peninsular Malaysia which are Northern region, Eastern region and Southern region. The study would identify the technology transfer skills by three (3) components: technical skills, technology delivery skills and technology evaluation skills and human resource development skills by three (3) components: leadership skills, decision making support skills and social skills. While, work performance focused on communication ability, level of managerial task and personal discipline. However, this study only focused on six main skills in technology transfer and human resource development that determine extension agents work performance as perceived by farmers. This is to strengthen the fact that those skills have great influence on the level of performance of extension agents especially relevance in Malaysian cocoa industry.

Most of the extension agencies in less evolved nations together with Malaysia are faced with major issues of skilled incompetence and lack of motivation among their staff. Furthermore, several of the agricultural extension departments of those countries do not have complete facilities and also human resource limitation. There is a considerable gap between present and desired competencies at different management levels in extension organizations including instruction from top management through middle

level officer to extension agents that could be bridged by means of operative ToT and HRD efforts in a holistic approach. Immediate responded to the policy makers from this study findings assumed contributed to the revolution of the extension reputation into the nation productivity.

1.9 Limitation of the Study

A number of important limitations need to be considered regarding the current study. First, the most important limitation lies in the sampling method when the respondents were not recruited from the entire cocoa plantations that have existed in Peninsular Malaysia because it was costly to collect the data from all of the respondents. Thus, stratified random sampling was preferred in this current study, and the respondents were limited to only the productive cocoa farmers from the areas under the Malaysian Cocoa Board (MCB) incentive program. The study areas were only those that were covered by the regional MCB office in entire Peninsular Malaysia. Another major limitation in the current study is the fact that restricted studies were available on the competency of cocoa extension agents. However, this problem can be considered as a common feature of all competency evaluation tests. In the empirical analysis, the relationship between extension agents' competencies and extension agents' work performance was examined.

1.10 Definition of terms

The followings are the definitions of the terms used in the current study.

- Work performance: Visweswaran (2001) defines Work Performance as employee's outcomes produced associated to the organizational mission including beneficial action and also behaviours.
- Technical skills: Technical skills are competent in specific knowledge, the analytical ability within an area of expertise, including theory and practice (Ghalandari, 2012).
- Technology delivery skills: Technology delivery skill defines as a process of information (technology, data) transferring between a source and takers. Delivering method can be modifying with combination of sensory stimuli that work together to the objectives of the sources (Jiao *et al*., 2019).
- Technology evaluation skills: Technology evaluation skills are measurement process to determine the differences between planned and current output with able to give reason and appropriate explanation (Frank *et al.,* 2013).

- Leadership skills: Leadership skills are defines as the individual ability to encourage group to support the vision and lead others to move with a passion toward a common objectives (Jesica *et al*., 2019).

- Decision-making support skill: Decision making support skill means the action or process of making important decisions. The extension agents are able to provide good encouragement to make the right decision (Oriana and Elena, 2014)

- Social skills: Social skill is defined as one's ability to associated and created good relationship with the social network (Isabelle, 2018).

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