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CORRELATION ANALYSIS OF TECHNOLOGY TRANSFER SKILLS AND WORK PERFORMANCE OF EXTENSION AGENTS' AMONG COCOA SMALLHOLDERS IN MALAYSIA

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Abstract:

This study examines the relationship between technology transfer skills and work performance of extension agents among cocoa farmers in Malaysia. The study used stratified sampling technique to select 668 cocoa farmers who are exposed to extension programmes facilitated by the extension agents of Malaysian Cocoa Board in the three regions of Malaysia. The data were analyzed using descriptive statistics, correlation and regression analyses. Result shows that cocoa farmers rated level of work performance, technical, technology delivery, and technology evaluation skills as high. Significant and positive correlation ($p<0.01$) existed between each variables and work performance. Regression analysis results showed that technology transfer skills were significant predictors to enhance work performance. The R^2 value of 0.511 indicates that the three skills give 51.1% explanation of the variance in extension agents' work performance. The result also suggested that technical skill ($\beta=0.346$) 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. The skills that have been identified in this study can be integrated into both the pre-service and in-service training and development of extension agents in their line of work to improve their skills in sharing new technology.

Keywords: *Cocoa smallholders, extension agents, skills, technology transfer, work performance.*
JEL Codes: *M5, M53, M54, O13, O15, Q16*

1. Introduction

An effort to sustain the economic viability of the cocoa production and planting industry since its decline around 1990 has become a major challenge to the Malaysian Cocoa Board (Ramle, 2012). It has often reported that a crash in the price of cocoa globally; issues of labour, competition from oil palm against cocoa cultivation, serious spread and infestation of pest and disease were some of the reasons farmers' loss interest in cocoa crop (Lee, 2013). Ramle (2012) stated that in the effort of the Malaysian Cocoa Board (MCB) to increase cocoa bean production, Cocoa Smallholder Development Programme (CSPD) was introduced in 1996 to increase smallholder's yield to 1.5 tonnes per hectare from an initial yield of 0.5 tonnes. This strategy was to transfer technology to farmers in groups as this was seen to be cost-effective and time-saving to educate the farmers on cocoa technologies so that they will practice and adopt in groups.

The technology available was categorized into two: Cocoa technology (hard technology) and Cocoa management (soft technology). The hard cocoa technology refers to tangible or physical technology which includes fertilizer, seedling, and chemical for pest and disease control. While the soft technology refers to intangible which is knowledge or skill that is required to operate the technology, the technologies are nursery technology, seedling technology, weeding control technology, disease control technology, pest control technology, fertilizer technology, pruning technology, mature grafting technology, fermentation technology, and dry technology. The farmers who work in groups were involved directly in the programmes, starting from the rehabilitation or replanting of cocoa trees to the marketing of cocoa beans. Therefore, this approach continues in encouraging cocoa smallholders using the cocoa farmers cluster approach to spearhead enhancement and transfer of technology on cocoa bean production in Malaysia by way of improving cocoa technology adoption (Hassan et al., 2017).

However, the role of extension agents of the Malaysian Cocoa Board was to transfer technology to the farmers to develop their technical and management capabilities towards the adoption of cocoa technology (Tiraieyari, 2009). There is a need for farmers to take on a certain form of skills in addition to technology usage; this will give a clear and deep perception of the problem and provide different alternatives from which they can be solved (Vukelić & Rodić, 2014). According to Shah et al. (2013), the accomplishment of any extension programmes will depend on the responsibility of extension agents to transfer technology with the required skills and knowledge in enhancing farmers' capability to increase production. The skills needed by each farmer may be at variance with their level of performance from one community to another, but the role of extension agents is to make farmers technical knowledge and management skills within the farm better as well as making the information received effective, which will extend over a relatively long time on the quality of production, enhancement of return on economic status and contribution to both local and international economy (Benjamin, 2013). The generation of technology, its adaptation, dissemination process and adoption of new technologies are part of agricultural knowledge and information system released to the farmers and its improvement need be considered at different levels of skills and strategies display by the extension agents to farmers (Falsafi et al., 2015).

Furthermore, the impact of extension agents' to agriculturally related field and rural development in Malaysia has been regarded as important in promoting the growth and development of smallholders agricultural enterprise through technology transferred in the country, and this was referred to as one of the determining factors that can improve their level of work performance (Sail, 2016). Consequently, extension agents low performance in technology transfer has been attributed to problems of poor skills and inadequacies in professional competencies needed to skillfully perform the work assigned to them (Saleh and Man, 2017). It is not often to come upon research that concentrates attention on the skills to be considered for extension agents in technology transfer to the farmers and in what way they are used in the delivery of extension services to assist in promoting the growth of the rural area and a positive change in the quality of agricultural output (Issahaku, 2014). Thus, this study was carried out to determine the relationship between technology transfer and extension agents' work performance among cocoa growers in Malaysia. Specifically, the objectives to be achieved are as follows:

1.To determine the level of technology transfer skills and extension agents work performance among cocoa growers in Malaysia.

2.To determine the relationship between technology transfer skills and extension agent work performance among cocoa growers in Malaysia.

3.To identify the most important technology transfer skills that contribute to the work performance of the extension agents among cocoa growers in Malaysia

1.1 Research Framework

The research framework as proposed in Figure 1 composed of the independent variable (technology transfer skills) and the dependent variable (work performance). Direct relationship existed between technology transfer skills and work performance. Based on the proposition of Resource-Based Theory (RBT), levels of productivity (i.e. work performance) are influenced by technology transfer skills (Suvedi and Ghimire, 2015; Issahaku, 2014; Chae et al., 2014; Washiun et al., 2013). In line with the proposition of RBT, the research framework suggests that technology transfer skills such as technical skill, technology delivery skill and technology evaluation skill primarily influence their level of work performance.

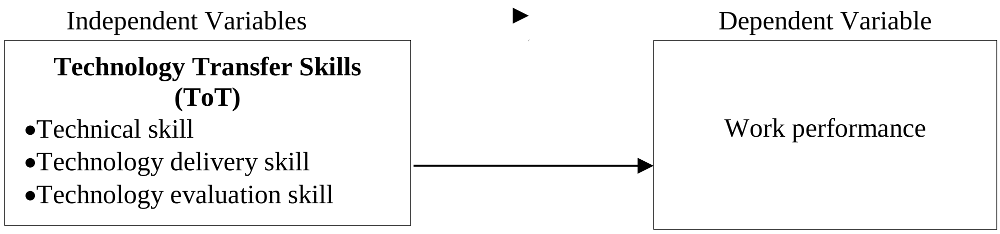

Figure 1. Research Framework of the Relationship between ToT Skills and Work Performance

2. Theoretical Background

Resource-Based theory was used in this study as the basis for research framework design. Within the framework of the relationship between technology transfer and work performance, research has shown that technical skills, technology delivery skills, and technology evaluation skills influence work performance. The resource-based theory introduced by Barney (1991), contends that work performance is determined by individual employee's correct proportion alignment of tangible and intangible resources as well as capabilities in achieving organization objectives by making excessive use of technology transfer to strengthen employees and clients capability (Miles, 2012).

This important theoretical basis derived from the resource-based theory literature is contriving an idea or given an explanation of tangible and intangible resources as well as capabilities that have a strong influenceontheorganization and individual growth and performance (Kamasak, 2013). Resources (hard technology) such as fertilizer, seedling, and chemical for pest and disease control are categorized as tangible or physical resources (Karia & Wong, 2013). Cocoa management (soft technology) refers to intangible or non-physical resources which is knowledge and skills that are required to operate the technology will provide value to the agricultural extension agencies and farmers in economic term in form of lessen cost or creating service difference (Karia & Wong, 2013). The resource-based theory literature also contends that rare and valuable resources and capabilities will only make impermanent competitive advantage possible but a high price resources and capabilities which cannot be easily reproduced or put in the place of another will assume a certain state of sustainable competitive advantage and performance for an individual as well as the organization (Kor & Mesko, 2013).

Despite the literature review on technology transfer and performance, almost all past studies assess technology transfer and performance from a financial perspective that lead to organization performance. Geringer & Herbert (1991) earlier evaluated technology transfer and performance in line with economic components of production and management of material wealth. While other studies measure technology transfer and performance based on the activities carried out in delivering the technology. Waroonkun (2007) defined the performance of technology transfer as the achieved or reached outcome when there is an implementation of technology transferred programmes by local recipients with the guidance of technology transfer agents (Waroonkun, 2007).

Performance and technology transfer has created a lot of curiosity among researchers by seeking to know and comprehend the processes of technology transfer transverse way without limits. Several studies make use of objectives and subjective measurements purposely to assess technology transfer and performance. In essence, performance within an organization is perceived or think about accumulated skills and competencies acquired through exceeding or meeting financial means from organizations (Gilbert & Cordey-Hayes, 1996; Hung et al., 2010).

Hence, the integration of these resources such as tangible, intangible, and capabilities are perceived as the strength which will contribute to the performance of an extension agent to effectively transfer technology to the farmers (Al-Abed *et al.*, 2014). Therefore it can be concluded that resourced based theory can explain the transfer of technology, technical skill, technology delivery skill and technology evaluation skill based on the resources and capabilities managed or controlled by the firm or individual employee which is adjudged as the baseline for sustainable competitive advantage and high-performance difference (Miles, 2012).Based on the above understanding of resource-based theory, this study adopted this theory to address and explain the predictor variables of transfer of technology and the dependent variable. Hence, this study was aimed at investigating how transfer of technology skills influenced work performance of extension agents (Figure 1).

2.1 Hypotheses Development

This study tested the following hypotheses:
H1: Technical skill is significantly related to work performance.
H2: Technology delivery skill is significantly related to work performance.
H3: Technology evaluation skill is significantly related to work performance.

2.2 Technical Skill and Work Performance

Technical skill is the ability a person has in carrying out a specific activity. Before one can be able to do this, there is a need for technical knowledge and skill about the processes involved, methods, and a set sequence of steps intended to achieve results. This is necessary for frontline officers as they need to be taught by their supervisors on how to carry out different tasks given to them through training and clarifying doubts in work-related problems (Jaya, 2016).

Bahadori and Sadighi (2016) confirmed in their research on "meta-analysis of factors affecting occupational and professional performance of agricultural extension agents" that skills and technical competence, the number of field visits, membership of organizations and participation in in-service training courses and access to educational facilities have a high impact on the occupational and professional performance of the extension agents. They give more emphasis to professional qualifications and characteristics, technical skills, and competencies of the extension agents which are the basis for their individuals' involvement in extension works.

Some researchers found technical skills to be related and predict work performance of an extension agent (Sail, 2010). Similarly, Motolani *et al.* (2017) identified technical skills as having a relationship to work performance and at the same time, a good predictor of extension agents' work performance. However, Khan (2017) has identified the existence of a gap between possessing technical skills and the potentials for the smooth performance of their responsibilities.

H1: There is a significant relationship between technical skill and extension agents work performance among cocoa growers in Malaysia.

2.3 Technology Delivery Skill and Work Performance

One of the main challenges facing the researchers as far as today's agricultural development is concerned is the questions on the failure of smallholder farmer's non-adoption of innovations and technologies designed for improvement in the lives and agricultural activities of the farmers?Various arguments have been made to explain the problem on a technology-by-technology basis, but there are few assessments of the role played by agricultural extension on technology delivery mechanism to the farmers in addressing the problem (Odhong, 2017). Hugh *et al.* (2010) refers to the delivery services of agricultural extension as the support given by entire organizations that make it easy for the people who carry are involved in agricultural production to solve farm problems. Agricultural technology can be formed into a planned structure and transfer through different forms. The forms of delivery can contribute to productivity differentiated by changing the magnitude of technology transfer to the clients and increasing their knowledge on how to improve the information flow from farmers to scientists (Alhassan, 2013).

However, the result of research conducted by Demenongu *et al.* (2015) indicated that failure linked to extension performance is due to the inability of the extension workers to deal with delivery concerns. They established that the effectiveness of extension agents in the area of communication with farmers, because of their deficiencies in the training related to the scientific principles and skills of communication and noted that, to effectively serve their clients, they must be effective in communication and as agents of development.

Berhanu*et al.* (2014) and Maoba (2016) suggested that extension service should have a strong delivery mechanism that would lead towards increasing participation of farmers and restore confidence in extension activities since every success of extension programmes is a reflection of the roles played by farmers in the programme. Similarly, findings of the study conducted by Ayansina and Adeogun (2017) also recommended a very strong delivery and communication skills as this serves as a fundamental principle or practice of extension professionals to communicate needed technologies effectively with the farmers and stakeholders. Correspondingly, Asiedu-Darko (2013) and Banya (2014) recommended that extension workers need the required competence on delivery and communication skills to enable them to deliver effectively and enhance their performance.

H2: There is a significant relationship between technology delivery skill and extension agents work performance among cocoa growers in Malaysia.

2.4 Technology Evaluation Skill and Work Performance

The importance of evaluation has long been recognized, but there have been some important shifts in the understanding of its function and significance in the global context (OECD/DAC, 2008 & Martin *et al.*, 2011). In advocating for technology evaluation skills, firstly, to understand what evaluation means is very important. Evaluation is characterized by order and planning to assess a completed or an on-going programme, project, or policy, its design, implementation, and results (Christoplos *et al.*, 2012). According to Suvedi and Stoep (2016), evaluation is both an art and a science. The art of evaluation involves identifying purposes and audiences, creating appropriate designs, and interpreting data about a programme or policy. While on the other hand, the science of evaluation involves systematically gathering and analyzing evidence about the outcomes and impacts.

Consequently, to improve the performance of the extension agents, Lamm and Israel (2011) suggested that there should be an increased emphasis on the skill development of extension professionals which is very important to determine their level of performance. Also, Ghimire and Martin (2013) recommended that senior-level extension officers should serve as mentors for the junior level officers by encouraging them to learn evaluation skills directly from field experience; it requires teamwork and collaboration that fosters a feeling of psychological safety. The study reported and suggested that universities and colleges with academic extension education programmes can review their curricula to make sure that future extension agents are trained well to assess programme outcomes using scholarly evaluation methods. Similarly, Suvedi and Stoep (2016) recommended that immediate investment are needed to upgrade and strengthen applied research and evaluation skills of mid-level officers who supervise front-line extension officers to mentor and train them to gain evaluation skills and subsequently include evaluation into their programme for capacity building to their enhanced performance.

H3: There is a significant relationship between technology evaluation skill and extension agents work performance among cocoa growers in Malaysia.

3. Material and Methods

The sample for this study consisted of productive cocoa farmers who are exposed to extension activities facilitated by the extension agents of Malaysian Cocoa Board in the 3 regions of Peninsular Malaysia, Sabah and Sarawak with 9 Management location offices (MCB, 2019). There are a total of 1902 productive cocoa farmers in Malaysia. Therefore, the population for the study is 1902 productive cocoa farmers that cover the three (3) regions of Malaysia. In this study, the method of Krejcie and Morgan (1970) was followed at the reliability of 0.95 along with the margin of error of 0.5 to determine the sample size for research. The sample size formula is as follows:

$$S = \frac{X^2 NP(1-P)}{d^2(N-1) + X^2 P(1-P)}$$

Where,

S = sample size required

X^2 = chi squared table value for 1 d.f (degree of freedom) at the confidence level as desired (3.841)

N = population size

P = proportion of population (for attaining maximum sample size it was assumed 0.05)

d^2 = the degree of accuracy expressed in proportion (0.05)

$$S = \frac{1.96^2 (1{,}902) * (0.5)(0.5)}{(0.05)^2 (1{,}902) + 1.96^2 (0.5)(0.5)}$$

$$= \frac{3.84 * 1{,}902 * 0.25}{0.0025 * 1{,}902 + 3.84 * 0.25}$$

$$= \frac{1{,}825.92}{5.715} = 319.50$$

$$= 320$$

A sample size of 1122 far exceeds the minimum required for the 1902 population according to Krejcie and Morgan (1970). Note, however, the very uneven quantities in each variable, populations and research coverage required a large sample size for greater reliability, adequate and wide representation, inclusion of people with different backgrounds and statistical inferences. Furthermore, from the 3 locations of the study: Peninsular Malaysia and Sarawak have far fewer populations than Sabah, and by definition they are not of the same proportion. Based on the table of Krejcie & Morgan, a representative sample of 1,902 is 1,122, which was arrived by obtaining a representative size independently from the table for each MCB Management location office to adequately represent their populations.It is therefore crucial to justify the sample size to carefully and quantitatively describe the respondents and the population. Thus, descriptive, bivariate correlation and multiple regression were used to analyze the data to determine the level of technology transfer skills and work performance, relationship between technology transfer skills and work performance and most important factor contributing to work performance. It is to be noted that a total of 1122 questionnaires were distributed across the nine location offices within the 3 regions, but the number of accomplished returns was 671 respondents. However, during the data analysis, 668 responses were duly answer as well as having complete valid cases, representing 60 percent and this indicates good response. This is in line with Babbie (2015) who reported a review of published social research literature and suggested that 50 percent response rate is considered adequate for analysis and reporting, while a response of 60 percent is good and acceptable for analysis. Thus, the sample used for the analysis is 668 respondents.

The study used stratified sampling technique to meet the 668 respondents from 9 cocoa management locations in Malaysia and this was carried out by using a well structured six-point scale questionnaire that was reviewed and pre-tested for validity and reliability. Moreover, in order to assess response of the farmers, a six-point scale, ranging from strongly disagree to strongly agree was used to measure all the variables apart from their demographic and crops profile. The three-part questionnaire included demographic and crops profile of respondents, technology transfer with three dimensions (technical skill, technology delivery skill and technology evaluation skill) and work performance. The researcher employed IBM SPSS version 23 software for analyzing the data of this study. The questionnaire comprises measurement items on technology transfer skills with three components: (a) technical skill - contains nine (9) statement items, (b) technology delivery skill - contains nine (9) statement items, (c) technology evaluation Skill - contains nine (9) statement items, The last part of the questionnaire is to measure work performance of the extension agents. It also contains eight (8) statement items. The respondents were to indicate their perception based on the positive impact made on farmers by utilizing those skills through response to all declarative statements items which were rated on a six-point scale and were scored 6 points for Strongly Agree (SA), 5 points for Agree (A), 4 points for Somewhat Agree (SWA), 3 points for Somewhat Disagree

(SWD), 2 point for Disagree (D) and 1 point for Strongly Disagree as used by Motolani et al. (2017) and Adesoji et al. (2019) which was modified to suit the research purpose

4. Results and Discussion

The findings from the study according to Table 1 indicated that 47.9% of the farmers are above 61 years old which revealed the highest numbers of the farmers involved in cocoa farming are older than 61 years of age. Out of 668 respondents, the study found that the majority are males of 582 equivalents to 87.1% with Malay race (33.8%) being involved more in cocoa production than other races in Malaysia. More so, 334 equivalents to 50% realized less than RM1,000 in a month and more than half of the respondents (67.8%) undertake cocoa farming as a part-time job. The descriptive analysis of the educational level of the respondents indicated that 480 (71.9%) had only completed primary education, 159 (23.8%) completed secondary education and only 22 (3.3%), 4 (.6%) and 3 (.4%) had Certificate, Diploma and Bachelor/Degree respectively.

Table 1.Farmers' Demographic Profile

Variables	**Frequency (n=668)**	**Percentage**
Farmers Age		
≤30	16	2.4
31-40	50	7.5
41-50	100	15.0
51-60	182	27.2
≥61	320	47.9
Gender		
Male	582	87.1
Female	86	12.9
Race		
Malay	226	33.8
Chinese	62	9.3
Indian	1	.1
Orange Asli	131	19.6
Kadazan	126	18.9
Murut	16	2.4
Bajau	1	.1
Iban	69	10.3
Bidayuh	9	1.3
Others	27	4.0
Monthly Income		
<RM1000	334	50.0
RM1000-RM1999	248	27.1
RM2000-2999	59	8.8
RM3000-3999	21	3.1
≥4000	6	.9
Focus of Work		
Full Time	215	32.2
Part-Time	453	67.8
Educational Levels		
Complete Primary School	480	71.9
Complete Secondary School	159	23.8
Certificate	22	3.3
Diploma	4	.6
Bachelor/Degree	3	.4

Findings from the study according to Table 2 revealed the highest percentage of the farmers 507 (75.9%) started their cocoa plantation under programmes facilitated by the extension agents of the Malaysian Cocoa Board (MCB) in the three (3) regions from year 2006-2010. More than half of the farmers 396 (59.3%) used 3-5 clones for their cocoa plantation out of the clones presented to them by MCB extension agents. In the same way, 340 (50.9%) of cocoa farmers cultivated 1-3 hectares of cocoa farmland, while 316 (47.3%) cultivated less than or equal to 1 hectare of cocoa farmland. The descriptive analysis of sources of information on cocoa technology by the respondents indicated that 51.4% received information from MCB extension agents, 21.3% of the farmers received information through their friends and 10.8% received information on cocoa technologies from their families.

Table 2. Crops Profile

Variables	**Frequency (n=668)**	**Percentage**
Location of Office		
Hilir Perak	124	18.6
Machang	100	15.0
Jengka	129	19.3
Tawau	33	4.9
Tenom	67	10.0
Ranau	39	5.8
Keningau	47	7.0
Kota Samarahan	95	14.4
Betong	34	5.0
Year Started Planting Cocoa		
At/Before 2000	73	10.9
2001-2005	88	13.2
2006-2010	507	75.9
Number of Clones Planted		
<3 Clones	229	34.3
3-5 Clones	396	59.3
≥5 Clones	43	6.4
Hectare Cultivated		
<1 Hectare	316	47.3
1-3 Hectares	340	50.9
3.1-5 Hectares	10	1.5
5.1-7 Hectares	2	.3
Information on Cocoa Technology		
MCB Extension Officers	643	51.4
Family	135	10.8
Friend	267	21.3
Pamphlet	44	3.5
Radio	13	1.0
Television	66	5.3
Newspaper	46	3.7
Internet	28	2.2
Others	9	0.7

As presented in Table 3, the descriptive statistics of the contributions of technical skill, technology delivery skill, and technology evaluation skill to work performance of extension agents among cocoa growers. The mean scores and standard deviations of the level of agreement were determined based on the range of (1-2.669) as low, (2.67-4.339) as moderate and (4.34-6.00) is high as an indication of measurement for the levels on a six-point scale of

6.00. As indicated in Table 3, the mean scores ranged from 4.68 to 4.76 and the standard deviation also ranged from 6.34 to .664. From Table 3, the level of work performance was high (M=4.68; SD=.643). All the factors that contributed to work performance also showed high mean scores with technology skill (M=4.76; SD=.634) being the highest score, followed by technology delivery skill (M=4.74; SD=.664), meanwhile, the lowest being technology evaluation skill (M=4.69, SD=0.65).

Table 3. Levels of Technical Skill, Technology Delivery Skill and Technology Evaluation Skill and Work Performance

Levels	**M**	**SD**
Work Performance	4.68	.643
Technical Skill	4.76	.634
Technology Delivery Skill	4.74	.664
Technology Evaluation Skill	4.69	.656

Note: M = mean, SD = standard deviation

The relationship between technology skill, technology delivery skill, and technology evaluation skill and work performance were determined using Pearson correlation coefficients. Exploratory analysis was carried out to ensure that assumptions of normality and linearity were not violated. The result of the correlation analysis showed that all factors were significantly correlated. As indicated in Table 4, the strongest linear relationship was found between technical skill and work performance (r=.677; p<.001). The result also showed positive and significant correlations between technology delivery skill and work performance (r=.651; p<.001) and between technology evaluation skill and work performance (r=.618; p<.001). These results indicated that hypotheses H1, H2, and H3 were supported and reject the null hypothesis.

Table 4. Bivariate Correlation Coefficients among Transfer of Technology Skills and Work Performance

Variables	**Technical Skill**	**Technology Delivery Skill**	**Technology Evaluation Skill**	**Work Performance**
Technical Skill	1			
Technology Delivery Skill	.784	1		
Technology Evaluation Skill	.731	.709	1	
Work Performance	.677**	.651**	.618**	1
Significant	.000	.000	.000	
Mean	4.76	44.74	4.69	4.68

Note: **Significant at p<.01 level.

To identify the effect of the skills to work performance, Table 4 presents the result of the regression analysis and was based on the contribution of all independent variables to work performance. The three independent variables were supported and statistically significant; technical skill (β=.346; p<.001), technology delivery skill (β=.243; p<.001), and technology evaluation skill (β=.192; p<.001). H1, H2, and H3 were supported as they were positive and significantly contributed to work performance. The summary statistics of the regression analysis show the variables for which the coefficients are statistically significant with R2 of .511. The work performances were attributed to the three-component of technology transfer with a combined contribution of 50.9% to variance of work performance.

Table 5. Multiple Linear Regression of Technical Skill, Technology Delivery Skill, Technology Evaluation Skill, and Work Performance

Coefficients	Unstandardized Coefficients		Standardized Coefficients		
Predictors	B	Std. Error	Beta	t	Sig.
Y Constant	1.009	0141		7.167	.000
X1 Technical Skill	.351	.048	.346	7.251	.000
X2 Technology Delivery Skill	.235	.045	.243	5.269	.000
Technology Evaluation Skill	.189	.041	.192	4.585	.000

Note: Significant; *p<.05, R = 0.715, R^2= 0.511, Adj.R^2 = 0.509, Std. Error of the Estimate = 0.45121, β = standardized regression coefficient, t value = test statistics of β

Results of the demographic profile showed that almost half (47.5%) of the farmers involved in cocoa production are aging which may serve as constraints to yield improvement (Keogh, 2016). Also, nearly three quarters (68.3%) of the farmers had only completed primary education and usually taking cocoa as a part-time job, this indicated significantly a lesser production and output from the farmers on cocoa production (Fadzim *et al.*, 2017).

The farmers' level of agreement on technical skill as having the highest mean value of 4.76 followed by technology delivery skill (4.74) and technology evaluation skill (4.69) respectively. This emphasized the importance of acquiring technology transfer skills by the extension agents to assist them in developing the technical capability of the farmers towards the adoption and application of cocoa technology available to them. The above result was similar to Tiraieyari *et al.* (2014) and Motolani *et al.* (2017) study, they reported that for cocoa farming to be sustainable, the extension agents need to be equipped with knowledge and skills in transferring technology and this is very important to enhance effectiveness for higher performance in their work.

The findings of the relationship between technical skill, technology delivery skill, technology evaluation skill, and work performance indicate that the correlation coefficient is positively related. Based on the above results, they all have a good determinant of direction and strength by showing a positive and significant correlation between independent variable and dependent variables. Summarily, technical skills had the strongest relationship while technology evaluation skill had the weakest relationship to extension agents work performance. This was confirmed by Motolani *et al.* (2017), they found that technology transfer skills established a good relationship with the performance of extension agents as it strengthened the agricultural extension service and help farmers to make sustainable production practices decisions on their farms. Also, the result of this study on technical skills is also consistent with the findings of earlier scholars. (Davis, 2015) study reported that technical skills show the highest value of positive correlation which is indicating that there is a need for the extension agents to possess both technical and functional skills on cocoa technologies for effective dissemination to improve their performance on cocoa farmers. Additionally, the result of the study was supported by Sail (2010), which confirmed that there were relationships between technical skill, technology delivery skill, technology evaluation skills, and work performance of agricultural extension agents'. Furthermore, Suvedi and Stoep (2016) reports that evaluating extension programmes will give extension agents the opportunity to assess the operation, outcomes, and impacts of any programme or project by collecting evidence to determine if certain acceptable standards have been met by farmers and to answer other relevant questions.

The results of the multiple regression analysis revealed that the three variables contributed significantly to work performance. The results of the multiple regression model indicated the significance of the three skills as their $p<0.05$. Technical skill has the highest Beta value of 0.346. The R^2 value of 0.511 implies that three predictors explain about 51.1% of the variation in extension agents' work performance. To confirm the importance of technical skill on extension agents' work performance, a research was conducted in Bhutan and Ethiopia by Wasihun *et al.* (2013) in their study they observed that in the delivery of extension services to farmers', technical skill was more important in determining extension agents' performance than any other skills. Moreover, Issahaku (2014) observed that the critique of MoA where, among many others, lack of technical competency by extension agents resulted in the problems of extension non-performance and ineffective delivery of services.

5. Conclusion, Limitation and Policy Implication

The limitation of this study emanated from the usage of the sample meant to be representative of the whole population. Even though there is a positive relationship between dependent and independent variables, work performance variance of 51.1% explain three significant independent variables. The used of productive cocoa growers also serves as a limitation in this study since it may not be a representative sample of other cocoa farmers who are not involved in extension agents facilitated programmes. There is a need for more diverse samples for future research. The implication of the findings from this study is focusing on the need to integrate identifying skills that contribute to work performance into extension activities and transfer of technology programmes to improve the skills of extension agents on technology transfer among cocoa growers. Many of the cocoa related technology transferred by the extension agents lack the required skills for effective delivery such as technical skill, technology delivery skill, and technology evaluation skill. Given the importance of the required skills for technology transfer as well as capacity and potential development of the cocoa growers, these three skills should be entrenched in training programmes introduced by agricultural extension service agencies in Malaysia to enhance sustainable cocoa production.

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