ToT and HRD competencies and its relationship to extension agents' performance among cocoa smallholders

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Abstract: *The contribution of extension agents' (EA) competencies are considered crucial in transferring technology to the farmers. The study identify competency level of Extension Agents' on transfer of technology (ToT) and human resource development (HRD) to productive cocoa farmers (PCFs) in West Malaysia. The study employed stratified random sampling technique. A total of 353 PCFs were sampled to evaluate the competencies of the Extension agents' through the use of structured questionnaires to elicit response from the farmers. The data were analyzed using descriptive statistics and Pearson correlation analysis. The findings support the positive relationship between transfer of technology and work performance and also between human resource development and Extension agents' work performance. Finding revealed that required skills are needed in transfer of technology (ToT) as well as human resource development (HRD) to the farmers; this will play an important role in work performance of the extension agents' and also enhance their performance achievement which will increase cocoa smallholder potential for higher farm productivity.*

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

I. Introduction

Contribution of cocoa bean production to Malaysian economy was significance from late 80's. Since that time, contribution of cocoa bean was a dominant major plantation company with the support of favourable factor which include price [1]. The phenomenon has also promoted cocoa planting by smallholder sector because of stable commodity price and very high demand to fulfill the local grinding capacity. However, the current situation of the cocoa industry in Malaysia reflects the challenges it may face in the future. The gap between supply and demand is evident from time to time [2]. Many of the plantation companies have replaced cocoa plantation with other commodities particularly oil palm. This inadvertently makes the cocoa smallholders the most important contributors to Malaysia cocoa beans supply because of limited resources and land if follows the plantation company trend.

Therefore, in order to meet the supply and demand of cocoa production in Malaysia, participation of smallholders' was explored by the Malaysian government to look after the cocoa commodity as one of the economic resources especially rural people. This was carried out through planning and implementation of smallholder programme to increase household income of the cocoa smallholders. The outcome of the implementation was good but there are some challenges which reduced the productivity of the smallholder to at least 50 percent of the required target by the government. The ultimate aim of agricultural extension is to improve the farmer's standard of living through extension agents. The extension agents play a middle role between government agencies and farmers as a source of information and should be able to convince farmers to adopt relevant technology [3]. Moreover, the contribution of extension agents' (EA) is considered crucial in transferring technology to the farmers. Traditionally, extension has been closely associated with the field of agriculture and rural development. In fact, it was the single most important strategy employed to promote the growth and development of small scale agricultural and agricultural-related enterprises in Malaysia [4].

The iceberg model of [5] shows that only "visible" or "surface" competencies are used to measure the extension agent's competency and work performance. Figure (1) shows the Iceberg competency model which is one of the competency models and it is based on three main aspects; knowledge, attitude and skills. It is also one of the models that are frequently adapted and modified in different organizations for establishing competency model. Competency comes from the word competent or expertise that refers to an ideal situation and quality or physical and intellectual qualifications of individuals in carrying out specific tasks. According to the United

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Nations Industrial Development Organization [6], competency encompasses a combination of knowledge, skills and behaviour that are practiced for self-improvement. Similarly,competency isa set of skills, knowledge, and behaviour which characterize better performance in every aspect of an individual. Competency exists due to values in life, attitude and internal motivation of individual to complete tasks in hand perfectly and produce excellent job. According to [8], competency is not merely about knowledge and skills. Instead, it involves the ability to fulfill complex demands by preparing psycho-social resources such as skills and attitude in specific context. According to [9], from the management perspective, competency refers to a combination of resource and ability. On the other hand, the human resource management perceives competent as the ability of individual to complete the tasks assigned to them. The main purpose for organization to apply the concept of competency is to facilitate the process of evaluating the suitability and expertise of employers in completing assigned tasks. Basically, competency includes three important aspects which are knowledge (cognitive), attitude (affective) and skills (psychomotor) that are combined to solve certain assignments [6] (UNIDO, 2002). Two components were identified in this research to measure competency of the extension agents' inclusively transfer of technology (ToT) and human resource development (HRD). ToT means the process of transferring (disseminating) technology from the places and in-groups of its origination to wider distribution among more people and places. Meanwhile, HRD was the framework for helping employees develops their personal and organizational skills, knowledge, and abilities (Fig.1)

Conceptual background
This research was carried out by collecting data from cocoa smallholders who are involved in the extension activities by MCB's extension agents' at West Malaysia. To determine the extent of technology delivering by the extension agents' to smallholders, there is need to identify the level at which the smallholders respond to the work performance of extension agents'. As a result of this, the Iceberg competency model was employed as the basis for measurement. The framework indicates the relationship between dependent and independent variables.

The objectives of the study *are:*
1. Determine the level of extension agents competencies related to ToT and HRD component and Work Performance;
2. Determine the relationship between extension agents competencies and work performance;
3. Identify the most important factor contributing to work performance.

II. Materials And Methods

Research design: This study is a descriptive correlation which combines descriptive and correlational studies. In this study work performance is dependent variable while transfer of technology and human resource development are independent variables which may have relationship and determine work performance.

Sample: The target population of this study consist all productive cocoa farmers' who are exposed to the extension activities facilitate by the extension agents' of Malaysian Cocoa Board (MCB) in the Peninsular States for a minimum of five years. There are total of 561 productive cocoa farmers in West Malaysia. The population for this study is all productive cocoa farmers (N=561). It was decided usingKrejcie and Morgan table to determine the sample size of 379 as a sample size for this study.

Sampling Method and Procedure: This study employs a geographical stratified sampling method. West Malaysia is divided into three regions: Northern region, Eastern region and Southern region. In northern region (218 productive cocoa farmers), eastern region (133 productive cocoa farmers) and southern region (210 productive cocoa farmers). The total number of productive cocoa farmers in these three regions is 561. The population were divided into a homogeneous strata (grouping of individuals farmers from zoning cluster and the group of productive farmers) and then simple random sampling were used to select respondent within each stratum. Samples were chosen with Krejcie and Morgan table. The list of productive cocoa farmers in each region was obtained from Malaysian Cocoa Board. A total of 379 productive cocoa farmers were selected. Based on this, we distributed 379 questionnaires, of which we collected 356. We discounted 3 questionnaires with incomplete responses and use the remaining 353 PCFs sampled in the final analysis.

Instrument and measurement: This study utilizes questionnaire as the instrument to collect data from the respondents. The questionnaire consisted of four sections. First part of the questionnaire is designed to collect data on demographic profile of the respondents, the second part is to measure transfer of technology skills of the extension agents' on three dimensions, the third part measures human resource development skills of the extension agents' on three dimensions as well and the last part of the questionnaire measure work performance

of extension agents'. Six likert scale option (1 = strongly disagree to 6 = strongly agree) were used to measure respondents' perception on the statement given consisting of transfer of technology (ToT), human resource development (HRD) and work performance on cocoa technology used. The items in the questionnaire were built based on research questions and objectives of study. The pre-test analysis was conducted; reliability and validity were tested in final stage of questionnaire development. Krejcie and Morgan table was used to calculate an appropriate sample size for doing the research.

Data analysis: SPSS statistics 21.0 was used for data analysis. A descriptive analysis of respondents' profile was completed using mean, frequency and percentage. Competency and work performance level were described using the range level (low, moderate and high) based on mean value. Pearson's correlation coefficients were used to review the correlations between competency (ToT and HRD) and work performance. Multiple regression analysis was completed to verify the most contributing effect on the relationship between competency and work performance.

III. Results And Discussion

The demographic profile of the respondents is as stated in table 1.
The research analysis carried out was descriptive analysis based on frequency and percentage of respondent distribution.
Region: The higher respondents were from southern region (36.8%), follow by northern region (34.8%) and eastern region represented (28.3%).
Gender: Majority of the farmers were male (88.4%) and 11.6% were females.
Age group: Most of the respondents were distributed in the age group of equal or greater than 61 years (66.3%) compare to (22.1%) of 51-60 years and (9.6%) for 41-50. About (1.7%) for 31-40 and (0.3%) below 30 years of age.
Race: The most dominant race in this research was Malay (47.9%), follow by indigenous (36.3%) and Chinese recorded (15.6%) with Indian having (0.3%).
Household Income: The level of household income of the respondent shown that majority of the respondents had income between RM1, 000-RM1, 999 (49.3%) while (32.6%) of farmers range RM1, 000 and below.
Level of Education: Majority of the respondents (81.0%) completed primary education, while (17.6%) had secondary education, (0.8%) Certificate, (0.3%) Diploma and (0.3%) Bachelor.
Year of Cocoa Planting: Majority of the respondents (69.4%) are between 2006-2010 years of cocoa plantation, (19.8%) are between 2001-2005 years while (10.8%) of the respondents started at or before year 2000.
Clone/Farm: The data also shows that (79.0%) uses 3-5 clones for their plantation and followed the technology recommendation, (13.0%) less than 3 and (7.9%) uses more than 5 clones on their farm land.
Hectarage: Majority of the respondents (81.3%) had less than 1 hectare of farm land, while only (17.8%) of the respondents had a land holding size of 1-3 hectares and just (0.8%) cultivated 3.1-5 hectares of farmland for cocoa plantation.
Types of Work: Majority of the respondents (84.7%) takes cocoa plantation on part time basis while (15.3%) were on full time.
Source of Information on Cocoa Technology: Most of the respondents (53.8%) received information on cocoa technology through MCB extension agents', (19.0%) received information from friend while (7.5%), (6.9%) and (5.7%) source information through newspaper, TV and family respectively. All the information was analyzed based on 353 respondents and the detail of the profile shown at Table 1.

Competency in transfer of technology (ToT) and human resource development (HRD) and work performance
Translating the response of respondents on competency level of extension agents', the level of scale was developed to divide all the mean score of the findings into three different levels. Six likert scaleswas used in this research, mean score were divided into low, moderate and high level (Table 2).
In this research, variable of transfers of technology consist of three sub-variables which represent the meaning of competency based on Iceberg competency model (Spencer & Spencer, 1993). The three components were analyzed as stated in Table. 3. Technical skill component represent the higher mean score (4.87), followed by technology evaluation skill (4.79) and the lowest was technology delivery skill (4.77). The three components showed high score level of competency. Findings of this variable shows that the content of the cocoa technology was satisfactory as applied by the MCB extension agents' which was directly evaluated by the cocoa smallholders. Technology covered in this variable was based on disseminating technology on both theory and practical.[3] findings supported that cocoa extension agents' knowledge towards the concepts of cocoa sustainable farming is very important in transferring technology. Also, [10] opined that for any extension agent

to be competent; knowledge, technical skills and personal characteristics are very important in such that it leads to outstanding performance.

The human resources development (HRD) component also highlighted the high score level of competency. The leadership skill shows higher mean score of 4.87 and also decision making support skill of 4.82. Meanwhile, social skill was the lowest with social skill of 4.75. The HRD function is very important to the extension agents' in order to motivate convince the smallholder to apply all the technology available to them. According to [11], it was reported that effective organizations require effective leadership and thatorganizational performance will suffer in direct proportion to the neglect of it. Furthermore, [12]emphasized that the effectiveness of anyset of people is largely dependent on the quality of its leadership; effective leader behaviour facilitates the attainment of the follower's desires, which thenresults in effective performance. Also, [13] rated high competencies such as communication, analysis and diagnosis and leadership qualities as important factors to work performance of an individual.

The outcome of the competency level of extension agents' in this research was the work performance. According to [10], to improve the performance of extension agents, one of the ways is by getting to know the competencies, skills and abilities. The statement in the questionnaire emphasized the extension agents' efforts to disseminate all the technology farm productivity and socioeconomic benefits of the farmers. The respondents agreed that the level of work performance of MCB extension agents' was high with a mean score of 4.81.

Relationship between competency and work performance of extension agents'

The ToT skills and HRD skills were correlated with the work performance. The findings revealed that both variable had positive correlation with r = 0.752 and 0.785 (Table 3). The (r) value shows a strong correlation according to Guilford (1973) rules of thumb (Table 5). Findings also show that respondent was of the opinion that both components are very important in the extension agents' routine work.In the correlation of ToT and HRD, variable identified with strong correlation were leadership skills (r = 0.742), social skills (r = 0.731) and technical skills (r = 0.703) (Guilford, 1973). Meanwhile, decision making support skills (r = 0.700), technology delivery skills (r = 0.693) and evaluation technology skills (r = 0.693) shows a moderate correlation (Guilford, 1973). All these, highlighted as important the competency level of extension agents' to be able carry out extension role to develop smallholders potential and effectiveness. These results are supported by [14] which confirmed that there were relationships between leadership skills, social skills, technical skills, technology delivery skills, technology evaluation skills and work performance of agricultural extension agents'

The regression analysis was analyzed to identify the most contributing component to the extension work performance. The result (Table 6) shows social skills had the bigger Beta value 0.266, followed by leadership skills(0.199), technical skills(0.139) and the decision making support skills(0.118). Other component showed lower contribution to extension agents' work performance. Four significance values for that component interpreted the 63.0 percent (Adj. R^2 value) contributing to the extension agents' work performance. The findings emphasized four component (social skills, leadership skills, technical skills and decision making support skills) had (r) value higher than 0.700 (Table 4) as the most contributing factors to extension work performance. Meanwhile, three components contributed more to extension agents' work performance from HRD with only one components of ToT (technical skills) contributed to 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.

However, [15] reported social skills as the strongest predictor of extension agents' work performance. Also, findingsof another research showed that possession of social skills led to a good prediction of job performance[16]. Findings of a research by [17]indicated that among all factors, socialskill is strongest contribution in explaining the extension agents' work performance. The result of regression analysis in the study of analysis of the work performance of the extension agents' of Iran conducted by [18] revealed that competency contribute 48.6% of the variance in work performance of extension workers. Extension workers must be competent in technical area of their job in terms of knowledge and skills in new technology. Results of study conducted by [19] showed job performance of extension workers is positively related to technical aspect of their job. [20] stated that successful extension workers should have strong technical knowledge and skill (competency). Similarly [21] contended thathigher ratesof technology adoption by clients are achieved whenextension workers possess adequate technical competency.
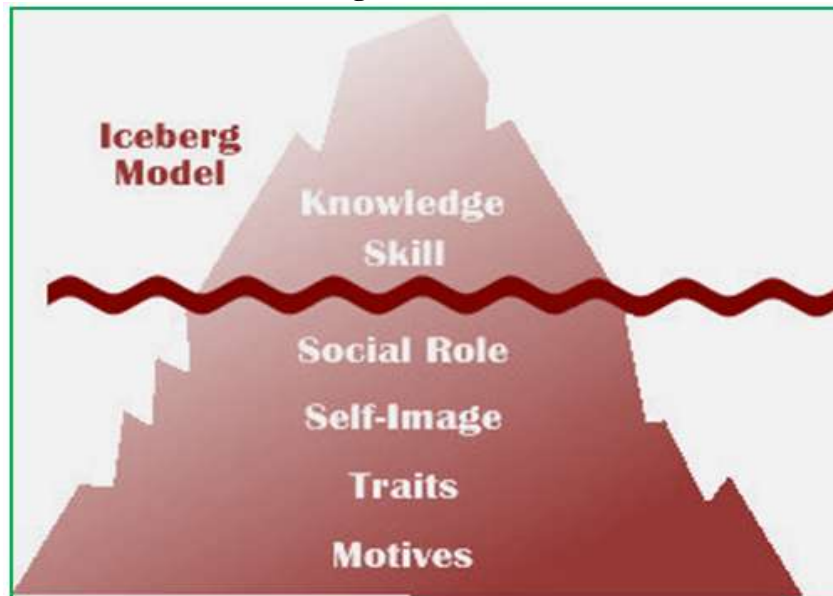
IV.   Figures And Tables

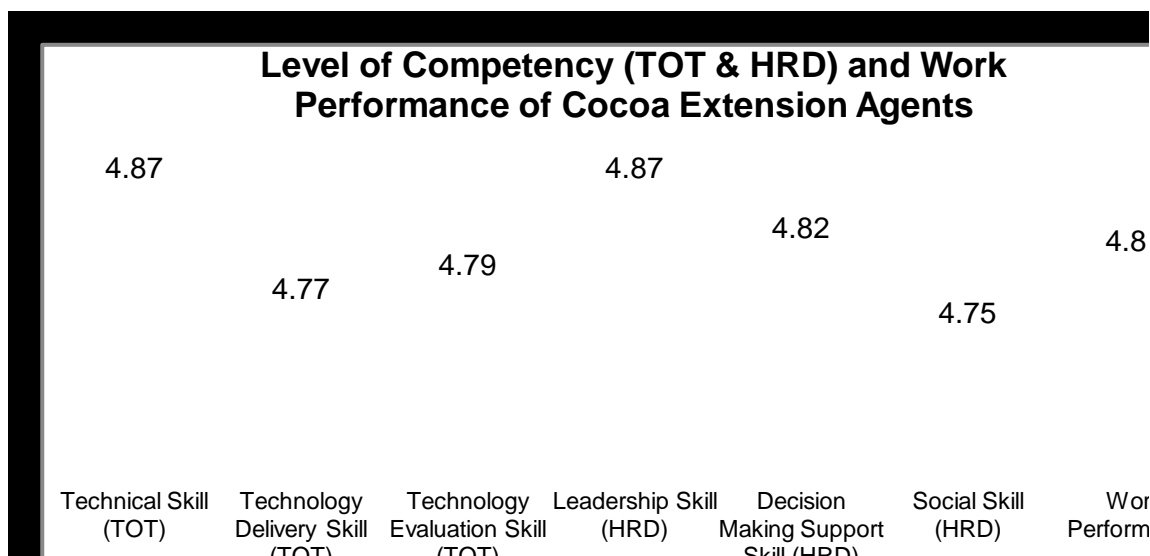**Figure 1:**Iceberg model developed by Spencer and Spencer (1993)

Level of Competency (TOT & HRD) and Work Performance of Cocoa Extension Agents

4.87   4.87

                                                     4.82

                                                                              4.8

                    4.79

         4.77

                                                              4.75

Technical Skill   Technology   Technology   Leadership Skill   Decision   Social Skill   Wor
(TOT)   Delivery Skill   Evaluation Skill   (HRD)   Making Support   (HRD)   Perform
                  (TOT)   (TOT)   Skill (HRD)

Figure 2: Level of competency (ToT & HRD) and work performance of Cocoa Extension Agents'

1: Respondents Profile

Profile	Frequency	Percent (%)
Region		
Northern	123	34.8
Eastern	100	28.3
Southern	130	36.8
Gender		
Male	312	88.4
Female	41	11.6
Age		
≤30	1	0.3
31-40	6	1.7

41-50	34	9.6
51-60	78	22.1
≥ 61	234	66.3
Race		
Malay	169	47.9
Indigenous	128	36.3
Chinese	55	15.6
Indian	1	0.3
Income		
< RM1000	115	32.6
RM1000 - RM1999	174	49.3
RM2000 - 2999	44	12.5
RM3000 - 3999	17	4.8
≥ RM4000	3	.8
Education		
Complete Primary School	286	81.0
Complete Secondary School	62	17.6
Certificate	3	0.8
Diploma	1	0.3
Bachelor/Degree	1	0.3
Year of Cocoa Planting		
2010 - 2006	245	69.4
2005 - 2001	70	19.8
At/Before 2000	38	10.8
Clone/farm		
< 3 clone	46	13.0
3-5 clones	279	79.0
> 5 clones	28	7.9
Hectarage		
< 1	287	81.3
1-3	63	17.8
3.1-5	3	0.8
Types of work		
Full time	54	15.3
Part time	299	84.7
Source of Cocoa Information		
MCB Officers	351	53.8
Family	37	5.7
Friends	124	19.0
Brochure	17	2.6
Radio	12	1.8
TV	45	6.9
Newspaper	49	7.5
Internet	14	2.1
Others	3	0.5

Table 2: Level of mean score

Likert Scale Level	
1 - 2.669	Low
2.67 – 4.339	Moderate
4.34 – 6	High

Table3: Relationship of competency (TOT & HRD) and extension agents' work performance

		X1	X2	Y
X1	Transfer of Technology	1	.876[**]	.752[**]
X2	Human Resource development		1	.785[**]
Y	Work Performance			1

Table 4: Transfer of technology (TOT) skill and human resources development (HRD) skill and its relationship to work performance

	Variables	X1	X2	X3	X4	X5	X6	Y
X1	Technical Skill (ToT)	1	.808[**]	.781[**]	.792[**]	.739[**]	.710[**]	.703[**]
X2	Technology Delivery Skill (ToT)		1	.769[**]	.803[**]	.732[**]	.736[**]	.693[**]
X3	Evaluation Technology Skill (ToT)			1	.805[**]	.718[**]	.702[**]	.693[**]
X4	Leadership Skill (HRD)				1	.768[**]	.788[**]	.742[**]
X5	Decision Making Support Skill (HRD)					1	.780[**]	.700[**]
X6	Social Skill (HRD)						1	.731[**]
Y	Work Performance							1

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5: Relationship using Guilford (1973), Rules of thumb

Correlation coefficient (r)	Strength of relationship
< 0.20	Negligible
0.21 - 0.40	Weak
0.41 – 0.70	Moderate
0.71 – 0.90	Strong
0.90 <	Very Strong

Table 6: Estimated coefficient for work performance model

Performance dimension	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	.787	.177		4.437	.000
Technical Skill (ToT)	.142	.065	.139	2.178	.030
Technology Delivery Skill (ToT)	.051	.064	.051	.800	.424
Technology Evaluation Skill (ToT)	.115	.062	.114	1.862	.063
Leadership Skill (HRD)	.178	.063	.199	2.826	.005
Decision Making Support Skill (HRD)	.118	.059	.118	1.987	.048
Social Skill (HRD)	.231	.052	.266	4.453	.000

$R = 0.798$, $R^2 = 0.637$, Adj. $R^2 = 0.630$, Std. Error of the estimate = 0.43443

V. Conclusion

Based on the findings and discussion given, it was realised that competency level of cocoa extension agents' in West Malaysia in transfer of technology (ToT) and human resource development (HRD) have a high competency level. Based on high level competency in ToT and HRD, work performance of the cocoa extension agents' was evaluated at high level. From this study, it is shown that farmers and extension agents' have successfully performed extension role. Function of ToT and HRD reflected work performance achievement to increase the smallholder potential and be able to empower them to increase cocoa production. The components of both ToT and HRD were influential as it is positively correlation to work performance of cocoa extension agents'.

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