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Development of Indicators and Rubric Score Criteria for Job Competency Assessment

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Abstract: This research aimed to develop and evaluate the validity of job competency assessment indicators; develop and evaluate the validity of rubric score for job competency assessment. It observed TISCO company's employees working during 2013 to 2014 (n = 1.857). Research tool was assessment form at the rubric score, created job competency assessment indicators derived from the board meeting. This research statistics were percentage, mean, standard deviation, confirmatory factor analysis and multidimensional form of the partial credit model.

Key words: Indicators, job competency, rubric scoring, confirmatory factor analysis, multidimensional form of the Partial Credit Model

INTRODUCTION

To become a successful organization, the development process of an organization must adapt with the social changes occurring in the surroundings. Human resource is one of the important elements in enhancing any organizational success. Organization that has competent human resources can increase the opportunity in the market with the higher success rate. Therefore, the success of the organization mainly depends on the performance of their staffs or employees.

Job competency is a good indicator of employee's performance. It includes both covert and overt behavior of individuals, their interest to learn, skill, ability and other attributes. Whiddett and Hollyforde (2003) state that competencies are behaviors that individuals demonstrate when undertaking job-relevant tasks effectively within a given organizational context. Similarly, Binning and Barrett (1989) also agree with the idea that competency is a performance indicator. Therefore, employees with high competency level can lead their organization to the successful one.

TISCO is the first investment bank in Thailand established in 1969. TISCO has been recognized as a pioneer and it has sustained its leading role in auto hire purchase, provident fund management, private banking, brokerage and investment banking for over four decades. With its long-year expertise in financial and investment fields, today TISCO engages in banking services for retail, SME and corporate clients. In parallel with business operation, TISCO has also taken social responsibilities role in providing educational support and financial literacy to create public awareness of personal finance management, one of life's most important priorities. TISCO has received many awards such as Board of The Year 2013, Top Corporate Governance Report Awards 2013, Outstanding Securities Company Awards 2013-Retail Investors, Outstanding Securities Company Awards 2013-Institutional Investors, Outstanding Investor Relations Awards 2013, Aon Hewitt Best Employers in Thailand 2013 and Top Bank in the Secondary Market for Corporate Bonds 2012. The major factor that has led to such organizational quality at TISCO is the competent employees. So, encouraging employees to improve their job competency enhance the quality of the service at any organizations.

Operational process in organizations changes over time due to the ongoing economic and social changes they face. It may result from both internal and external factors of the organization or caused by the nature of working processes. Once the working process changes, it certainly affects the competency of the employees as all. To help organizations perform effectively, these changes need to be checked regularly using the updated indicators. Such indicators provide the information which help identify the quantity or condition of the thing that would like to measure at that time (Johnstone, 1981). Good indicators should be up to date, timely, appropriate, meet

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the requirements or the purpose of its use and be a good assessment tool (Johnstone, 1981; UNESCO, 1993). Moreover, we need to set criteria or standards with the interpretation of indicators so that it can reflect the valid performance of employees.

So far, TISCO assesses their employee's job competency by using a rating scale. This caused an incompatible with true competency assessment technique, not up to date to the change in the organization and lack of tangible development. These problems indicated the need to develop better indicators and criteria as well as the validity of indicators and criteria for job competency assessment of employees. It challenges the researcher to develop a model which produces a good quality assessment that meets the constantly changing working processes.

Research objectives: The objectives of this research were to develop and assess the validity of job competency assessment indicators and to develop and assess the validity of rubric score for job competency assessment.

MATERIALS AND METHODS

Sample: Sample were selected by stratified random sampling technique; sample units were leader with pillar strata.

The sample consisted of 3,857 TISCO employees working between years 2013 to 2014. Sample were from 6 different departments: assess management business (4.28%), corporate support (14.99%), corporate banking business (3.40%), retail banking business (53.80%), securities business (3.52%), wealth business (13.22%) and unidentified (6.79%).

This research's sample size was sufficient according to the principle of factor analysis by Hair *et al*. (2010). They suggested a minimum sample size by taking ratios of the total variables per number of samples as 1:20. Then, the minimum sample size for this research was 480 because this study had 24 variables/single indicators. Moreover, this research's sample size was also sufficient according to Rasch Model which suggested a minimum sample size at 200 (Wright and Stone, 1979; Yen and Fitzpatrick, 2006).

Development of indicators and rubric score criteria:

- Identified component/indicator of job competency assessment. TISCO's board meeting determined 5 core components to evaluate the job competency such as communication, people, logic, business and leadership
- Information from literatures review were used to create empirical definition for all 5 core components
- Develop single indicators and rubric score criteria
- TISCO's board considered all single indicators and rubric scoring criteria of each single indicator
- Created research tool, validation for all single indicators and rubric score criteria and pilot test
- Assess the job performance

Research tool: The 24 single indicators rubric score questionnaire were based on the 5 major indicators namely; communication, people, logic, business and leadership. The questionnaire was review by experts for the content validity. The value of Index of Consistency (IOC) ranged from 0.6-1.0. From a pilot test (n = 46), item-total correlation ranged from 0.03-0.76 and the Cronbach reliability alpha was relatively high (0.91) confirming the relatively high reliability of this questionnaire.

Data analysis: Mean, standard deviation, confirmatory factor analysis and multidimensional form of the partial credit model were used to analyze the various data collected from the sample.

RESULTS AND DISCUSSION

Job Competency Assessment Indicators Model: The developed job competency assessment's indicators consist of communication indicators (4 single indicators), personnel indicators (3 single indicators), logic indicators (8 single indicators), business indicators (5 single indicators) and leadership indicators (4 single indicators).

The preliminary confirmatory factor analysis of measurement model validation: The correlation coefficient of 276 pair (24 single indicators) indicated a positive relationship ranged from 0.088-0.608 ($p<0.01$). This study Measure of Sampling Adequacy (MSA) value ranged from 0.91-0.98 which indicate the indicator was predicted without error by the indicator others (Hair *et al*., 2010).

The Bartlett's test of sphericity was 36507.627 (df = 276, $p<0.00$) indicated the proper relationship level. The Kaiser-Meyer-Olkin Measure (KMO) of sampling adequacy was 0.972 which proves the proper relationship as it is higher than 0.50 (Hair *et al*., 2010). So, the data was appropriate for factor analysis technique.

The confirmatory factor analysis result of measurement model validation: The confirmatory factor analysis result of measurement model validation indicated that job competency model consisted of 5 components: communication, people, logic, business and leadership (Table 1).

Table 1: The confirmatory factor analysis result of measurement model validation

Core competency	Single indicator	Factor loading (b)	Standard Error (SE)	t-values	Completely standard solution	Reliability (R^2)
Communication (com)	Indicator1	0.75**	0.01	50.38	0.75	0.56
	Indicator2	0.24**	0.02	14.02	0.24	0.06
	Indicator3	0.78**	0.01	53.32	0.78	0.61
	Indicator4	0.55**	0.02	34.01	0.55	0.30
People (peo)	Indicator5	0.58**	0.02	31.27	0.58	0.34
	Indicator6	0.39**	0.02	21.40	0.39	0.15
	Indicator7	0.45**	0.02	24.85	0.45	0.20
Logic (log)	Indicator8	0.73**	0.01	52.10	0.73	0.54
	Indicator9	0.60**	0.01	40.31	0.60	0.36
	Indicator10	0.58**	0.02	38.50	0.58	0.34
	Indicator11	0.71**	0.01	49.74	0.71	0.50
	Indicator12	0.71**	0.01	49.45	0.71	0.50
	Indicator13	0.73**	0.01	52.13	0.73	0.54
	Indicator14	0.52**	0.02	33.95	0.52	0.27
	Indicator15	0.60**	0.01	40.03	0.60	0.36
Business (bus)	Indicator16	0.57**	0.02	37.85	0.57	0.33
	Indicator17	0.66**	0.01	45.06	0.66	0.44
	Indicator18	0.66**	0.01	44.80	0.66	0.43
	Indicator19	0.58**	0.02	38.27	0.58	0.33
	Indicator20	0.72**	0.01	50.55	0.72	0.52
Leadership (led)	Indicator21	0.68**	0.01	46.14	0.68	0.47
	Indicator22	0.71**	0.01	48.62	0.71	0.51
	Indicator23	0.69**	0.01	46.50	0.69	0.47
	Indicator24	0.53**	0.02	34.11	0.53	0.28

χ^2 = 2612.64 (df = 242, p = 0.00); GFI = 0.95; AGFI = 0.93; RMR = 0.03; RMSEA = 0.05; **p<0.01

We found an acceptable factor loading score of each single indicator such as 0.24-0.75, 0.39-0.58, 0.52-0.73, 0.57-0.72 and 0.53-0.71, respectively. All factor loading value were statistically significant (p<0.01). Which means all single indicators were important for a job competency assessment. Similarly, square multiple correlations (R^2) of each single indicator were 0.06-0.56, 0.15-0.34, 0.24-0.54, 0.33-0.52 and 0.28-0.51, respectively that indicates that variances of single indicators are explained by components/indicators ranged from low to high percentage level such as 6.00-56.00, 15.00-34.00, 24.00-54.00, 33.00-52.00 and 28.00-51.00, respectively. Additional algebric formula was used to see difference factor loading score between single indicators (Johnstone, 1981) that revealed:

$$I = \frac{W_1V_1+W_2V_2+W_3V_3+, ..., +W_nV_n}{\sum W_i}$$

Where:

V = Single indicator score
n = A number of single indicator
ΣW_i = A summary of n single indicator's factor loading score

The equation for the core indicator as follows:

$$com = \frac{[0.75**(indicator1)+0.24**(indicator2)+0.78**(indicator3)+0.55**(indicator4)]}{0.75+0.24+0.78+0.55}$$

$$peo = \frac{[0.58**(indicator5)+0.39**(indicator6)+0.45**(indicator7)]}{0.58+0.39+0.45}$$

$$log = \frac{\begin{array}{c}[0.73**(indicator8)+0.60**(indicator9)+0.58**(indicator10)+0.71**(indicator11)+\\ 0.71**(indicator12)+0.73**(indicator13)+0.52**(indicator14)+0.60**(indicator15)]\end{array}}{0.73+0.60+0.58+0.71+0.71+0.73+0.52+0.60}$$

$$bus = \frac{[0.57**(indicator16)+0.66**(indicator17)+0.66**(indicator18)+0.58**(indicator19)+0.72**(indicator20)]}{0.57+0.66+0.66+0.58+0.72}$$

$$led = \frac{[0.68**(indicator21)+0.71**(indicator22)+0.69**(indicator23)+0.53**(indicator24)]}{0.68+0.71+0.69+0.53}$$

The results showed that the model designed by researcher was fitted with the empirical data. The statistical values of the model were: $\chi^2 = 2612.64$, df = 242, p = 0.00 (The chi-square is sensitive to departures from sample size, it has been suggested to use instead alternative measures of fit to correct for this bias), RMSEA = 0.05, GFI = 0.95, AGFI = 0.93 and RMR = 0.03. So, the job competency model in this research hold a theoretical or construct validity (McIntire and Miller, 2007).

Rubric score criteria for job competency assessment: We applied five level rubric score criteria for all developed indicators. This study was conducted on the basis of Multidimensional Random Coefficients Multinomial Logit Model (MRCMLM) (Adams *et al*., 1997). A multidimensional form of the Partial Credit Model was use to applied data because 5 indicators of job competency model were related. A multidimensional form of the Partial Credit Model (Multidimensional PCM) was developed from unidimensional form of the Partial Credit Model (PCM). PCM is suitable to multi-answer questionnaire or ordered polytomous items such as a measurement of personality, cognitive and attitude (Ostini and Nering, 2006). ConQuest 2.0 was used to analyze the drawn data. Item fit technique was used to test a consistency between Job Competency Model and single indicator criteria. The standard for the exceptional INFIT MNSQ score for rating scale should range from 0.60-1.40 (Wright *et al*., 1994).

INFIT MNSQ score of each single indicator in 'communication' indicator ranged from 0.87-1.41. The 5th item fit score of second single indicator was exceeded 1.40. So, most of a single criteria of communication indicator in Job Competency Assessment Model was perfectly suitable. A reliability (EAP/PV = 0.87) score was indicated a very high measurement efficiency level.

INFIT MNSQ score of each single indicator in 'people' indicator ranged from 0.86-1.12. So, all single criteria of people indicator in job competency assessment model was perfectly suitable. A reliability (EAP/PV = 0.80) score was indicated a very high measurement efficiency level.

INFIT MNSQ score of each single indicator in 'logic' indicator was range from 0.83-1.32. So, all single criteria of logic indicator in Job Competency Assessment Model was perfectly suitable. A reliability (EAP/PV = 0.96) score indicated a very high measurement efficiency level.

INFIT MNSQ score of each single indicator in 'business' indicator ranged from 0.87-1.18. So, most of the single criteria of business indicator in Job Competency Assessment Model was perfectly suitable. A reliability (EAP/PV = 0.94) score indicated a very high measurement efficiency level.

INFIT MNSQ score of each single indicator in 'business' indicator ranged from 0.84-1.58. The 24th item fit score of fifth single indicator was exceeded 1.40. So, most of the single criteria of business indicator in Job Competency Assessment Model was also found to be suitable. A reliability (EAP/PV = 0.94) score indicated a very high measurement efficiency level. The detailed results are presented in Table 2.

We found validity evidences (score and wright map diagram) that indicated a fit between the model and item/single indicator (Acton *et al*., 2005; Baghaei, 2008) (Fig. 1).

The developed indicator for job competency assessment were: communication indicators (4 single indicators), personnel indicators (3 single indicators), logic indicators (8 single indicators), business indicators (5 single indicators) and leadership indicators (4 single indicators). A factor loading of all single indicators were; 0.24-0.75, 0.39-0.58, 0.52-0.73, 0.57-0.7 and 0.53-0.71, respectively. The Job Competency Model was fitted with the empirical data. The statistic values of the model were $\chi^2 = 2612.64$, df = 242, p = 0.00 (The Chi-square is sensitive to departures from sample size, it has been suggested to use instead alternative measures of fit to correct for this bias), RMSEA = 0.05, GFI = 0.95, AGFI = 0.93 and RMR = 0.03 (Bollen, 1989; Kelloway, 1998; Hair *et al*., 2010). The results reflected the reliability and validity of five indicators determined by TISCO's board that assess employee's job competency. All developed indicators were accurate and compatible with TISCO values [TISCO values are the essence of the service we offer to the customers and qualities we captivate and seek in the people. Through induction, training and comprehensive corporate guidelines, these values are transferred into TISCO culture and shape the professional attitude...] including mastery, reliability, integrity, customer, creativity and guidance. In applying these indicators, the user should use the all set of single indicators in each core indicator for the better result. For example, use all 4 single indicators of communication indicators based on the priority of indicator loading refer to an employee who is able to present, able to communicate fluently, able to negotiate and able to persuade audiences for the set objectives.

There were 8 single indicators with over 50 percentage to explain the core indicator such as able to be a presenter, able to communicate fluently, able to analyze, able to create framework, able to follow working strategies, able to manage human resources, able to set

Table 2: A consistency analysis between Job Competency Assessment Model and rubric score criteria of a single indicator

		OUTFIT		INFIT				OUTFIT		INFIT	
Indicators	Level	MNSQ	T	MNSQ	T	Indicators	Level	MNSQ	T	MNSQ	T
com						**log**					
Indicator 1	1	0.86	-6.7	0.94	-2.8	Indicator 13	1	0.87	-6.0	0.92	-5.0
	2	0.92	-3.8	0.95	-3.8		2	0.89	-4.9	0.95	-3.2
	3	0.90	-4.8	0.97	-0.9		3	0.77	-10.8	0.94	-2.3
	4	0.91	-4.2	0.98	-0.7		4	0.99	-0.4	0.93	-2.3
	5	0.66	-16.8	0.89	-3.8		5	1.98	33.7	0.99	-0.1
Indicator 2	1	1.16	6.6	0.95	-2.2	Indicator 14	1	1.28	11.1	1.07	3.4
	2	1.28	11.2	1.10	5.4		2	0.95	-2.1	0.99	-0.4
	3	0.98	-0.8	1.00	0.0		3	1.04	1.8	1.00	-0.2
	4	1.12	5.2	1.00	0.0		4	0.94	-2.6	0.95	-1.7
	5	2.95	57.2	1.41	18.4		5	22.49	240.1	1.32	6.8
Indicator 3	1	0.72	-13.4	0.87	-6.3	Indicator 15	1	1.07	3.0	1.00	-0.2
	2	0.93	-3.2	0.97	-2.3		2	0.94	-2.5	0.99	-0.6
	3	0.91	-3.9	0.98	-0.9		3	0.76	-11.7	0.96	-1.3
	4	0.77	-10.8	0.91	-4.3		4	2.79	53.8	1.14	5.7
	5	0.77	-10.7	0.94	-1.4		5	1.04	1.6	0.96	-0.6
Indicator 4	1	0.96	-2.0	0.95	-2.3	EAP/PV reliability = 0.96					
	2	0.99	-0.4	0.99	-0.6	**bus**					
	3	0.98	-0.9	1.00	-0.1	Indicator 16	1	2.22	40.1	1.08	2.5
	4	0.83	-8.1	0.97	-0.6		2	0.96	-1.7	0.98	-1.9
	5	1.10	4.1	1.04	1.6		3	0.99	-0.3	0.99	-0.4
EAP/PV reliability = 0.87							4	1.35	14.0	1.02	0.8
peo							5	3.00	58.3	1.11	2.1
Indicator 5	1	0.80	-9.2	0.86	-11.0	Indicator 17	1	1.47	18.1	1.03	1.5
	2	1.01	0.4	1.00	0.2		2	1.00	0.2	0.99	-0.1
	3	0.91	-4.1	0.98	-0.6		3	0.92	-3.6	0.97	-1.9
	4	0.71	-14.1	0.94	-1.4		4	0.86	-6.3	0.98	-0.5
	5	2.05	35.6	1.10	2.4		5	2.14	38.0	1.09	1.3
Indicator 6	1	1.04	1.5	0.99	-0.5	Indicator 18	1	1.19	7.7	1.00	0.2
	2	1.09	3.6	1.01	0.4		2	1.02	1.0	0.97	-2.5
	3	1.03	1.3	1.01	0.9		3	1.01	0.4	0.99	-0.6
	4	1.15	6.3	1.04	1.2		4	0.71	-14.0	0.94	-2.0
	5	1.25	10.1	1.07	3.6		5	2.29	41.8	1.07	1.2
Indicator 7	1	1.04	1.6	1.00	0.2	Indicator 19	1	1.13	5.4	1.06	3.4
	2	1.05	2.3	1.00	0.1		2	0.94	-2.9	0.98	-0.8
	3	0.98	-0.7	1.00	-0.1		3	0.89	-5.0	0.97	-0.9
	4	1.17	7.2	1.12	10.1		4	1.92	32.0	1.03	0.7
	5	0.67	-16.3	0.91	-2.0		5	21.79	236.3	1.18	3.0
EAP/PV reliability = 0.80						Indicator 20	1	0.80	-9.4	0.87	-8.8
log							2	0.88	-5.6	0.93	-6.5
Indicator 8	1	0.79	-9.8	0.90	-4.9		3	0.66	-17.2	0.93	-1.9
	2	0.91	-4.0	0.94	-9.0		4	0.69	-15.1	0.94	-1.2
	3	0.76	-11.7	0.91	-4.3		5	3.16	61.7	1.06	0.7
	4	0.77	-10.8	0.96	-0.9	EAP/PV reliability = 0.94					
	5	1.10	4.3	0.91	-1.3	**led**					
Indicator 9	1	1.00	0.1	0.98	-1.3	Indicator 21	1	0.76	-11.4	0.86	-8.7
	2	0.92	-3.7	0.98	-0.9		2	0.89	-4.8	0.95	-4.4
	3	0.90	-4.4	0.96	-2.6		3	0.80	-9.6	0.97	-0.8
	4	0.67	-16.2	0.95	-1.2		4	1.38	15.0	1.01	0.4
	5	10.21	154.1	1.25	5.5		5	6.68	116.3	1.15	2.6
Indicator 10	1	1.22	9.0	1.06	3.5	Indicator 22	1	0.94	-2.5	0.98	-0.9
	2	1.00	-0.2	1.00	0.0		2	0.91	-4.3	0.98	-0.4
	3	0.95	-2.2	0.99	-0.6		3	0.96	-1.6	0.98	-1.2
	4	1.12	5.1	0.98	-0.5		4	1.08	3.4	0.97	-1.1
	5	2.13	37.8	1.13	2.6		5	1.30	11.9	1.08	1.2
Indicator 11	1	0.75	-11.8	0.83	-12.3	Indicator 23	1	0.74	-12.8	0.84	-6.9
	2	0.89	-4.8	0.94	-5.9		2	0.96	-1.6	0.97	-3.7
	3	0.67	-16.3	0.92	-2.4		3	0.76	-11.6	0.96	-1.2
	4	0.60	-20.5	0.95	-0.7		4	1.63	23.3	1.03	1.1
	5	11.68	167.2	1.08	1.2		5	3.42	66.8	1.15	3.4
Indicator 12	1	0.80	-9.2	0.89	-6.9	Indicator 24	1	0.83	-8.0	0.92	-3.5
	2	0.95	-2.1	0.97	-3.1		2	0.97	-1.2	0.98	-2.3
	3	0.77	-10.7	0.96	-1.5		3	0.81	-9.1	0.95	-1.8
	4	0.95	-2.1	0.96	-1.1		4	1.11	4.8	1.00	0.0
	5	1.20	8.2	0.96	-0.5		5	10.93	160.7	1.58	11.7
						EAP/PV reliability = 0.94					

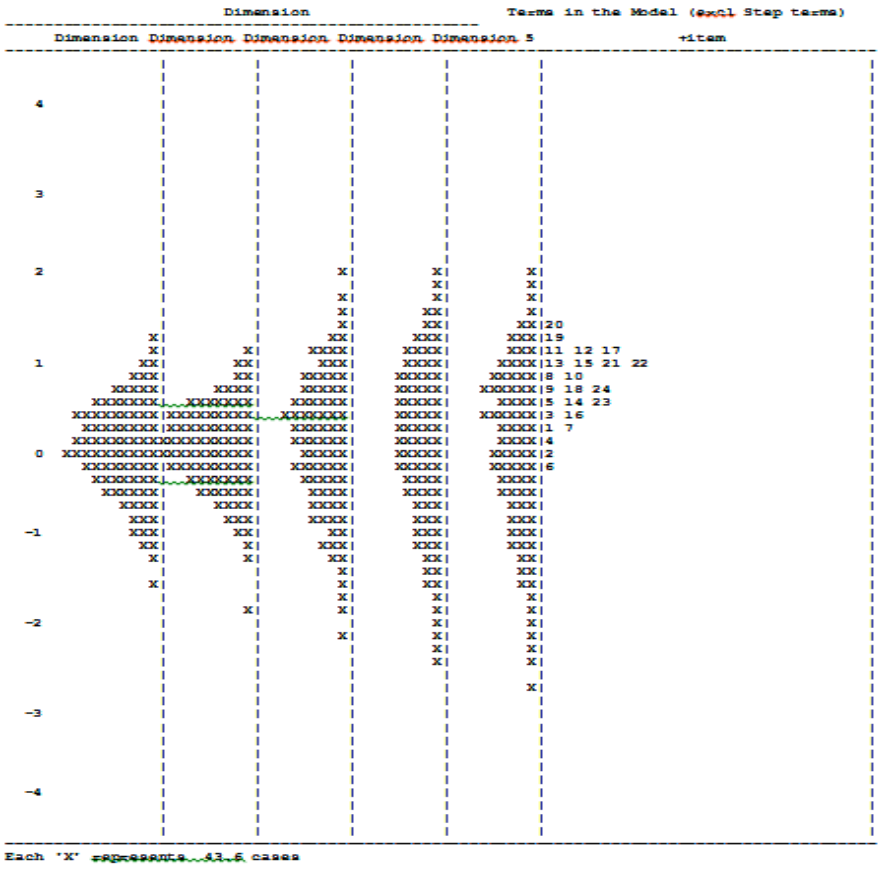

Fig. 1: Wright map diagram for Job Competency Assessment Model

objectives and able to choose benefit information. The most important single indicator was able to be a presenter (communication indicator) because this attribute meets the need of an employer who want employees with communicative competence and presentation skills (Woodward *et al*., 2010). Kelley and Bridges (2005)' study showed that business communication skills and presentation skills as the top two of twenty three skills necessary for successful career. This attribute also serves TISCO values about customer priority. Moreover, this attribute can benefit in many situation such as reporting important issue, making decision, learning and training, enhance work group operation and reflect employee's job competency quality. Organization should consider the employee's ability to be a presenter as a first priority.

There were two inappropriate single indicators because of the unclear criteria between the 4th and the 5th that can't identify separately. Nevertheless, the reliability of the measurement indicated a very high measurement efficiency level.

CONCLUSION

The results showed that the developed job competency assessment indicators consist of communication (4 single indicators), personnel (3 single indicators), logic (8 single indicators), business (5 single indicators) and leadership (4 single indicators). The Job Competency Model developed by researcher was fitted with the empirical data ($\chi^2 = 2612.64$ (df = 242, p = 0.00), GFI = 0.95, AGFI = 0.93, RMR = 0.03, RMSEA = 0.05). And the rubric score criteria of each single indicator was suitable to the Job Competency Model where INFIT MNSQ were: 0.87-1.41, 0.86-1.12, 0.83-1.32, 0.87-1.18 and 0.84-1.58, respectively.

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