



RASCH MODEL APPLICATION IN VALIDATING INSTRUMENT FOR KNOWLEDGE INTEGRATION IN SMALL MEDIUM ENTERPRISES

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ABSTRACT

This paper aims in analysing the application of Social Media to enhance the Knowledge Integration (KI) by proposed of KI model for Small Medium Enterprises (SMEs) by using Rasch Model Application. An initial conceptual model has been constructed based on TOE framework (Technology, Organization, Environment) which is including KI, Social Media, SMEs, Environment, and Service Quality Factors.

1. INTRODUCTION

Knowledge is acknowledged as a sustainable basis of competitive advantage for many organizations possess [1]. Most Small Medium Enterprises (SMEs) have started to realize the importance of Knowledge Integration (KI) in streamlining their operations and processes to improve organizational performance [2]. Due to this motivation, this paper aims in analysing the application of Social Media to enhance the Knowledge Integration (KI) by proposed of KI model for SMEs by using Rasch Model Application. An initial conceptual model has been constructed based on TOE framework (Technology, Organization, Environment) which is including KI, Social Media, SMEs, Environment, and Service Quality Factors [3]. The data has been collected based on 31 employees from SMEs practitioners who are getting involved in KI with Social Media environment. The result shows that person reliability is high (0.96) but item reliability is fair (0.70). Out-fit and infit mean square values are very much close to 1, and Z-standardize value is within the expected range. Value for Point Measure Correlation (PMC) is more than 0 and positive value. So, there are no questions/ items which do not fit or not appropriately constructed. Unidimensionality shows that there is no visible secondary dimension. The initial model has been develop as a basic of the future model deployment of KI implement in SMEs.

2. DESCRIPTION

31 staff from Small Medium Enterprises (SMEs) in Malaysia participated in this pilot study. The pilot data were tabulated and analyzed using WinSteps. Rasch identified an extreme score which will later be excluded from further analysis. Person and Item summary statistics results and measures are shown in Figure 1 and Figure 2.

SUMMARY OF 31 MEASURED Persons									
	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	
MEAN	269.1	84.9	1.85	.26	1.00	-.3	1.02	-.3	
S.D.	25.1	.3	1.52	.14	.66	3.0	.70	3.1	
MAX.	339.0	85.0	7.86	1.01	3.48	7.4	3.60	7.4	
MIN.	195.0	84.0	-1.06	.15	.16	-5.7	.13	-6.0	
REAL RMSE	.31	ADJ.SD	1.49	SEPARATION	4.72	Person RELIABILITY	.96		
MODEL RMSE	.29	ADJ.SD	1.49	SEPARATION	5.12	Person RELIABILITY	.96		
S.E. OF Person MEAN	.28								
VALID RESPONSES: 99.8%									
Person RAW SCORE-TO-MEASURE CORRELATION = .95 (approximate due to missing data)									
CRONBACH ALPHA (KR-20) Person RAW SCORE RELIABILITY = .97 (approximate due to missing data)									

Figure 1: Statistic Summary for person

SUMMARY OF 85 MEASURED Items									
	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	
MEAN	98.1	31.0	.00	.39	.98	.0	1.02	.1	
S.D.	5.2	.3	.75	.02	.34	1.1	.56	1.0	
MAX.	114.0	31.0	1.98	.41	1.93	2.6	4.78	4.4	
MIN.	82.0	29.0	-2.40	.29	.36	-2.2	.26	-2.3	
REAL RMSE	.41	ADJ.SD	.63	SEPARATION	1.52	Item RELIABILITY	.70		
MODEL RMSE	.39	ADJ.SD	.64	SEPARATION	1.66	Item RELIABILITY	.73		
S.E. OF Item MEAN	.08								
UMEAN=.000 USCALE=1.000									
Item RAW SCORE-TO-MEASURE CORRELATION = -.98 (approximate due to missing data)									
2631 DATA POINTS. APPROXIMATE LOG-LIKELIHOOD CHI-SQUARE: 3282.21									

Figure 2: Statistic Summary for item

Figure 1 also shows statistics summary for person of which Cronbach alpha is 0.96 is quite high. Hence, it means that the responses are reliable for analysis. Individual Mean is 1.85logit. In other words, the logit shows that respondents endorse most items. The spread of person respondent is 7.86-(-1.06) = 8.92. This is due to very erratic by one of the respondent. The person separation is 4.72 is quite good. In Rasch, person separation is used to classify people. Low person separation (< 2, person reliability < 0.8) with a relevant person sample implies that the instrument may not be not sensitive enough to distinguish between high and low performers. Whereas, Figure 2 shows statistic summary for item reliability score of 0.70 is fair. This might be due to small sample size being used for analysis. The spread of item is 1.98-(-2.40) = 4.38. The item separation is 1.52.

As shown in Figure 3, the person map illustrates that the person at the top are most agreeable while person at the bottom are most disagreeable to endorse. This indicates tendency to endorse higher importance for the questionnaire items. Person P03 being the highest in Wright Map, have the tendency to easily endorse to most of the items, while P11 tends to rate lower which mean, she or he hardly agrees with all items. On the Item side as show in Figure 4, the item at the top are the most difficult question (item) and at the bottom are easiest item. The distribution is quite closely bunched together, except for A1. This might be due to respondents may not understand the term 'structured format' used in the item. Therefore, this question will be re-revised for easier understanding. Almost all items are below person mean, except H4 and A7. This indicates overall agreeableness on the high importance of these factors.

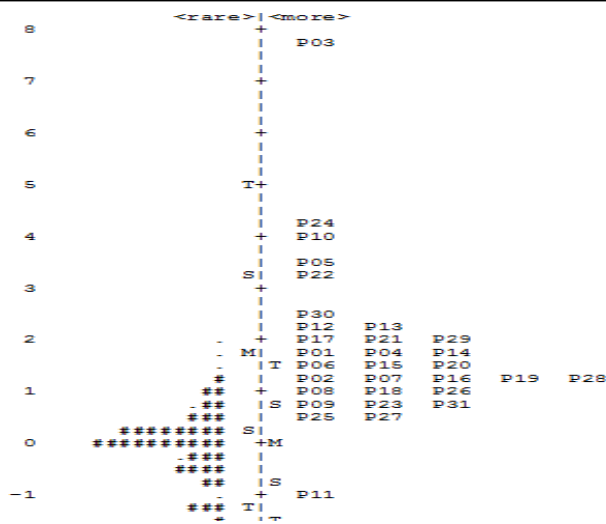


Figure 3: Item map of Person

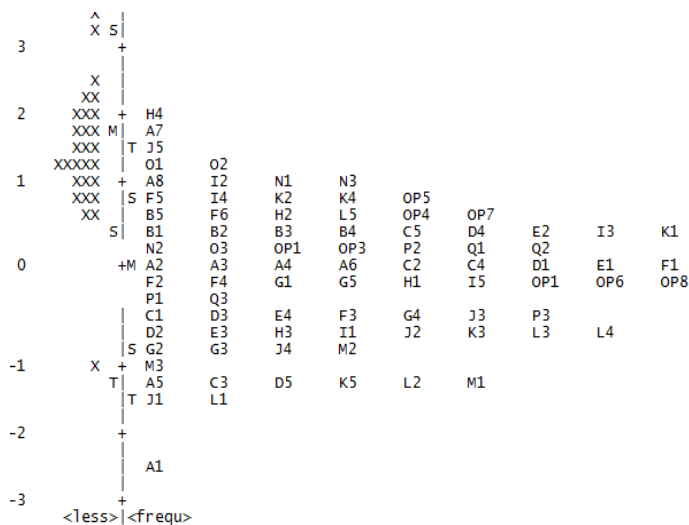


Figure 4: Person map of Item

Analysis obtain from Figure 5 shows value for Point Measure Correlation (PMC) is more than 0 and positive value. So, that there are no questions/items which do not fit or not appropriately constructed. Therefore, no further action, such as checking or eliminating any questions should be taken.

ENTRY NUMBER	RAW SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	PTMEA CORR.	EXACT ODS%	MATCH EXP%	Person
1	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P21
2	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P22
3	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P23
4	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P24
5	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P25
6	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P26
7	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P27
8	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P28
9	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P29
10	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P30
11	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P31
12	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P32
13	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P33
14	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P34
15	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P35
16	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P36
17	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P37
18	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P38
19	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P39
20	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P40
21	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P41
22	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P42
23	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P43
24	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P44
25	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P45
26	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P46
27	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P47
28	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P48
29	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P49
30	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P50
31	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P51
32	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P52
33	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P53
34	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P54
35	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P55
36	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P56
37	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P57
38	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P58
39	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P59
40	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P60
41	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P61
42	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P62
43	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P63
44	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P64
45	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P65
46	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P66
47	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P67
48	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P68
49	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P69
50	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P70
51	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P71
52	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P72
53	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P73
54	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P74
55	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P75
56	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P76
57	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P77
58	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P78
59	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P79
60	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P80
61	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P81
62	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P82
63	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P83
64	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P84
65	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P85
66	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P86
67	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P87
68	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P88
69	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P89
70	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P90
71	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P91
72	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P92
73	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P93
74	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P94
75	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P95
76	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P96
77	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P97
78	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P98
79	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P99
80	272	85	1.90	2.41	1.99	4.31	1.97	4.09	0.34	50.0	74.1	P100

Figure 5: Item/Person Measure

STANDARDIZED RESIDUAL VARIANCE SCREE PLOT			
Table of STANDARDIZED RESIDUAL variance (in Eigenvalue units)			
		Empirical	Modeled
Total variance in observations	=	390.7	100.0%
Variance explained by measures	=	305.7	78.2%
Unexplained variance (total)	=	85.0	21.8%
Unexplained variance in 1st contrast	=	11.7	3.0%
Unexplained variance in 2nd contrast	=	9.0	2.3%
Unexplained variance in 3rd contrast	=	8.1	2.1%
Unexplained variance in 4th contrast	=	5.8	1.5%
Unexplained variance in 5th contrast	=	5.2	1.3%

Figure 6: Item map of Person

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