Work Ability Index: Validation and Model Comparison of the Malaysian Work Ability Index (WAI)

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ABSTRACT

Purpose: The study aimed to (1) measure the Work Ability of employees with disability; (2) assess the factor structure of different potential models of Work Ability Index (WAI) for employees with disability; and (3) identify the best factor structure of Work Ability Index for employees with disability in the Malaysian cultural context.

Methods: Data was collected using the Work Ability Index (WAI) translated into Malay language. The study sample consisted of 275 employees with physical disability, from both public and private sectors across Malaysia. Descriptive statistics were calculated using IBM SPSS 20 to evaluate the score of each subscale and the cumulative index of Work Ability among employees with disability. Confirmatory factor analysis (CFA) was conducted using IBM SPSS AMOS 21 to assess the factor structure of WAI and evaluate the validity of the proposed models for employees with disability.

Results: The WAI scores were 29.5% poor, 35.3% moderate, 28.7% good and 6.5% excellent. In the validation process, a non-orthogonal two dimensional structure was identified. In this model of WAI, the subscales were attributed to two factors: (1) subjective Work Ability factor that consisted of subscales 1, 2 and 7; and (2) health-related Work Ability factor, comprised of subscales 3, 5, 4 and 6. These two factors were positively correlated, which indicates that employees with disability who exhibit positive subjective Work Ability tend to also report positive health- related Work Ability.

Conclusion: This study has provided the first Malay version of WAI and has paved the way for future studies on work ability among employees with disability. The WAI translation has been validated among employees with disability and has shown adequate psychometric properties, thus making it

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suitable to investigate the associations between aspects of work and their impact on the health of employees with disability.

Key words: *Employees with disability, Work Ability Index, Validity and Reliability Test*

INTRODUCTION

Work Ability has become an important concept in organisational studies and has contributed towards developing policies and organisational practices that enable prolonged working lives of people currently active in the labour force (Berg, 2010). The concept of Work Ability was initially developed at the Finnish Institute of Occupational Health (FIOH) in the early 1980s, to address the concern of companies and organisations regarding the potential impact of premature retirement of older workers. Work Ability is a generic evaluation of the productive capacities of employees, their current health status and psychological resources(Ilmarinen and Rantanen, 1999; Pohjonen and Ranta, 2001).To operationalise Work Ability, a questionnaire was designed by a research team from the FIOH(Ilmarinen et al, 1991; Tuomi et al, 1998). The questionnaire is known as the Work Ability Index (WAI) and consists of 7 items categories that measure the (1) subjective estimation of current Work Ability compared with lifetime best, (2) subjective Work Ability in relation to the physical and mental demands of work, (3) number of diagnosed diseases, (4) subjective estimation of work impairment due to diseases, (5) sickness absenteeism during the past year, (6) own prognosis of Work Ability after 2 years, and (7) psychological resources (e.g., enjoying daily tasks, activity and life spirit, optimism about the future) (Tuomi et al,1998). The Work Ability Index (WAI) scores range from7-49, and are divided into the following four Work Ability categories: poor (7-27 points),moderate(28-36 points), good (37-43 points), and excellent (44-49 points)(Tuomi et al, 1998). The psychometric properties and the validity and reliability of Work Ability Index (WAI) are described in detail elsewhere (Ilmarinen and Tuomi, 2004; Radkiewicz and Widerszal-Bazyl, 2005; Lavasani et al, 2015). The Work Ability Index (WAI) is a validated tool, widely used in different European countries, China and Brazil, and has been translated into 26 languages (Ilmarinen, 2009; Martus et al, 2010). According to Ilmarinen and Tuomi, (2004), all items in the Work Ability Index (WAI) significantly predicted work disability, retirement and mortality. Gould et al, (2008) indicated that among people of all ages, health, functional capacity,

and characteristics of one's work are the most statistically significant predicting factors of Work Ability.

As stated by Ilmarinen (2009), work ability as a concept has changed and developed over the past decade. The clinical model of Work Ability, characterised by its health-based definition of work ability, has evolved into more holistic, versatile and integrative models. These integrative models describe work ability as a function of non-physical work demands, psychosocial work environment, work content, management style, physical and mental capacity, competences (e.g., skills and knowledge), attitude and motivation (Gould et al, 2008). Thus, work ability refers to the balance between work and individual resources; individual resources consist of the individual's health, functional abilities, education and other competence, value, and attitude; while work demands comprise content and context work, working environment, the organisation of work, etc.(Ilmarinen, 2009).

The Work Ability Index (WAI) was designed to assess the work ability in order to prolong working lives of retiring employees in Finland; therefore, it has a strong focus on health status measures and the subjective estimation of work ability. There is no agreement however, regarding the factor structure of the Work Ability Index. For example, Radkiewicz and Widerszal-Bazyla (2005) reported that the subscale 5 ("sick leave during the past year") has poor discriminant power; thus, its association with the total Work Ability Index (WAI) score is not substantial. Therefore, the subscale 5 cannot be a determinant factor of Work Ability and should not be included in the Work Ability Index. Their findings indicate a one-factor structure for Work Ability Index (WAI) in the German and Finnish sample, and a 2-factor structure in the samples from Poland, Norway, Netherlands, Italy, France, and Slovakia. These 2-factor structures consisted of a "subjective assessment of ability to work and one's own mental resources" and "objective information concerning one's own health and absenteeism due to diseases".

On the other hand, Lavasani et al (2015) and Martus et al (2010) argued against excluding subscale 5 as suggested by Radkiewicz and Widerszal-Bazyla (2005), and concluded that the proposal of excluding subscale 5 cannot be confirmed by the confirmatory factor analysis. However, in consonance with Radkiewicz and Widerszal-Bazyla (2005), they suggested that in their psychometric analysis, the Work Ability Index showed a two-dimensional structure including subjective estimated work ability and objective health status of work ability. They stated that the subscales 1, 2 and 7 constituted a factor that clearly underlines the subject

estimation of work ability and resources; hence they termed it 'subjectively estimated work ability and resources'; and the subscales 3 and 5 constituted another factor, which they named 'ill-health-related factor'. Their results also indicated that the subscales 4 and 6 loaded on both subjective and objective health-related factors.

The findings of Martus and colleagues (2010) seem to be more in line with the initial assessment of Tuomi et al (2001), in which the subscales with the highest internal consistency were 1, 2, 4 and 7; while the subscales 3, 5 and 6 had the weakest internal consistency. Similarly, Lavasani and his co-workers (2015) and Gould and colleagues (2008) reported that the subscales 1, 2 and 4 had the greatest impact on the overall validity and reliability of the Work Ability Index. Table 1 shows the different views about factor structure of the WAI and also illustrates some suggestions in this regard. However, this variation in work ability factor structures might be associated with the occupational characteristics, such as work demands, working conditions, and also individual characteristics and resources (Gould et al, 2008).

Table 1: Different views about Factor Structure of the WAI

Author /year	Type of Factor Structure of the WAI	Suggestions regarding subscales of WAI
Radkiewicz and Widerszal-Bazyla (2005)	Both one-factor and two-factor structure of WAI	The subscale 5 cannot be a determinant factor of Work Ability and should not be included in the Work Ability Index
Martus et al (2010)	Two-factor structure of WAI	Subscales 1, 2 and 7 subjectively estimated individual's work ability; while subscales 3 and 5 associated with 'ill-health-related factor'. Subscales 4 and 6 loaded on both subjective and objective health- related factors.
Tuomi et al (2001)	One-factor structure of WAI	The subscales 1, 2, 4 and 7 were found to be with the highest internal consistency; while the subscales 3, 5 and 6 had the weakest internal consistency
Gould et al (2008) Lavasani et al (2015)	One-factor structure of WAI	The subscales 1, 2 and 4 had the greatest impact on the overall validity and reliability of the work ability index

The reliability of the Work Ability Index (WAI) has been examined among different occupations and industrial sectors such as metal industry workers, retail and trade industry employees, commercial services industry employees, construction workers (e.g., De Zwart et al, 2002; Kaija et al, 2004; van den Berg et al, 2008). However, to the best of the authors' knowledge, the Work Ability Index (WAI) and its factor structure have not been assessed among employees with disability.

Objective

The present study sought to (1) measure the work ability of employees with disability; (2) assess the factor structure of different potential models of Work Ability Index (WAI) for employees with disability; (3) identify the best factor structure of Work Ability Index for employees with disability in the Malaysian cultural context.

METHOD

Study Design

The study was cross-sectional in design. Data was collected using the Malay translation of the Work Ability Index (WAI). Translation was done by a local expert who was familiar with both the subject of study as well as Malaysian culture. The original version and the translated version of instruments were later reviewed by a panel of experts.

Sampling Technique

The sample for this study consisted of 275 employees with hearing, vision and physical disabilities as categorised by the Department of Social Welfare Malaysia (DSWM), from both public and private sectors across the country. A pre-test study was conducted by the authors, among a sample of employees with all types of disabilities. Employees with mental and learning disability were excluded from the study as it was found that they would not be able to respond to the survey properly due to the complexity of the Work Ability Index.

A two-stage sampling design was used to select the participants. During the first stage, the research team used proportional stratified sampling method to group the sample into the three categories of disability given by the Department of Welfare Malaysia (vision, hearing and physical disabilities). The stratified

sampling method guaranteed proper representation of each type of disability in the given sample size, based on the official statistical data reported by the Department of Social Welfare Malaysia in 2013. At the second stage, the research team employed a simple random sampling technique to collect the required sample for each group from among 27 active NGOs, working with and for people with disability in Malaysia. The disability NGOs were asked to provide a list of their members with physical, hearing and vision disabilities who were employed in public or private sectors. The list included the names and disability types of those falling within the above-mentioned three disability categories. Based on the list of all employed people with disability, the required sample size for each category was chosen through random number generator.

Study Sample

Of the 275 employees with disability who comprised the study sample, 18.54% had vision disability, 24% had hearing disability and 66.54% had physical disability. The initial demographic analysis indicated that more than half of the respondents (66.5%) were male. 38.5% of the respondents were in the age group of 26 – 40 years, 25.5% were in the age group of 15 - 25 years and 24.7% were in the age group of 41 - 55 years, while just 11.3% of the respondents were 56 years of age or older.

The respondents were from the 8 states of Malaysia. More than half (51.2%) of them worked in urban areas, 29.5% worked in rural areas and 19.3% worked in sub-urban areas.

Instrument

Data was collected using the Work Ability Index (WAI) (Tuomi et al, 1998). The WAI is comprised of 7 subscales that measure: (1) subjective estimation of current work ability compared with lifetime best, (2) subjective Work Ability in relation to the physical and mental demands of work, (3) number of diagnosed diseases, (4) subjective estimation of work impairment due to diseases, (5) sickness absenteeism during the past year, (6) own prognosis of Work Ability after 2 years, and (7) psychological resources. The scoring for each subscale was calculated separately and then aggregated as one score. Scores ranging between 7 and 27 indicate poor work ability, 28-36 moderate work ability, 37-43 good work ability, and 44-49 excellent work ability.

Analysis

The descriptive statistics were calculated with the statistical package IBM SPSS 20. Descriptive analysis was performed to evaluate the score of each subscale and the cumulative Work Ability Index among employees with disability (Table 2). The factor loadings of all 7 WAI subscales were assessed by conducting confirmatory factor analysis (CFA) using IBM SPSS Amos 21with maximum likelihood (ML). The fit of proposed WAI models to the data was evaluated by Chi-square statistic and goodness-of-fit indices. In this study, as suggested by Hooper et al (2008), the absolute fit indices including relative chi-square, Root mean square error of approximation (RMSEA) and Goodness-of-fit Index (GFI), along with the supplementary incremental fit indices such as Comparative fit index(CFI), were calculated and reported in order to examine model fit of each WAI proposed model.

Table 2: Descriptive Statistics for WAI (n=275)

Cumulative WAI		Mean	Standard Deviation	Median	Range
		32.08	**8.56**	**33.50**	**12-47**
1.	Current Work Ability compared with their lifetime best	6.87	1.65	7	2-10
2.	Work Ability in relation to the demands of the job	6.89	1.528	7	3-10
3.	The number of diagnosed illnesses or limiting conditions from which they suffer	4.25	1.85	4	1-7
4.	Estimated impairment due to diseases/illnesses or limiting conditions	2.47	1.12	3	1-6
5.	The amount of sick-leave they have taken during the last year	3.37	1.11	3	1-5
6.	Their own prognosis of their Work Ability in two years' time	5.319	2.10	7	1-7
7.	The estimation of the mental resources	2.92	0.86	3	1-4

The criteria of good model fit used in this study were: relative chi-square ($\chi 2$/df)<5; RMSEA < 0.08 and GFI > 0.9 (Wheaton, 1977; MacCallum et al, 1996; Chau, 1997) and CFI> 0.9 (Bentler, 1990). Furthermore, as suggested by Kline (2011), the Parsimony fit indices of parsimony normed fit index(PNFI), Akaike information criterion (AIC) along with the value of $\chi 2$(CMIN)were used in this study to identify which models of WAI fit the data best. The comparison of models was carried out by identifying the non-nested model with the best fit. That is, the model with the smaller value for CMIN and AIC, and larger value for PNFI, indicated the better model fit among the models compared (Kline, 2011).

RESULTS

Table 2 summarises the descriptive statistics for the WAI. The mean score of cumulative Work Ability Index (WAI) was 32.08 (SD=8.56).

The frequency analysis results presented in Table 3 revealed that overall the employees with disability who participated in the study obtained moderate scores in the Work Ability Index. More specifically, 29.5% of the participants reported poor level of work ability, while 35.3% indicated moderate, 28.7% showed good and 6.5% obtained excellent levels of Work Ability. Results from a comprehensive study on the working population showed that 35% of employees in general had poor levels of Work Ability across different occupations (Gould et al, 2008). Therefore, it can be concluded from Table 3 that employees with disabilities do not seem to be at a disadvantage in terms of their WAI levels.

Table 3: Distribution of Work Ability levels of Employees with Disability

Work Ability Level	N	%
Poor Work Ability	81	29.5
Moderate Work Ability	97	35.3
Good Work Ability	79	28.7
Excellent Work Ability	18	6.5
Total	275	100

In this study, 6 structural models for WAI were proposed and tested to discover whether different subscales of WAI could be considered as measurement tools for the same underlying construct work ability or whether they should be regarded as the measurement tools for two different constructs. The structures of 6 models are illustrated in Figures 1-6.

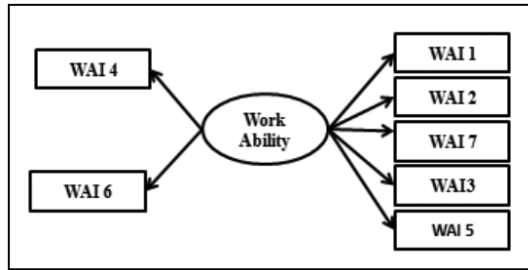**Figure 1: Model A (One-factor Structural Model of WAI)**

Figure 2: Model B [Two-factor Structural model of WAI (Orthogonal Model)]
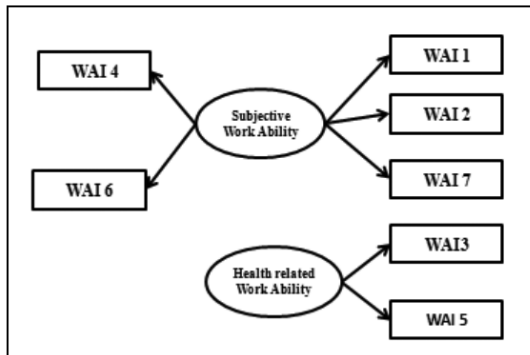

Figure 3: Model C [Two-factor Structural model of WAI (Non-orthogonal Model)]
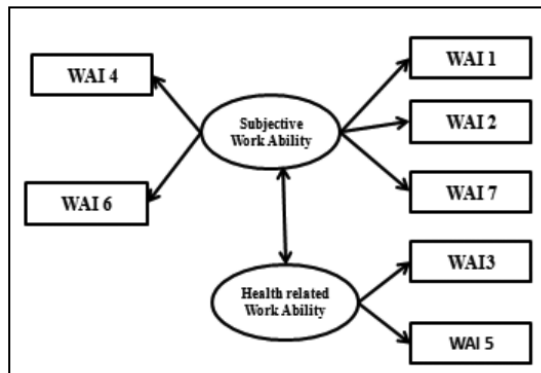
Figure 4: Model D [Two-factor Structural model of WAI (Orthogonal Model)]
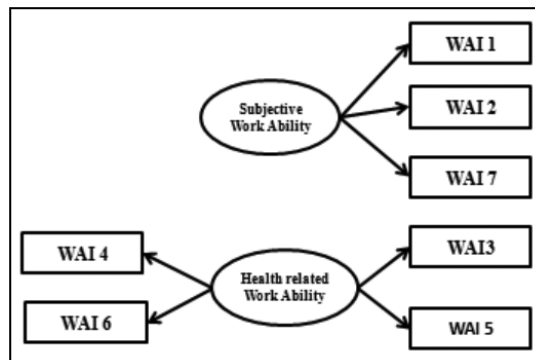

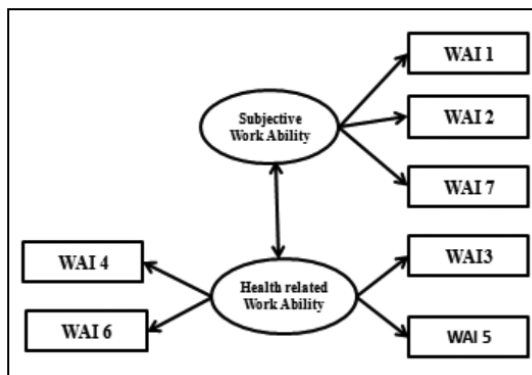**Figure 5: Model E [Two-factor Structural model of WAI (Non-orthogonal Model)]**

Figure 6: Model F [Two-factor Structural model of WAI (Non-orthogonal Model)]
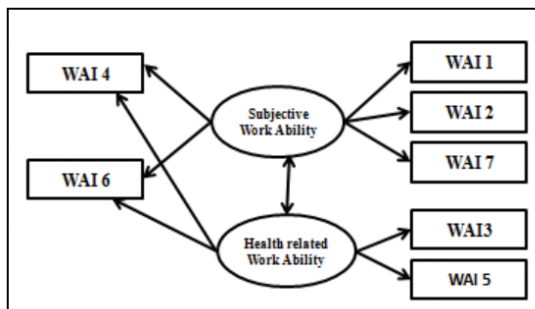
Figure 1 illustrates Model A which was proposed as a one-factor model in which the seven subscales of WAI can be reduced to just one overall score (Tuomi et al, 2004). Furthermore, 5 different WAI models with two-factor structure were also proposed in this study in which the subscales of WAI could be grouped into 2 different dimensions of work ability, the subjective related work ability and health-related work ability.

The first 2-factor structure of WAI (Model B) illustrated in Figure 2 is an orthogonal model (there is no correlation between health-related and subjective factors of WAI) that groups the subscales 1, 2, 4, 6 and 7 into one dimension, the subjective work ability; and the subscales 3 and 5 are grouped into a second dimension, that describes the health-related work ability. This model is based on the assumption that there is no association between the two resulted dimensions of work ability.

The second 2-factor structure model (Model C) illustrated in Figure 3 is a non-orthogonal mode (there is a correlation between objective and subjective factors of WAI) in which the subscales 1, 2, 4,6 and 7 still loaded in one factor, the subjective work ability; and the subscales 3 and 5 loaded in another factor, the health-related work ability. However, in this model subjective and health- related work ability are assumed to be significantly associated.

In the third 2-factor structure model (Model D), described in Figure 4, the subscales 1, 2 and 7 loaded into one factor, the subjective work ability, while subscales 3, 5, 4 and 6 loaded into a second factor, the health-related work ability. Like Model B, this model assumes that there is no significant association between subjective and health-related work ability.

Consistent with Models B and C, Model D indicates that using an overall score for WAI (one-factor structure model) may not be adequate to assess levels of Work Ability.

The fourth proposed model, (Model E) illustrated in Figure 5, was also a non-orthogonal model (there is a correlation between objective and subjective factors of WAI).In this model the subscales 1, 2 and 7 loaded into the subjective work ability factor, while subscales 3, 5, 4 and 6 loaded into the health-related work ability factor; and it is assumed that these 2 factors are associated in the structure of the WAI.

The final proposed model (Model F), illustrated in Figure 6, is again a non-orthogonal model in which subscales 1, 2 and 7 loaded into the subjective work

ability factor; the subscales 3 and 5 loaded into the health-related work ability factor; and subscales 4 and 6 loaded into the two factors.

Table 4 illustrates the factor loadings of one-factor structure model of WAI(Model A).The results indicate that in line with previous studies (Gould et al,2008; Lavasani et al, 2015) the subscales 1, 2 and 4 have the greatest impact on the cumulative index of WAI (the respective factor loadings ranged from 0.86 to 0.92). The factor loadings of the remaining subscales also are all above 0.5(ranging from 0.73 to 0.76) and Average Variance Extracted (AVE) is well above the acceptable threshold of 0.5 (AVE = 0.652), hence convergent validity of the model is satisfactory to indicate that the 7 subscales explain the one-factor structural model of work ability well. Results also show that the Construct Reliability for this model has met the acceptable threshold of 0.7 (CR=0.929), revealing the satisfactory internal consistency within 7 subscales in Model A.

Table 4: Factor Loadings, Average Variance Extracted (AVE) and Construct Reliability for Model A

	WAI1	WAI2	WAI3	WAI4	WAI5	WAI6	WAI7	AVE	(CR)
Model A	0.92	0.86	0.76	0.87	0.74	0.75	0.73	0.652	0.929

Table 5 below shows the results of Confirmatory Factor Analysis (CFA) for five competing two- factor structural models of WAI to determine how the models fit the data and also to examine the convergent validity and construct reliability of each proposed model.

Table 5 summarises the factor loadings in Models B, C, D, E and F. Results show that, in contrast to previous findings of Radkiewicz and Widerszal (2005), in Model B subscale 5 shows high impact (r=0.98) on the health-related factor of work ability. The factor loadings of other subscales on both factors of work ability in this model are also above the acceptable value of 0.5(ranging from 0.59 to 0.92) and the AVE met the threshold of 0.5(AVE f1 =0.685, AVE f2=0.654). Hence the convergent validity is established for both sub-constructs in this model. The result of construct reliability also reflects that internal consistency exists among sub-scales of both factors of work ability (CR f1=0.915 and CR f2=0.781).

Table 5: Factor Loadings, Average Variance Extracted (AVE) and Construct Reliability for Models A B, C, D, E and F

	WAI 1	WAI 2	WAI 3	WAI 4		WAI 5	WAI 6		WAI 7	AVE		Construct reliability (CR)	
				Factor 1	Factor 2		Factor 1	Factor 2		Factor 1	Factor 2	Factor 1	Factor 2
Model B	0.92	0.87	0.59	0.86	-	0.98	0.74	-	0.73	0.68	0.65	0.91	0.78
Model C	0.92	0.86	0.77	0.87	-	.75	.75	-	0.73	0.69	0.57	0.91	0.73
Model D	0.93	0.89	0.77	-	0.88	0.76	-	0.74	0.69	0.71	0.62	0.88	0.86
Model E	0.93	0.87	0.77	-	0.88	0.75	-	0.75	0.72	0.71	0.62	0.88	0.86
Model F	0.93	0.87	0.78	0.04	0.84	0.76	0.27	0.48	0.72	0.43	0.53	0.74	0.81

After considering the relation between two factors in Model C, the factor loading of subscales 3 and 5 on health-related work ability changed considerably, perhaps because the subscales 3 and 5 are significantly influenced by subjective work ability, supporting the proposed one-factor structure model of WAI. Furthermore, the correlation between subjective and health-related factors was strong (r=.99; p<0.001), reflecting the presence of multicollinearity. This indicated that two work ability factors (subjective and health related) may be explained by the same sub-scales.

The information in Table 5 shows that in Model D all of the sub-scales had a loading factor above 0.5, and the convergent validity and construct reliability in both subjective and health-related factors are acceptable. Similarly, in Model E, after assuming the association between the subjective and health-related factors, all factor loadings were significant and higher than 0.5; and both structural factors of work ability represented convergent validity and construct reliability. However, similar to Model C, the correlation between the two factors was very high(r=.96; p<0.05).

The results from Table 5 show that although in Model F the sub-scales 4 and 6 were assumed to load on both subjective and health-related factors, these subscales had low factor loadings on the subjective work ability factor (.04 and.27 respectively).

In addition, the subscale 6 did not reach the factor loading threshold of 0.5 on the health-related factor of work ability.

Multiple absolute and incremental fit indices were used by this study to assess the model fit of proposed models of WAI. Table 6 shows the results of the absolute and incremental fit indices for the entire 6 proposed structural models of WAI.

The results presented in Table 6 show that, using the calculated fit indices and based on the recommended threshold values of Relative χ 2 <5, GFI, CFI >0.9 and RMSEA <0.1,the fitting accuracy of Models B and D is not satisfying ; while Models A, C, E. and F had a good fit to the data.

The results illustrated that the overall fit indices of Models A, B, E and F, presented in Table 6, were very similar and all of the mentioned alternative models closely fit the data. Hence, this study also employed parsimony fit indices (PNFI and AIC) along with the value of CMIN to determine which model represents the optimal fit. As suggested by Kline (2010), the smaller value of CMIN and AIC and larger value of PNFI indicate the best model fit among alternative models.

Table 6: Absolute and incremental Fit Indices of all Models

	Relative χ 2(χ 2/df)	RMSEA	GFI	CFI
Model A	2.830	0.082	0.961	0.982
Model B	22.651	0.281	0.818	0.766
Model C	3.035	0.086	0.961	0.981
Model D	29.208	0.321	0.810	0.717
Model E	2.439	0.072	0.969	0.987
Model F	2.820	0.081	0.969	0.986

The results shown in Table 7 indicate that Model E was the best fitting model among the four proposed rival models of WAI(CMIN= 31.707; PNFI= 0.605 ; AIC= 61.707).

From the information presented in Table 7, it can be observed that the CMIN value of Model E is 31.707 (df=13); and it is considerably smaller than the CMIN value of Model A (39.622,df=14) and Model C (39.457,df=13) while it is very close to the CMIN value of Model F (31.019,df=11). Results also show that the PNFI value of Model E is greater than the recommended threshold value of 0.5 (Wu, 2009). Findings represented that the PNFI value of Model E is higher than

Table 7: Parsimony Fit Indices of well-fit Models

	CMIN	PNFI	AIC
Model A	39.622	0.648	67.622
Model C	39.457	0.602	69.457
Model E	31.707	0.605	61.707
Model F	31.019	0.512	65.019

the PNFI value of Model C (0.602) and Model F (0.512), and the value of AIC of Model E (61.707) is smaller than that of Model A (67.622), Model C (69.457) and Model F (65.019).

In general, the results indicate that Model E has greater parsimony than the other proposed alternative models, provides the best fit and best explains the observed data. Hence this model can be considered as the best structural model of WAI.

It is notable again that in Model E, the subscale 1 (current Work Ability compared with their lifetime best), subscale 2 (Work Ability in relation to the demands of the job) and subscale 7 (the estimation of the mental resources) loaded on the subjective Work Ability; while subscale 3 (the number of diagnosed illnesses or limiting conditions from which they suffer), subscale 5 (the amount of sick-leave they have taken during the last year), subscale 4 (estimated impairment due to diseases/illnesses or limiting conditions) and subscale 6 (own prognosis of their Work Ability in two years' time) loaded on the health-related Work Ability.

DISCUSSION

The descriptive analysis of work ability was conducted on the basis of the continuous sum score of seven dimensions of the Work Ability Index (WAI). As suggested by Ilmarinen and Tuomi (2004), the WAI was categorised within 4 groups as: poor work ability (7 - 27 points), moderate work ability (28 - 36 points), good work ability (37 - 43 points) and excellent work ability (44 - 47 points). The results showed that the overall mean score of WAI for the population of 275 employees with disability was 32.8 (SD= 8.561), indicating that, in general, the respondents of the study evaluated their work ability as moderate. As anticipated, the respondents of the study did not assess their work ability level as excellent or good, due to the limitations caused by their disabilities. The explanation for these outcomes could be that the health status of the respondents greatly influenced their evaluation of their own work ability. This conclusion is in line with the

notion that the level of perceived work ability is intensely related to self-rated health. As Gould et al (2008) reported in their study, employees who regarded their health condition to be average perceived their work ability to be more limited than those employees who believed they were in good physical health. This part of the result assumes more importance when it comes to respondents with certain disabilities whose obvious disadvantages have not convinced them to evaluate their work ability as 'poor' on the given categories. It could be inferred that assessment of their work ability is not influenced by their health status alone, but other elements such as attitudinal or dispositional factors could play a part too. This is in agreement with the findings of Verhoef et al (2013), which revealed that employees with disability considered their work ability to be at a moderate level.

The results indicated that the non-orthogonal 2-factor structure of Model E can be considered the best measurement of the subjective and health-related work ability factors, even though these factors might be correlated. In other words, these findings support the two-dimension factor structure of work ability proposed in previous studies, and the existence of a correlation between subjective and health-related work ability, namely that employees with disability with positive perception of their subjective work ability tend to exhibit positive health-related Work Ability (Martus et al, 2010).

However, the findings of this study indicate that for employees with disability, subscales 4 and 6 in the WAI are more likely to be related to health-related work ability. The reason could be that employees with disability are more aware of their objective health impairments at work than employees who have no physical impediment or disabilities. Therefore, for employees with disability, current health and fitness might play a large part in forecasting their future work ability.

The results of this study support the dismissal of the orthogonal model of work ability (Models B and D) as these two models do not fit the data well. However, the findings do not support the idea of rejecting a one-factor model because, although the Model E (a non-orthogonal 2-factor model) was found to be the best fitting model among tested alternative models of WAI, results indicated that the one-factor model of Work Ability Index still has acceptable fit to data, and the 7 dimensions of the WAI represent acceptable factor loading on the one-factor construct of work ability. Therefore, the one-factor structure model can be used when WAI is operationalised as the outcome variable in a structural path-analysis, where using a 2-factor model will be a methodological issue.

In this study, the results show that in all models, except for Model F, the subscales 1, 2 and 4 show the highest factor loadings on the WAI. However, it is important to point out that for employees with disability, the subscale 7(the estimation of the mental resources) had the lowest effect on WAI scores in all models.

In contrast to the results reported by Radkiewicz and Widerszal (2005), the present study found that the subscale 5 should not be excluded because it has actually a high loading factor (above 0.75) on all proposed and tested models of WAI.

Limitations

As this is the first study in which Work Ability Index was validated and tested among employees with disability, there is no existing data against which to compare the results obtained. Another limitation of the study lies in the specific characteristics of the sample in terms of health profile, which does not allow the WAI results to be generalised to the whole working population in Malaysia. Therefore, the reliability of the instrument should be validated among employees without disability as well as among employees with other types of disability such as learning and developmental disabilities (LDDs) and mental and psychological disabilities. Nonetheless, the study provided the first Malay version of WAI and paved the way for future research studies on work ability among employees with disability.

Unlike European and other developed countries in the west, ageing of the work force is not yet an issue in nations such as Malaysia and others in South-East Asia. These countries have a large population of young people who, along with people with disabilities, have only recently become an active part of the labour force. However, assessment of their work ability will provide research-based data for policy makers and work ability promotion programmes to enhance their performance at work and to prolong their working life. This in turn would translate into lower financial costs for the organisations and the country, in terms of reducing medical leave, healthcare costs and improving well-being of their employees.

CONCLUSION and IMPLICATIONS

To sum up the findings of this study, the WAI scores among employees with disability in Malaysia were 29.5% poor, 35.3% moderate, 28.7% good and 6.5%

excellent. The model that best fit the data was a non-orthogonal two-factor structural model of WAI in which (a) subjective work ability included subscale 1 (subjective estimation of current Work Ability compared with lifetime best), subscale 2 (subjective Work Ability in relation to the physical and mental demands of work)and subscale 7 (psychological resources) ; (b) health-related work ability factor included subscale 3 (number of diagnosed diseases), subscale 5 (sickness absenteeism during the past year), subscale 4 (subjective estimation of work impairment due to diseases) and subscale 6 (own prognosis of Work Ability after 2 years). These two factors are positively correlated, indicating that employees with disability who exhibit positive subjective Work Ability tend to also report positive health-related Work Ability. The WAI, translated into Malay language and validated among employees with disability, showed adequate psychometric properties; therefore, the instrument could be used to further investigate the associations between aspects of work and their impact on health among employees with disability. Future studies should be carried out to assess the work ability of the working population, and draw comparisons between the work ability of employees with and without disability in Malaysia and other South-East Asian countries. The research data so obtained can contribute towards better design of work space, allocation of job tasks and a positive working environment, all of which may have a positive spill-over effect on productivity, job satisfaction and individual and organisational health.

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