The Dimensions of Job Characteristics: A Validation Study in a Malaysian Context

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Abstract: This study attempts to examine the psychometric properties of the job characteristics construct which integrates 5 subscales-skill variety, task identity, task significance, autonomy and feedback using a Malay language version of the Job Diagnostic Survey (JDS). A priori proposition was made that job characteristics could be explained by the 5 aforementioned factors. SPSS version 14 and AMOS 16 were used to analyze the data. The results supported the hypothesis of the study that job characteristics can be measured by the 5 theorized factors. The findings also showed acceptable internal consistency reliability for the overall and the 5 specific subscales of job characteristics factor. Based on the results, it can be concluded that the Malay translated version of JDS can be a useful instrument in assessing the job characteristics construct.

Key words: Job characteristics, Job Diagnostic Survey (JDS), construct validity, theorized factors, feedback, Malay language

INTRODUCTION

The role of job characteristics in predicting attitudinal and behavioral conditions of employees have been extensively scrutinized in organizational and industrial psychology literatures. However, equivocal results have been reported thus far for various reasons (Brief and Aldag, 1975; Dunham, 1976; Firedlander, 1964; Fried and Ferris, 1986, 1987; McCormick *et al.*, 1972). Among others are the inconsistencies of instruments used in measuring job characteristics (Fried nd Ferris, 1986, 1987; Marchese, 1998; Ronan, 1970; Zaccaro and Stone, 1988). Based on the literature, there are 7 measurements of job characteristics, namely the Yale Job Inventory (YJI) by Hackman and Lawler (1971), the Job Diagnostic Survey (JDS) by Hackman and Oldham (1975), the Job Characteristics Inventory (JCI) by Sims *et al.* (1976), the requisite task attributes and perceived task index of Turner and Lawrence (1965), the multi-method job design questionnaire by Campion and Thayer (1985), the job characteristics instrument by Stone and Gueutal (1985) and the revised job diagnostic survey by Idaszak and Drasgow (1987).

In most studies, job characteristics were mainly measured by JDS and JCI because there is extensive evidence of psychometric properties of both instruments in various different samples (Fried and Ferris, 1987). Specifically, JDS is an instrument that assesses 5 dimensions of core job characteristics consisting of skill variety, task identity, task significance, autonomy and feedback. Each dimension is measured by 3 items which brings to a total of 15 items that measure overall job characteristics. JCI originates from JDS but the instrument has a total of 37 items that measure similar dimensions with the exclusion of task significance (Sims *et al.*, 1976). In the same vein, Stone and Gueutal (1985)'s measure of job characteristics comprised 15 items of JDS and another 18 items developed by the researchers. However, the 18 additional items are found to be least appropriate because the questions are too industry specific in which they were designed to measure job characteristics in manufacturing settings. It also deserves noting that the revised version of JDS by Idaszak and Drasgow (1987) comprises exactly the same items developed by Hackman and Oldham (1975). Due to several empirical findings showing inconsistency in job characteristics factors measured by JDS. Idaszak and Drasgow (1987) reversed the negatively-worded items to enhance respondents' understanding of the items. Idaszak and Drasgow (1987) and Idaszak *et al.* (1988) further added that the inconsistent factor analytic results were attributed to the reverse statements. However, Kulik *et al.* (1988) re-evaluated the psychometric properties of the original and revised version of JDS.

Kulik *et al.* (1988) reported that although the revised JDS produced better factor solutions than the original instrument, items in the former were no better in predicting several workplace outcomes. Based on the results, Kulik *et al.* (1988) concluded that it may be premature to substitute the negatively-worded items as asserted by

Idaszak and Drasgow (1987), Idaszak *et al.* (1988) and Buys *et al.* (2007) because predictive validity of the revised instrument has not yet been strongly established. Based on the literature, JDS is the most frequently used measure of job characteristics (Fried and Ferris, 1987; Marchese, 1998). This is due to the good construct validity that warrants its further use (Dunham, 1977b; Fried and Ferris, 1987; Pierce and Dunham, 1978) and it is a comprehensive instrument in measuring job characteristics (Dunham, 1977a).

With a total of 15 items, JDS offers a more parsimonious but in-depth measure of the job characteristics construct compared to JCI which comprised up to 37 items.

A study by Marchese (1998) reported similar internal consistency reliabilities for overall JCI and JDS of 0.76-0.88 for all dimensions. Another psychometric analysis comparing JDS and JCI by Pierce and Dunham (1978) indicates higher internal consistency reliability for JCI than JDS yet both yielded similar results in terms of construct validity. This implies that JCI is no superior to JDS in measuring job characteristics because higher reliability of JCI was most probably confounded by the large number of items or redundancy of items. Importantly, Ferrat *et al.* (1981) asserted that a measurement with a larger number of items has a higher tendency to produce stray loadings or low loadings items that loaded on more than one factor.

Although, JCI was posited to measure core job characteristics, the instrument excludes the measure of task significance which had been reported to substantially affect job performance (Grant, 2008). JCI assesses feedback in terms of feedback that an incumbent gets from others i.e. colleagues, supervisors or customers while feedback in JDS evaluates feedback that an incumbent gathers from his or her job. The latter are more closely related to the concept of job characteristics delineated in the operationalization of feedback in the seminal work of Hackman and Oldham (1975).

Marchese (1998) and Oliver *et al.* (2005) also reported that JDS has good predictive validity of various workplace outcomes because dimensions in JDS strongly influenced the aforementioned criterion compared to factors in JCI. For instance, JDS accounted for by 58% of the variance in salary and job worth compared to 22% for JCI (Marchese, 1998).

More importantly, a psychometric analysis of JDS by Pierce *et al.* (1986) revealed that JDS is an instrumental and pragmatic scale because it validly represents the conceptual definition of the job characteristics construct. This indicates that JDS has a strong predictive validity property of various employee outcomes including

attitudinal state. Fried and Ferris (1987) also asserted that job characteristics strongly predict psychological or cognitive conditions and attitudinal states. Ferrat *et al.* (1981) and Roberts and Glick (1981) contended the goodness of JDS measure as all items in the instrument specifically instruct respondents to indicate the descriptive level of their real work situation. JDS is all about describing a situation before leading respondents to evaluate a situation as in other affective or attitudinal measures. In other words, job characteristics items are best in directly predicting various cognitive, emotional, psychological, attitudinal as well as behavioral outcomes.

Additionally, more empirical scrutiny has been given on JDS compared to JCI, indicating the former has been widely used and cited in the job characteristics literature (Pierce and Dunham, 1978). This is perhaps due to its parsimonious nature and superior construct validity properties as opposed to JCI (Marchese, 1998). According to Fried and Ferris (1987), Parker (2003), Roberts and Glick (1981) and Wanous (1974), job characteristics have always been measured through the perceptions of the job incumbents which are subjected to different interpretations. This has become the main methodological concern as to what extent all items in JDS can fully grasp the variance of the hypothesized dimensions in job characteristics construct.

On top of that Griffin *et al.* (1980) asserted that construct validity and dimensionality of JDS would have to be assessed continuously across time, occupation, industry and more importantly culture because these external factors would have affected the psychometric properties of the instrument to a certain degree. Further, JDS has been theorized to measure 5 dimensions of job characteristics yet empirical evidence shows different numbers of job characteristics dimensionality (Fried and Ferris, 1987). With the exclusion of Idaszak *et al.* (1988), other studies (Ferrat *et al.*, 1981; Fried and Ferris, 1987; Griffin *et al.*, 1980; Pierce and Dunham, 1978; Sims *et al.*, 1976) have reported that JDS is sample-specific which brings to an inconsistent dimensionality of the measure.

In the Malaysian context, only a handful of studies for instance (Johanim *et al.*, 2008, 2009, 2010; Panatik *et al.*, 2009) have provided evidence for the construct validity of JDS. This is because according to Ferrat *et al.* (1981), Fried and Ferris (1987), Griffin *et al.* (1980), Pierce and Dunham (1978), Roberts and Glick (1981), Spector and Jex (1991) and Sims *et al.* (1976) in most instances, psychometric analyses of JDS were limited to exploratory factor analyses as well as the predictive validity of the construct. This study attempts to observe the gap by examining the construct validity and empirical dimensionality of the job characteristics

construct by employing JDS as an instrument to evaluate the aforesaid construct through convergent validity and discriminant validity.

Therefore, the objectives of this study were two fold; firstly to assess the internal consistency reliability of the job characteristics dimensions and the total score and secondly to assess the construct validity of JDS utilizing exploratory and confirmatory factor analytic procedures. The construct validity of the factor was assessed in terms of Variance Extracted (VE), construct or Composite Reliability (CR) as well as standardized factor loadings in the measurement model for evidence of convergent validity and Average Variance Extracted (AVE) for discriminant validity (Hair *et al.*, 2006). The items and dimensions of JDS were developed and adapted based on Hackman and Oldham (1975) that assessed 5 dimensions of job characteristics: skill variety, task identity, task significance, autonomy and feedback.

LITERATURE REVIEW

Conceptual background of job characteristics: Job characteristics has been defined as the job design that results in three psychological states namely meaningfulness of the work performed, responsibility for work outcomes and knowledge of the results of work performed that bring about positive work outcomes (Hackman and Oldham, 1975). In specific, skill variety assesses the extent to which a job allows various activities such as skills and talents that a job incumbent has to utilize in performing his or her job while task identity examines the level of a job that allows completion of a whole and identifiable piece of work from the beginning to an end with a visible outcome (Hackman and Oldham, 1975).

Task significance was hypothesized to test the level of effect of the job on lives or work of others be it in the immediate organization or the external environment. Further, autonomy evaluates the level that a job gives substantial freedom, independence and discretion to the job incumbent in planning the work and in determining the procedures to be used in performing it and finally feedback examines the extent to which work activities give the job incumbent direct and clear information about the effectiveness of his or her performance (Hackman and Oldham, 1975).

Based on the literature, the first version of job characteristics dimensions was broad. According to Morgeson and Campion (2003), the earliest description of job characteristics dimensions developed by Turner and Lawrence included the aspects of dealing with others and friendship opportunities. However, these 2 dimensions

were later omitted because it is not centrally related to the job characteristics construct and too vague to be operationalized as part of job design (Hackman and Oldham, 1975). Therefore following Dunham (1977a), this study adopts the job characteristics dimensions developed by Hackman and Oldham due to its comprehensiveness in providing appropriate meaning to this particular construct.

Most studies on job characteristics adopt the job characteristics model developed by Hackman and Oldham (Morgeson and Campion, 2003). This model incorporates 5 dimensions of job characteristics, namely task identity, skill variety, task significance, autonomy and feedback. The first 3 dimensions determine whether or not a certain job are meaningful to the job incumbent while autonomy and feedback are useful to tap the level of autonomy and feedback that the job incumbent has acquired from his or her job. Job characteristics is defined by Hackman and Oldham (1975) as the job design that results in 3 psychological states namely meaningfulness of the work performed, responsibility for work outcomes and knowledge of the results of work performed which will bring about positive work outcomes (Hackman and Oldham, 1975).

In specific, skill variety assesses the extent to which a job allows various activities such as skills and talents that a job incumbent has to use in performing his or job while task identity examines the level a job allows completion of a whole and identifiable piece of work from the beginning to an end with a visible outcome. Task significance was hypothesized to test the level of effect of the job on lives or work of others be it in the immediate organization or the external environment. Further, autonomy evaluates the level a job gives substantial freedom, independence and discretion to the job incumbent in planning the work and in determining the procedures to be used in performing it and finally feedback examines the extent work activities give the job incumbent direct and clear information about the effectiveness of his or her performance.

The predicting role of job characteristics: Based on (Hackman and Oldham, 1975) job characteristics theory theorizes that enriched and motivating job characteristics would bring about positive cognitive, psychological and emotional condition of the incumbent. The theory further posits that positive cognitive state would result in positive affective state such as job satisfaction, motivation and affective commitment. Ultimately, positive affective condition promotes positive workplace behavior such as high level of job performance, depicted through task and contextual performance. Said differently,

effective job characteristics produce positive workplace attitudes which inevitable encourages employees to engage in positive behaviors at work.

According to Grant (2008), job characteristics are an important aspect of situational factors that is worth being studied yet it has been under-represented in the job performance studies. This is because the factor has been considered as a crucial aspect of job experience that needs to be further evaluated in understanding its role in predicting job performance (Daniels, 2006; Grant, 2008). Most studies examined the self-interested intrinsic outcomes such as personal equity which is due to lack of focus on pro-socially oriented intrinsic outcomes such as intrinsic motivation, affective commitment and job performance (Cohen, 1992; Cook and Hunsaker, 2001; Comeau and Griffith, 2005; Grant, 2008; Janssen, 2001).

There has also been a proposition of a curvilinear link between job characteristics and performance (Marchese, 1998; Singh, 1998). The curvilinear or inverted U link of job characteristics and performance assumes that enriched and complex job characteristics improve motivation and ultimately job performance but to some extent too enriched and too complex job designs exacerbate employees' level of motivation and job performance. Singh (1998) argued that this would not be the case because enriched and motivating job characteristics would consistently have stimulating effects in developing intrinsic motivation potential in incumbents.

Such condition energizes the incumbents to exert efforts while optimally focusing on jobs. This is consistent with Rogelberg *et al.* (1999) who reported a significant amount of variance accounted for job characteristics in predicting Customer Service Behavior (CSB) because a well-designed job provides conducive condition or opportunities for good service delivery.

Several studies have also demonstrated the influence of dimensions in job characteristics on job performance, for instance task significance (Ang *et al.*, 2003; Chiu and Chen, 2005; Grant, 2008; Thakor and Joshi, 2005), skill variety (Chiu and Chen, 2005; Dodd and Ganster, 1996; Kanter, 1988; Thakor and Joshi, 2005), task significance (Leach *et al.*, 2005; Thakor and Joshi, 2005), task autonomy (Christen *et al.*, 2006; Dodd and Ganster, 1996; Hall *et al.*, 2006; Langfred and Moye, 2004; Morgeson *et al.*, 2006; Parker *et al.*, 2001; Tjosvold and Sun, 2006) and feedback (O'Reilly and Anderson, 1980; Van den Berg and Feij, 2003). Task autonomy was reported to have a significant influence on contextual performance or OCB. Autonomy means the discretion that employees have in executing their job. Hence, if employees have more autonomy on their job, they have more time to engage in OCB. Furthermore, task significance was found to be related to job performance because if employees perceive their job as important, they will give exert more effort to become high performers. In other words, once perceptions of good job characteristics are cultivated, employees are more likely to perform at their best.

As for skill variety, Chiu and Chen (2005) suggested that when employees have the opportunity to use different skills and talents at work, they put more effort in performing their core tasks as well as OCB which will ultimately result in high quality performance. Chiu and Chen (2005) also reported a positive association between overall job characteristics and OCB. On the same note, Fried and Ferris (1987) suggested that organizational goals should be defined based on the specific job design. For instance, task identity and feedback provide employees with the information on their own performance standards.

As such, employees would be able to upgrade their performance based on the input or feedback gathered from the job performed. Skill variety, autonomy and feedback are important in reducing absenteeism (Panatik *et al.*, 2009). This is because these factors could increase or lower employees' motivation and satisfaction level at work. Employees would find their job interesting if they are allowed to use different skills are given autonomy to decide on how to go about doing their work and provided with adequate feedback for continuous improvements. As such they would be more likely to be present rather than absent at work. Additionally, job feedback is highly associated with all psychological and behavioral outcomes (Fried and Ferris, 1987; O'Reilly and Anderson, 1980; Van den Berg and Feij, 2003).

This is because by getting adequate information on performance based on the job done, incumbents have the opportunity to improve their quality of work from time to time. Knowing what is expected of them develops positive attitudes and ultimately produces favorable behavioral outcomes, reflected through high level job performance (Bohlander and Snell, 2007; Gomez-Mejia *et al.*, 2007; Hackman and Oldham, 1975; Kreitner and Kinicki, 1998). Therefore, motivating aspects associated with each dimension in job characteristics is of great importance in predicting various organizational outcomes. Parallel to the empirical findings noted earlier, job characteristics theory by Hackman and Oldham (1975) also specifically explains that job characteristics are the systems or situational factors affecting the psychological condition or attitudinal aspects of employees and this state eventually produces positive behavioral outcomes. To sum up, the characteristics of a job have long been considered an

important influence on individuals' intrinsic motivation and later lead to higher job performance levels of employees (Brief and Aldag, 1975; Demerouti, 2006; Dunham, 1976; Firedlander, 1964; George and Zhou, 2001; Hackman and Lawler, 1971; Lawler and Hall, 1970; Oldham and Cummings, 1996; Ronan, 1970; West and Farr, 1989).

Autonomy, feedback, skill variety, task significance and task identity have been proposed as dimensions of job factors that affect employee performance (Hackman and Oldham, 1975; Morgeson *et al.*, 2006; Oldham and Cummings, 1996) because the job characteristics model developed by Oldham and Hackman (1980) purports that individual job performance can be enhanced when he or she perceives their job as having enriched and effective characteristics.

MATERIALS AND METHODS

Procedures: Self-administered questionnaires were distributed to the respondents in nine public service agencies and departments in the northern region of Peninsular Malaysia. The researchers went to each agency and department and personally gave the questionnaires to the chief clerk of each department whom were contacted prior to the researchers' visit. They were briefed on the research objectives and guidelines in answering the questionnaires.

Questionnaires were given out to the respondents to answer 15 items on job characteristics. A total of 500 questionnaires were distributed and 268 were returned. However, only 256 questionnaires were usable for data analysis. Measurement of Job Characteristics using a Job Diagnostic Survey (JDS). The job characteristics scale was assessed by employing JDS that evaluates 5 subscales: skill variety, task identity, task significance, autonomy and feedback. All items were rated on a 7 point Likert scale, namely 1= very disagree, 2 = disagree, 3 = slightly disagree, 4 = moderate, 5 = slightly agree, 6 = agree and 7 = very agree. To determine the score of this scale, ratings within each scale are summed and divided by the total number of items in that particular scale. Negative statement items on the instrument were reverse coded so that a high score on the instrument indicates a high degree of job characteristics for the respondents. Job characteristics is the job design that purports 3 psychological states of a job incumbent, namely meaningfulness of the work performed, responsibility for the work outcomes and knowledge of the results of the work performed which will yield positive outcomes. All of the items were adapted from Hackman and Oldham (1975). Skill variety assessed whether or not a job entails various activities which requires the

incumbent to demonstrate a number of different skills (e.g., this job requires me to do many different things at work using a variety of skills and talents), task identity measured whether or not a job demands completion of a whole and identifiable piece of work which is performing a certain job from the beginning to an end with a visible outcome (e.g., the job involves doing a whole and identifiable piece of work with an obvious beginning and end) and task significance assessed the level in which a job has a significant effect on the lives or work of others be it in the immediate organization or in the external environment (e.g., the job is one where a lot of other people can be affected by how well the works get done).

Additionally, autonomy examined whether or not a job gives substantial freedom, independence and discretion to the individual in planning the work and in determining the procedures to be used in performing it (e.g., this job gives me the chance to use my personal initiative and judgment in carrying out the work) and feedback measured the extent to which the performing work activities required by the job results in the individual being given direct and clear information about the effectiveness of the job holder's performance (e.g., after I finish a job, I know whether or not I have performed well).

Decentralization and back translation of the items: In the decentralizing process, the original measurement was changed before it was adapted and back-translated. The purpose is to improve the translatability of the measurement whereby items that are likely to be specific to the original culture or context were removed or altered (Geisinger, 2003; Brislin, 1970). Two bilingual experts and one public service officer helped to identify some items in the measurement that need to be refined to suit the Malaysian culture and public sector context. Then, the measurement was assessed to ensure that there is no culture-specific language or content.

JDS was translated using back-translation procedure. Following Brislin (1970) and Geisinger (2003), two different bilingual language experts were used in the back-translation process. One of the experts translated the original items to the Malay language and another expert re-translated the translated items into the English language without having seen the original test. After that, based on Geisinger (2003), the quality of the language translation was observed in terms of how accurately the back translated measurement agrees with the original version.

Then, the back translated items were discussed and verified with officers and clerical staff from the public service departments and agencies to ensure suitability of all items in the public sector context. Another discussion

was made with 2 human resource officers in one of the public service departments to get feedbacks on the appropriateness of items adapted and translated in measuring job characteristics of public servants. This stage is crucial to guarantee content and face validity of all items used in the study. Based on the feedbacks, several improvements were made to the items.

Analytical procedures: Data was analyzed using Statistical Package for Social Science (SPSS) version 14 and Analysis of Moments Structure (AMOS) version 16. The reliability and initial evidence of validity were reported based on results from Cronbach's alpha reliability and Exploratory Factor Analysis (EFA). The EFA on the latent construct was carried out to determine if the responses gathered can be grouped according to items in each of the hypothesized dimension.

Following Byrne (2001), Hair *et al.* (2006), Kim and Mueller (1978), Tabachnick and Fidell (2007) and Worthington and Whittaker (2006), EFA using principal axis factoring with direct oblique rotation and a priori criteria of 5 factors was conducted to analyze factor structure of the construct. The cutoff point of 0.5 was used as the threshold to ensure practical significance for further analysis (Hair *et al.*, 2006; Worthington and Whittaker, 2006).

Then, measurement model or CFA for each latent factor was examined by observing the model fit level. Based on Hair *et al.* (2006) and Tabachnick and Fidell (2007), convergent validity in this study was assessed by calculating the Variance Explained (VE) and Composite Reliability (CR) of each latent construct.

RESULTS AND DISCUSSION

Demographic profiles of the respondents were gathered in this study. Further, exploratory and confirmatory factor analyses and internal reliability consistencies and mean were employed to examine the factor structure of the job characteristics multidimensional scale using JDS.

Demographic profiles of the respondents: The sample consists of 61.70% male and 38.30% female. The majority of respondents, 55.08% were below 30 years old while 7.42% were above 50 years old. Given the fact that Malaysian public service departments and agencies were predominantly Malay-populated, 98.4% of the respondents were Malays. Only 1.2 and 0.4% were Chinese and Indian, respectively.

Additionally, the majority of respondents, 34% were SPM holders, 22.70% were STPM holders and 29.30% were diploma holders. The rest of the respondents or 13.7% were undergraduates and masters degree holders.

A total of 72.2% of the respondents had worked in the organization for <10 years while 27.80% had worked for >10 years. A total of 210 respondents or 83% had been in the current job position for <10 years while the rest were >10 years. Finally, a vast majority of the respondents or 94.90% were support staffs and only 5.10% were professional and management staffs.

Reliability: Table 1 shows the results of the internal consistency reliability, mean and standard deviation for the total score and each subscale. Cronbach's alpha values were within the ranges of 0.606 and 0.840 for all 5 subscales. The overall internal consistency reliability for the job characteristics scale was 0.847.

Exploratory Factor Analysis (EFA): EFA was conducted to examine the factorial validity of the job characteristics construct. Principal axis factoring was chosen over other methods of extraction because it is mostly used and understood (Tabachnick and Fidell, 2007). Most importantly, principal axis factoring extraction method analyzes the common or shared variance among items while unique and error variances were eliminated (Byrne, 2001; Costello and Osborne, 2005; Hair *et al.*, 2006; Kim and Mueller, 1978; Tabachnick and Fidell, 2007; Worthington and Whittaker, 2006). Direct oblique rotation was used because all items shared the same second-order factor and hence, they are assumed to be positively correlated (Costello and Osborne, 2005; Hair *et al.*, 2006; Tabachnick and Fidell, 2007; Worthington and Whittaker, 2006). Based on the EFA results in Table 2

Table 1: Summary statistics for job characteristics and Cronbach's alpha

Constructs	Items	Mean	SD	Cronbach's alpha
Skill variety	3	4.561	0.327	0.606
Task identity	3	5.014	0.110	0.686
Task significance	3	5.180	0.008	0.706
Autonomy	3	4.570	0.045	0.744
Feedback	3	5.291	0.010	0.840
Overall job characteristics	15	4.923	0.157	0.847

Table 2: Exploratory factor analysis result of job characteristics

Items	Factor				
	1	2	3	4	5
Skill variety 1	-	-	0.551	-	-
Skill variety 2	-	-	0.903	-	-
Task identity 1	-	-	-	0.922	-
Task identity 2	-	-	-	0.687	-
Task significance 1	-	-	-	-	0.862
Task significance 2	-	-	-	-	0.787
Autonomy 1	-	0.828	-	-	-
Autonomy 2	-	0.918	-	-	-
Feedback 1	0.646	-	-	-	-
Feedback 2	0.753	-	-	-	-
Feedback 3	0.628	-	-	-	-
Total eigenvalues	4.723	1.674	0.927	0.655	0.561
Variance explained	36.887	11.879	8.101	5.461	4.676
KMO	0.786	-	-	-	-
Total variance explained	67.003	-	-	-	-

Table 3: Composite reliability of each dimension

Observed variables	Standardized loadings	(Sum of standardized loadings)^2	Error	Number of items	Composite reliability
Skill variety 1	0.890		0.210		
Skill variety 2	0.780		0.540		
Total	1.670	2.789	0.750	2	0.788
Task identity 1	0.810		0.390		
Task identity 2	0.890		0.150		
Total	1.700	2.890	0.540	2	0.843
Task significance 1	0.750		0.350		
Task significance 2	0.890		0.320		
Total	1.640	2.690	0.670	2	0.801
Autonomy 1	0.670		-0.060		
Autonomy 2	1.130		0.490		
Total	1.800	3.240	0.430	2	0.883
Feedback 1	0.770		0.260		
Feedback 2	0.860		0.170		
Feedback 3	0.770		0.350		
Total	1.630	2.657	0.520	3	0.836

shows that job characteristics was a 5 dimensional factor which encompass skill variety, task identity, task significance, autonomy and feedback. Additionally, item 3 in each of the first four dimensions were omitted due to low loadings, i.e., <0.5. The items were this job is quite difficult and it involves no repetitiveness, this job is arranged so that I can do an entire piece of work from beginning to the end, this job itself is very significant and important in the broader scheme of things and the job gives me the chance to use my personal initiative and judgment in carrying out work.

The total variance explained for this construct was 67.003 and KMO value was 0.786. The factor loadings for all of the remaining items range from 0.551-0.918. To ensure good construct validity of the instruments although some items were deleted, Composite Reliability (CR), Variance Extracted (VE) values and discriminant validity by comparing the values of Average Variance Extracted (AVE) and Squared Multiple Correlations (SMC) between the five dimensions were examined and reported in the subsequent section.

Construct validity of the job characteristics using JDS: Convergent validity and discriminant validity were used to assess the construct validity of the instruments used in this study. According to Hair *et al.* (2006) construct validity is crucial to ensure that a set of items actually represents the theoretical latent construct these variables were designed to measure. Specifically, convergent validity identifies the proportion of variance for each factor and discriminant validity examines the extent to which an independent variable is truly distinct from other independent variables in predicting the dependent variable (Hair *et al.*, 2006).

In addition to the standardized factor loadings in the confirmatory factor analysis, convergent validity in the present study was examined by observing the value of composite or Construct Reliability (CR) and Variance

Table 4: Variance extracted for each dimension of job characteristics

Observed variables	SMC	Error	No. of items	Variance extracted
Skill variety 1	0.812	0.210		
Skill variety 2	0.592	0.540		
Total	1.404	0.750	2	0.652
Task identity 1	0.675	0.390		
Task identity 2	0.778	0.150		
Total	1.453	0.540	2	0.729
Task significance 1	0.752	0.350		
Task significance 2	0.570	0.320		
Total	1.322	0.670	2	0.664
Autonomy 1	0.538	-0.060		
Autonomy 2	1.058	0.490		
Total	1.596	0.430	2	0.788
Feedback 1	0.581	0.270		
Feedback 2	0.790	0.160		
Feedback 3	0.579	0.360		
Total	5.142	1.650	3	0.550

Extracted (VE) for each dimensions of job characteristics. As noted by Hair *et al.* (2006), CR values should be >0.6 while VE should be above 0.5. CR value that is <0.6 indicates that the items do not consistently measure the hypothesized latent construct and the value of VE that is <0.5 indicates that more error remains in the items than variance explained by the latent factor structure imposed on the measure (Hair *et al.*, 2006). CR, VE and standardized factor loadings are the indicators for convergent validity. The rule of thumb for a good reliability estimate is 0.7 or higher which means that all observed variables consistently represent the same latent construct. Table 3 shows the calculated composite reliability for each latent construct which were above 0.70 and the standardized factor loadings of above 0.5 for all items. Discriminant validity was assessed by comparing the value of the Average Variance Extracted (AVE) and the Squared Multiple Correlations (SMC) between constructs. To assume that all independent variables were orthogonal of one another, the value of AVE should be greater than the SMC between the respective variables (Hair *et al.*, 2006). Table 4 shows the result of the

Table 5: Correlations, correlation squared matrix and Average Variance Extracted (AVE) of dimensions in the job characteristics factor

	Skill variety	Task identity	Task significance	Autonomy	Feedback
Skill variety	1.00	-	-	-	-
Task identity	0.540	1.00	-	-	-
	(0.292)				
	0.691				
Task significance	0.466	0.541	1.00	-	-
	(0.217)	(2.93)			
	0.658	0.697			
Autonomy	0.252	0.113	0.197	1.00	-
	(0.064)	(0.013)	(0.0039)		
	0.720	0.759	0.726		
Feedback	0.606	0.688	0.643	0.816	1.00
	(0.367)	(0.473)	(0.413)	(0.036)	
	0.807	0.839	0.819	0.859	

Squared correlation values presented in parentheses and AVE values in italics

Table 6: Model fit statistics for each hypothesized measurement model

Model	df	χ^2	p	$\chi^2 \, df^{-1}$	RMSEA	RMR	TLI	CFI
First-order	10	44.028	0.116	1.295	0.034	0.036	0.988	0.993
Second-order	16	20.810	0.186	1.301	0.034	0.031	0.990	0.994

calculated Variance Extracted (VE) to further support the convergent validity of each dimension. A Variance Extracted (VE) of 0.5 or higher suggests adequate convergence (Hair *et al.*, 2006). VE for the 5 dimensions in job characteristics were between 0.550 and 0.788, lending empirical support for convergent validity of all items in JDS. Table 5 shows the calculated values of Average Variance Extracted (AVE) to support discriminant validity for the constructs. This test was done by comparing the VE for any 2 constructs with the square of the correlations estimates between these 2 constructs. The former should be greater than the latter to provide good evidence of discriminant validity (Hair *et al.*, 2006). As shows in Table 5, the values of AVE between all factors were greater than the squared correlation values between each of them. This lends support for discriminant validity among the dimensions which suggests that all dimensions in job characteristics were orthogonal of one another in predicting criterion variables.

First-order and second-order job characteristics measurement model: The measurement model was observed for overall fitness by referring to other fit indices as suggested by Byrne (2001), Kline (2005), Schumacker and Lomax (2004) and Tabachnick and Fidell (2007). The fit indices reported in this study were the Root Mean Square Error of Approximation (RMSEA) and Root Mean Square Residual (RMR) for model fit, the Tucker-Lewis Index (TLI) and the Comparative Fit Index (CFI) for model comparison and the Normed Chi-square (NC) for model parsimony (Byrne, 2001; Hair *et al.*, 2006; Schumacker and Lomax, 2004; Tabachnick and Fidell, 2007; Tanaka, 1993). To indicate that the model is adequately fit, the cutoff values are 0.90 or higher for CFI and TLI (Byrne, 2001; Kline, 2005; Schumacker and Lomax, 2004; Tanaka, 1993), 0.08 or lower for RMSEA and 0.10 or

lower for RMR (Byrne, 2001; Kline, 2005; Schumacker and Lomax, 2004; Tanaka, 1993). The acceptable range for normed χ^2 was 1-5 (Schumacker and Lomax, 2004). Table 4 shows the model fit criteria and acceptable fit interpretation based on Byrne (2001), Kline (2004), Schumacker and Lomax (2004) and Tanaka (1993).

Job characteristics were originally measured by 15 items. But based on the exploratory factor analysis results, items 3 of skill variety, task identity, task significance and autonomy were deleted due to low factor loadings, i.e., <0.50. Hence, only 11 items were subjected to confirmatory factor analysis. The first order measurement model showed good fit with TLI = 0.988, CFI = 0.993, RMSEA = 0.034, RMR = 0.036, normed $\chi^2 = 1.295$ ($\chi^2 = 44.028$, df = 10, p = 0.116). Likewise, the second order measurement model also demonstrated good fit with TLI = 0.990, CFI = 0.994, RMSEA = 0.034, RMR = 0.031, normed $\chi^2 = 1.301$ ($\chi^2 = 20.810$, df = 16, p = 0.186). The standardized factor loadings ranged from 0.75-0.96 and all were significant at p<0.05 (t-values ranging from 2.671-13.904). This shows support for the convergent validity of the model. Model fit statistics comparing both factor models are shown in Table 6. The results indicated that the 2 measurement models for the job characteristics construct met the criteria for good fitting models. The second order factor reproduced similar results to the earlier first order factor. This finding suggests for validity and utility of the first order and second order measurement model of JDS in evaluating job characteristics.

RESULTS AND DISCUSSION

This study adopted the Job Diagnostic Survey (JDS) developed by Hackman and Oldham (1975) to measure job characteristics. This is because JDS is the most

established instrument in measuring job characteristics due to its frequent utility and extensive reports on its construct validity (Fried and Ferris, 1987; Marchese, 1998). JDS is also more parsimonious in nature with only 15 items used to measure 5 dimensions, namely, skill variety, task identity, task significance, autonomy and feedback. Most importantly, JDS has been reported to have a good construct validity that warrants its wide utilization (Fried and Ferris, 1987; Pierce and Dunham, 1978) and it is the most comprehensive measure of job characteristics (Dunham, 1977a, b) compared to other job characteristics measures such as the Job Characteristics Inventory (JCI).

JDS had gone through extensive scrutiny ever since its creation in 1975 (Ferrat *et al.*, 1981; Fried and Ferris, 1987; Griffin *et al.*, 1980; Idaszak *et al.*, 1988; Pierce and Dunham, 1978; Sims *et al.*, 1976). JDS has been posited to extract 5-dimensions of job characteristics however, empirical evidence shows different numbers of factors emanated in most cases (Ferrat *et al.*, 1981; Fried and Ferris, 1987; Griffin *et al.*, 1980; Pierce and Dunham, 1978; Sims *et al.*, 1976). A study by Idaszak, nevertheless, showed support for 5 empirical dimensionalities of job characteristics measured by JDS as theorized by Hackman and Oldham (1975). According to Fried and Ferris (1987), the inconsistent number of dimensions is attributed to the fact that JDS was very sample-specific and perceptual in nature and too subjective to be grasped by items in JDS. On top of that Griffin *et al.* (1980) strongly suggested that the validity of JDS should be evaluated continuously across different contexts including industry, occupation and most importantly culture. In other words, researchers should not underestimate the impact of contextual factors in influencing the psychometric properties of JDS. Taking into account the suggestion by Griffin *et al.* (1980), this study examined construct validity and empirical dimensionality of the job characteristics using JDS.

The results of this study provided evidence of robustness of JDS in terms of construct validity. This is based on the fact that EFA and CFA results supported the 5-dimensionality of job characteristics measured by JDS. Additionally, Composite Reliability (CR) for each dimension were all above 0.60, variance extracted were all exceeded 0.50 and standardized factor loading were all >0.5. In terms of discriminant validity, the results show evidence that all dimensions in job characteristics were distinct of one another. This study also reported coefficient alphas were >0.60 for all dimensions in job characteristics, indicating evidence of internal consistency reliability of all items in JDS. Based on the results, JDS is usable in the Asian context, particularly in

the Malaysian setting because of the evidence of construct validity of items in JDS. Like the original version of JDS, the Malay-translated version also measured 5 dimensions of job characteristics: skill variety, task identity, task significance, autonomy and feedback.

The evidence for construct validity of the Malay translated version of JDS was conceivable due to the detailed procedures undertaken to establish content validity for the Malay-translated version of JDS. First, the appropriateness of items was assessed to ensure that each of them truly represented the theorized latent. This is followed by the decentralization process (Brislin, 1970; Geisinger, 2003) which was conducted to identify and rephrase items that were too culture-specific. Second, all items were back-translated based on specific procedures suggested by Brislin (1970) and Geisinger (2003). Third, the back-translated items were discussed and verified with officers and clerical staff from the public sector to ascertain suitability in the public sector context. By employing all the necessary steps prior to using the translated version of JDS, the reliability and validity of JDS could be enhanced as noted by Brislin (1970) and Geisinger (2003).

Additionally, construct validity of the Malay-translated version of JDS was established in this study due to the demographic factors of the respondents in terms of job tenure. It deserves noting that all of the respondents selected in the study had been in their current position for at least a year. As such, they would have a substantial amount of knowledge on their job content and therefore, they could evaluate whether or not their jobs are motivating and enriching. With relevant knowledge in hand, respondents in the study were conversant about their job and hence, able to respond aptly to all of the job characteristics items. This has yielded the 5 factor solution for JDS obtained for respondents in this study. The results of the empirical dimensionality of job characteristics measured by JDS were similar to the theoretical dimensionality of the job characteristics factor structure as hypothesized by Hackman and Oldham (1975).

Most importantly, to the best of the researcher's knowledge, only a few studies (Johanim *et al.*, 2008, 2010; Johari *et al.*, 2009) had been conducted to attest the construct validity of JDS. This is because most of the results that reported psychometric properties of JDS were strictly based on the results of exploratory factor analysis and internal consistency reliability. This study moved one step ahead in evaluating the robustness of the Malay-translated version of JDS in terms of construct validity to establish usability of the instrument in the Malaysian setting, particularly in the public service

sector. Furthermore, the results were found to be consistent with findings by Idaszak *et al.* (1988) that JDS measured the 5 hypothesized dimensions of job characteristics based on EFA and CFA. Importantly, Idaszak *et al.* (1988) reported good evidence of construct validity of JDS. The results, however are inconsistent to other findings (Ferrat *et al.*, 1981; Fried and Ferris, 1987; Griffin *et al.*, 1980; Pierce and Dunham, 1978; Sims *et al.*, 1976) that reported different numbers of factors emanating from exploratory and confirmatory factor analyses of JDS.

Similar to Idaszak *et al.* (1988), three negatively worded items in skill variety, task identity and task significance were deleted due to low communalities. Idaszak *et al.* (1988) earlier asserted the need to reverse the negatively-worded items to enhance the convergent validity of the items but Kulik *et al.* (1988) argued that such assertion was perhaps pre-mature.

This is because Kulik *et al.* (1988) strongly suggested that more empirical evidence showing support for problems of these negatively-worded items before the revised JDS by Idaszak *et al.* (1988) could be used extensively. Based on the findings, there is additional evidence parallel to suggestions by Idaszak *et al.* (1988) that researchers should consider using the revised JDS to ensure all items produced high factor loadings.

On the same note, this finding also refuted the earlier assertion by Ferrat *et al.* (1981), Fried and Ferris (1987), Griffin *et al.* (1980), Pierce and Dunham (1978) and Sims *et al.* (1976) that JDS is sample-specific because results of this study indicated acceptable reliability and construct validity of JDS. Importantly, confirmatory factor analysis provided the evidence of construct validity based on assessment of the psychometric properties and measurement model fit for JDS, suggesting utility of JDS in different settings.

CONCLUSION

As a conclusion, the results of this study suggest good reliability and validity of the instrument. Most importantly, confirmatory factor analysis provided the empirical evidence of construct validity based on assessment of the psychometric properties and measurement model fit for JDS. Taken together, the Malay-translated version of JDS measuring 5 subscales, namely skill variety, task identity, task significance, autonomy and feedback can be a useful instrument in assessing job characteristics construct in Malaysia, particularly in the public service setting due to the of construct validity of the instrument.

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