

Measuring Utrecht Work Engagement Scale: Factor analysis approach in Telecommunication Sector

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Abstract

The aim of this paper was to examine the factor structure of the instruments measuring work engagement (Utrecht Work Engagement Scale / UWES) for Somaliland Telecommunication employees via factor analysis approach. Confirmatory factor analyses in the sample supported the superiority of the proposed three-factor structure of the UWES (vigor, dedication, and absorption). The results suggest that the UWES are valid instruments for testing work engagement.

Keywords

Utrecht, Work Engagement, Factor analysis and Telecommunication Sector.

1. Introduction

Organizational psychologists and managers are interested in employees' engagement because it is a significant correlate of employee health and performance (Amos *et al.*, 2017). Over the past decade, researchers have shifted the attention from employee malfunctioning to optimal functioning. This latter development reflects the trend towards a 'positive psychology' that focuses on human strengths rather than on weaknesses (Andrea *et al.*, 2018). Bakker & Bal, (2010), underlined the need for positive organizational behavior research, defined as 'the study and application of positively oriented human resource strengths and psychological capacities that can be measured, developed, and effectively managed for performance improvement in today's workplace'. In this context, researchers and managers became interested in understanding not only what makes employees burned out, but also what makes them energetic and enthusiastic about their work (Bakker & Bal, 2010). This is because engaged employees enjoy better health, are more proactive and perform better. According to Bakker & Leiter (2010), contemporary organizations need employees who are psychologically connected to their work. The information and service economy of the 21st century requires employees who are willing and able to invest themselves fully in their roles. Organizations need employees who are energetic and dedicated, i.e., who are engaged in their work. It is therefore not surprising that, since the turn of the century, work engagement has gained significant popularity in the management (e.g., Macey, Schneider, Barbera, & Young, 2009) and scientific literature (e.g., Bakker & Leiter, 2010). Thus, valid instruments to estimate employee work engagement are necessary both for researchers and managers.

2. Work Engagement

According to Ruud *et al.*, (2018) and Muntaha *et al.*, (2013) work engagement is defined as a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption. Rather than a momentary and specific state, engagement refers to a more persistent and pervasive affective-cognitive state that is not focused on any particular object, event, individual, or behavior (Ruud *et al.*, 2018). Vigor is characterized by high levels of

energy and mental resilience while working, the willingness to invest effort in one's work, and persistence even in the face of difficulties (Amos *et al.*, 2017). Dedication refers to being strongly involved in one's work and experiencing a sense of significance, enthusiasm, inspiration, pride, and challenge (Amos *et al.*, 2017). Absorption, is characterized by being fully concentrated and happily engrossed in one's work, whereby time passes quickly and one has difficulties with detaching oneself from work (Amos *et al.*, 2017).

In order to briefly present the historical background of the concept of work engagement it started in the year of 1990. Work engagement from the academic perspective goes back to Kahn's (1990) conceptualization of engagement in a work setting in his article Psychological Conditions of Personal Engagement and Disengagement at Work (Anitha 2014; Shuck 2011). This first conceptualization builds on an ethnographic study of 32 employees, 16 summer camp counsellors and 16 financial professionals about psychological conditions at work and their individual and contextual sources (Kahn 1990). The point of departure that Kahn (1990) takes in the aforementioned paper is the different roles individuals take on in different situations. In these terms, Kahn (1990) defines personal engagement as the simultaneous employment and expression of a person's "preferred self" in task behaviors that promote connections to work and to others, personal presence (physical, cognitive, and emotional), and active, full role performances. Later studies by Muntaha *et al.*, (2013) place engagement in constellation with burnout defined by the three dimensions of exhaustion, cynicism and inefficacy (Amos *et al.*, 2017). Defining engagement as "a persistent positive affective-motivational state," proposing that it (engagement) is the positive antithesis of burnout (Muntaha *et al.*, 2013). Amos *et al.*, (2017), later on test Kahn's (1990) concepts of meaningfulness, safety and availability as psychological conditions influencing employee engagement when job demands are high. The study showed positive correlations between the three conditions (especially in terms of meaningfulness) and engagement, and also posited the concept of engagement as one close to both the concept of job involvement as well as that of flow. Later studies, and most notably Amos *et al.*, (2017) as the first one, research into antecedents and outcomes of employee engagement, and thereby identify employee engagement as a distinct and unique construct. Sowath *et al.*, (2014) also suggest that it is possible that the antecedents and consequences of engagement might depend on the kind of engagement is in question, pertaining to the idea of different types of engagement. Another noteworthy study is that of Osman & Olusegun, (2016) who introduce a distinct conceptualization of different types of employee engagement, namely trait, state, and behavioural engagement as separate constructs in a causal direction, suggesting also that engagement can be regarded as directly observable behaviour. In a seminal review of the foundations of employee engagement, Amos *et al.*, (2017) attempt to synthesize the definitions that the authors have proposed for employee engagement, and propose the following emergent definition of the concept: "Employee engagement can be defined as "an individual employee's cognitive, emotional, and behavioral state directed toward desired organizational outcomes."

Work engagement is assumed as the opposite of burnout (Ruud *et al.*, 2018; Amos *et al.*, 2017). Contrary to those who suffer from burnout, engaged employees have a sense of energetic and effective connection with their work activities and they see themselves as able to deal well with the demands of their job (Ruud *et al.*, 2018). Some schools of thought exist on the relationship between work engagement and burnout. For example, the approach of Kam *et al.*, (2018) assumes that engagement and burnout constitute the opposite poles of a continuum of work related well-being, with burnout representing the negative pole and engagement the positive pole. Because Kam *et al.*, (2018) define burnout in terms of exhaustion, cynicism and reduced professional efficacy, it follows that engagement is characterized by energy, involvement and efficacy. By definition, these three aspects of engagement constitute the opposites of the three corresponding aspects of burnout (Kam *et al.*, 2018).

3. Outcomes of Work Engagement

Outcomes, or consequences of employee engagement have attracted the interest of both practitioners as well as academics. In academic research Kam *et al.*, (2018) work is clearly one of the most notable contributions to this facet of the employee engagement research. Whereas it is possible that consequences (and antecedents alike) vary depending on the type of engagement. Kam *et al.*, (2018) offers insights into what could form a universal basis of consequences to employee engagement. The consequences that are identified are first and foremost job satisfaction. Added to this come organisational commitment, intention to quit, as well as employees' job performance (Amos *et al.*, 2017). This correlates with aforementioned suggestions by Ruud *et al.*, (2018) suggesting that job performance

is the manifestation of employees engagement. Osman & Olusegun, (2016) add to this with two additional outcomes; discretionary effort and intention to turnover. The authors refer to discretionary effort as a willingness to perform above the normal job responsibilities of the employee. From a business or organisational perspective on the other hand, Osman & Olusegun, (2016) proposed with a somewhat different set of outcomes. It is shown that employee satisfaction and engagement are positively correlated with business outcomes, such as customer satisfaction, productivity, profit, employee turnover and accidents. However, the present study focuses on job performance as an outcome of employees' engagement.

4. Research Design

According to Helen & Thomas, (2012), sampling is the process whereby some elements from the population are selected to represent the whole population. Sample size is the number of units that is required to get accurate findings (Fink, 2003). For the purpose of this paper, a sample of a group of 183 employees (126 men, 68.9%; 57 women, 31.1%) from Somaliland Telecommunication sector completed the Utrecht Work Engagement Scale. Factor analysis was used to analyze the resulting data. The majority of participants (36.1%) were between thirty and thirty four years of age and held a bachelor degree (57.4%). Their mean organizational tenure was less than one year (39.9%), and the response rate was 87.1%.

5. Research Findings and Data Analysis

The data analysis was conducted using Statistical Package of the Social Sciences (SPSS) and SmartPLS. Factor analysis is a statistical tool to remove redundancy or duplication from a set of correlated variables. This tool helps us to cluster variables into homogeneous sets by identifying groupings and selecting one variable to represent many and thus helps us to describe several variables using a few factors. With the help of other statistical analysis such as Cronbach's Alpha, KMO and Bartlett's Test, Rotated Component Matrix and Correlation analysis, we can determine the validity and reliability of each driver the adequacy of the sample and also correlation among various items to reflect the employees' work engagement levels (Hair *et al.*, 2014).

In this present study, factor analysis was performed on all items that measured all the proposed variables of the study. Factor analysis is an established tool that helps determine the construct adequacy of a measuring device (Maryam & Mohammad, 2016). Factor analysis was conducted on the data collected from 183 employees. A sample of 100 cases is acceptable but a sample size of more than 200 cases is preferable (Maryam & Mohammad, 2016; Hair *et al.*, 2014). The researchers generally would not do factor analyze a sample of fewer than 50 cases and preferably the sample should be 100 or larger (Hair *et al.*, 2014). In a similar vein, according to Gour & Samai, (2014), factor analysis should not do with less than 100 cases. In the present study, the total number of usable questionnaires for factor analysis is 183 of sample size and was greater than the minimum requirement. To be conducted a single factor analysis of all variables requires huge sample size (Hair *et al.*, 2014). Therefore, a separate factor analysis was performed for all items measured on an interval scale (Gour & Samai, 2014).

5.1 Factor Analysis of Work Engagement

Work engagement construct contains three variables which are Vigor, Dedication and Absorption. As indicated in Table 1, to assess the underlying structure of three variables of the construct, 17 items were submitted to principle component method and varimax rotation analysis. Table 1 shows the loadings of the 17 items on the three factors extracted. The higher loading of more than .5 which contributes to the variables were only considered in analysis. The Kaiser-Meyer-Olkin criterion was applied to extract the number of factors and three factors with an eigenvalue of more than 1 were extracted as shown in Table 1. The documented KMO of work engagement construct was .809. The three extracted factors explained 59.67% of the variance in the construct. The three factors contain the three types of work engagement such as vigor, absorption and dedication respectively. The first factor (i.e. Vigor) consisted of six items and explained 21.91% of the variance in work attitudes construct. The second factor (i.e. Absorption) consisted of six items and explained 20.86% of the variance in work attitudes construct. The third factor (i.e. Dedication) consisted of five items and explained 16.90% of the variance in work attitudes construct.

Table 1: Summary of Factor Analysis of Work Engagement

No	Item	Component		
		1	2	3
Factor 1: Vigor	At my work, I feel bursting with energy	.924	.017	.005
	At my job, I feel strong and vigorous	.947	-.017	-.007
	When I get up in the morning, I feel like going to work	.902	.054	.005
	I can continue working for very long periods at a time	.930	.059	.012
	At my job, I am very resilient, mentally	.931	.075	.038
	At my work I always persevere, even when things do not go well	.874	.086	.060
Factor 3: Dedication	I find the work that I do full of meaning and purpose	-.008	.006	.954
	I am enthusiastic about my job	.014	-.022	.963
	My job inspires me	.010	-.028	.935
	I am proud on the work that I do	.066	-.076	.944
	To me, my job is not challenging	.026	-.066	.940
Factor 2: Absorption	Time flies when I'm working	.027	.914	.002
	When I am working, I forget everything else around me	.069	.951	-.064
	I feel happy when I am working intensely	.071	.844	-.093
	I am immersed in my work	.062	.883	-.019
	I get carried away when I'm working	.072	.946	-.015
	It is difficult to detach myself from my job	-.024	.856	-.011
Eigen values		5.697	5.424	4.393
Percentage of variance Explained= 59.67%		21.91	20.86	16.90
Kaiser-Meyer-Olkin Measure of Sampling Adequacy				.809
Bartlett's Test of Sphericity Approx. Chi-Square				6602
df				325
Sig.				.000

5.2 Confirmatory Factor Analysis of Work Engagement

Reliability refers to the “extent to which a variable or set of variables is consistent in what it is intended to measure”. In other words, reliability refers to the degree the latent variable reflects its true value with free errors. To further investigate the reliability of reflective constructs, Cronbach’s Alpha and composite reliability measures can be extracted by PLS-SEM. The measurements with Cronbach’s Alpha and composite reliability above .70 are considered reliable (Sungbum *et al.*, 2017). Compared to Cronbach’s Alpha, Composite reliability is regarded as a more rigorous assessment of reliability (Sungbum *et al.*, 2017). The reliability level of all reflective constructs is reported in Table 2. The results show that all Composite Reliability and Cronbach’s Alpha values are above .95, ,

consequently, all reflective items realized an acceptable level of reliability. Validity in general refers the level to which a measure correctly signifies what it is expected to (Sungbum *et al.*, 2017). “Validity is concerned with how well the concept is defined by the measure(s)” (Sungbum *et al.*, 2017). There are two types of validity, which are applicable to be executed on reflective measures: convergent validity and discriminant validity. Convergent validity investigates “the degree to which two measures of the same concept are correlated” (Ellen *et al.*, 2015) the same construct (Vinita, 2013). In contrast, Discriminant validity is “the degree to which two conceptually similar concepts are distinct” (Ellen *et al.*, 2015).

Table 2: Work Engagement Reliability

Construct	Composite Reliability	Cronbach's Alpha
Work engagement (WE)	Formative	
VIG	.964	.971
DED	.972	.978
ABS	.955	.963

Table 3: Item loadings and AVE for Work Engagement Construct

Item Loading	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values	AVE
Vigor						.847
VIG1	.923	.924	.017	53.824	.000	
VIG2	.939	.939	.014	69.044	.000	
VIG3	.894	.896	.020	44.373	.000	
VIG4	.935	.933	.013	73.504	.000	
VIG5	.945	.942	.009	101.269	.000	
VIG6	.885	.884	.018	50.525	.000	
Dedication						.900
DED1	.956	.956	.009	101.970	.000	
DED2	.964	.964	.006	154.490	.000	
DED3	.936	.936	.012	76.755	.000	
DED4	.949	.948	.010	96.095	.000	
DED5	.939	.941	.014	67.373	.000	
Absorption						.811
ABS1	.928	.924	.018	52.114	.000	
ABS2	.955	.954	.008	114.645	.000	
ABS3	.810	.817	.036	22.232	.000	
ABS4	.855	.861	.027	31.213	.000	
ABS5	.960	.957	.006	164.972	.000	
ABS6	.887	.879	.016	55.321	.000	

Convergent: Convergent validity can be evaluated by the average variance extracted (AVE) values, which refers to the degree the construct identifies the variance of its indicators. The threshold value of (AVE) must be reported if it exceeds .50 (Ellen *et al.*, 2015). In addition, confirmatory factor analysis (CFA) is another indicator of convergent validity by using PLS-SEM. The convergent validity is realized if the indicators or variables of each construct load exceeds .70 on their construct more than the other constructs (Ellen *et al.*, 2015; Vinita, 2013). Table 3 shows the items loading and the (AVE) values for all the three factors of work engagement. As a result, the loading for all items in reflective construct is reported to have values above .70. In addition, AVE values exceeds the cutoff point .50. Consequently, the convergent validity is achieved among all factors of work engagement.

Significance and relevance of the formative indicators: last stage of assessing the contribution of formative indicators and their relevance and outer weight is done by performing multiple regressions (Sungbum *et al.*, 2017). In order to form study second-order formative-reflective construct, the latent variable scores for all first-order constructs are generated by PLS-SEM, and are linked as formative indicators to the second-order construct. However, to picture this, the latent second-order construct is treated as a dependent construct and the formative indicators (latent scores) as independent constructs. This procedure is recommended by Hair *et al.*, (2014) when first-order constructs have different numbers of items. Furthermore, by comparing the value of outer weights indicators, one can decide the relative contribution of a particular indicator by taking into account its level of significance. Table 4 depicts that work engagement' indicators such as vigor, absorption and dedication, as reported all their outer weights are positive and significant.

Table 4: Formative Indicators, Outer Weight and Significance

Formative Construct	Indicators	Weight	Sample Mean	Standard Deviation	T Statistics	P Values
Work Engagement	Vigor	.299	.278	.153	2.815	.005
	Absorption	.855	.814	.143	5.977	.000
	Dedication	.309	.284	.146	2.120	.035

6. Conclusion

The present study showed that the instruments that are broadly used to measure work engagement (UWES; Schaufeli & Bakker, 2010) are meaningful, when these instruments are used. The confirmatory and factor analysis results from Smart PLS and SPSS respectively, suggest that UWES are valid instruments for testing work engagement. In addition, the findings of confirmatory factor analysis provided evidence supporting the reliability and three-factor structure of the Utrecht Work Engagement Scale for employees when evaluated with a Somaliland Telecommunication employees' sample in this study. Thus, it is appropriate to use The Utrecht Work Engagement Scale for the assessment of the work engagement of the employees.

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Biographies

Abdul Talib Bon is Professor of Technology Management in Department of Production and Operations Management, Faculty of Technology Management and Business at the Universiti Tun Hussein Onn Malaysia. He has a PhD in Computer Science, which he obtained from the Universite de La Rochelle, France in the year 2008. His doctoral thesis was on topic Process Quality Improvement on Beltline Moulding Manufacturing. He studied Business Administration major in Quality Management at the master's level in the Universiti Kebangsaan Malaysia for which he was awarded the MBA in the year 1998. He's bachelor degree and diploma in Mechanical Engineering which his obtained from the Universiti Teknologi Malaysia. He received his postgraduate certificate in Mechatronics and Robotics from Carlisle, United Kingdom in 1997. He is Director of Teaching Factory and Manager of Centre for Technology (Furniture Innovation Technology) from 1 September 2016 and Head of Program Bachelor of Technology Management (Furniture Design and Manufacturing) with Honours from 2014 until 2017. Before this he was the Deputy Dean (Research and Development) at the Faculty of Technology Management and Business in the Universiti Tun Hussein Onn Malaysia from 2008 until December 2011. Dr. Abdul Talib Bon has had over 30 year experience of teaching in higher learning education. A major part of his teaching experience involves teaching mechanical engineering students in polytechnics. However, from the year 1999, he was given the opportunity to be jointed in the Institut Teknologi Tun Hussein Onn (ITTHO), Universiti Teknologi Malaysia as a lecturer in Mechanical Engineering Department. In this institute, he teaches engineering management and quality control at the under-graduate level. Dr. Abdul Talib Bon has multidisciplinary research interests that encompass industrial engineering, quality management and production and operation management. His completed 17 research grant projects as project leader include applications of forecasting in industries. His current research project is looking into developing process quality improvement (PQI) in manufacturing industries. He has supervised more than 90 undergraduate and postgraduate research projects. He has served as a reviewer for a number of engineering management and computer science conferences and journals as part of his expertise sharing initiatives. He had published more than 180 International Proceedings and International Journals and 8 books. He is also Fellow and President of Industrial Engineering and Operation Management Society (IEOMS, Malaysia), Professional Technologist of Malaysia Board of Technologists (MBOT), Council member of Management Science and Operation Research Society of Malaysia (MSORSM), member of International Association of Engineers (IAENG), member of Institute of Industrial Engineer (IIE), USA, member of International Institute of Forecasters (IIF), member of Technological Association of Malaysia (TAM) and associate member of Malaysian Institute of Management (AMIM)..