

A structural equation analysis of employee work assessment tool for pharmaceutical marketing executives

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Abstract

Globally, human capital management is an ongoing challenge for human resource managers. The identification and provision of essential work resources addressing both direct work and implied needs of employees is a continuous subject of interest in the management sciences. Therefore, the use of reliable, valid, and precise research instruments capable of assessing employee perceptions across various subgroups is of prime importance. Hence, the need to validate an instrument that satisfies the pre-conditions of factorial invariance is required. The purpose of the study was to determine the construct and invariance validity of a developed psychometric instrument across subgroups of pharmaceutical representatives in Nigeria. A cross-sectional, self-reported quantitative study that used an employee work assessment questionnaire administered to sales professionals (N=369) operating in Nigeria using random sampling. Multigroup confirmatory factor analysis using structural equation modeling in AMOS, was used to develop model and test hypotheses. The mean weighted average method (MWA) was used to score the relative importance of indicators in the model. The measurement model satisfied model fit and reliability specifications. The invariance test parameters were adequate and invariant across gender, profession, and experience levels. Configural and metric invariance were obtained for the type of pharmaceutical company, with violations of scalar and metric invariance. The provision of work tools and adequate resources had the highest importance (MWA=3.53) followed by a need for impactful training to support work engagements (MWA=3.48). The application of the validated tool is a useful and statistically robust instrument for human resource managers to assess sales workforce perception.

Keywords: Behavioral research, factorial invariance, management, pharmaceutical marketing, structural equation modeling, working tools

INTRODUCTION

Human capacity development in pharmaceutical marketing firms is an ongoing challenge for human resource managers. They are faced with balancing the intrinsic and extrinsic resource needs of staff as well as ensuring optimal attainment or achievement of organizational objectives. Hence, the multiplicity of studies focused on investigating employee satisfaction, motivation, and engagement in several occupational sectors (Ahmad et al, 2020; Batura et al., 2016; Inayat & Khan, 2021; Mundayo et al., 2014; Sittisom, 2020). The identification and provision of essential work resources addressing both direct work and implied needs of employees is a continuous subject of interest in the management sciences. However, there is a paucity of assessment tools for pharmaceutical employees' satisfaction and perception of their work environment. Where they exist, they are unvalidated instruments and hence unconfirmed measures of perception. Therefore, human resource managers in the pharmaceutical marketing industry require empirically tested and adaptable evaluation tools to assess employee perception.

The employee work assessment tool is a 9-item psychometric tool developed for evaluating employees' estimation or perception of their working conditions (Oamen, 2021). This feedback tool was primarily applied to pharmaceutical marketing employees involved in the marketing and sales of pharmaceutical products in Nigeria. Albeit a generic research instrument, there are a couple of identified limitations with the developed tool (Oamen, 2021). There are three identified gaps: firstly, to explore the validity of the tool in a different sample to confirm applicability in a replicate sample; secondly, to compute configural, metric, scalar, and residual invariance of the research instrument. Thirdly, the application of a developed scale to assess the perception of the sales workforce in the pharmaceutical marketing industry. The present study used the a priori (predetermined)

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factor structure of the exploratory factor analysis as the theoretical basis for the confirmatory factor analysis. Invariance testing is a statistical measure used to determine if the measurement instrument is conceptually understood equivalently across subgroups of the study population (Bryne, 2010; Cheung & Rensvold, 2002; Putnick & Bornstein, 2016).

Structural equation modeling (SEM) was adopted as the principal analytical technique used to explore relationships between variables and for validating empirical and a priori theoretical models (Bryne, 2010). Structural equation models provide additional benefits for comparing parameter estimates among subsets or subgroups in a given sample population. Such as path differences in the hypothesized model between indigenous versus multinational firms, gender (male versus female), professional groups (pharmacists versus non-pharmacist), and years of practice experience (less experienced versus more experienced) (Bryne, 2004; Khaled et al., 2018). The application of the multigroup analysis algorithm in structural equation models revealed the benefits of comparing groups within a sample population to deduce where the hypothesized effects lie (Henseler et al., 2016).

The purpose of the study is to determine the construct and invariance validity of the instrument of the developed psychometric scale across key demographic subgroups of pharmaceutical sales representatives. Thereafter, apply quantitative techniques to estimate the relative importance of constructs defining employee perceptions.

Conceptual Framework

The academic literature is replete with various generic measures for evaluating perception among work teams with the purpose of these studies was to evaluate job satisfaction, organizational support, job motivation, and other psychological constructs (Ahmad et al., 2020; Batura et al., 2016; Inayat & Khan, 2021; Mundayo et al., 2014; Oamen & Omorenuwa, 2021; Sittisom, 2020). However, little has been done on evaluating the perception of the working environment of the sales workforce in a pharmaceutical marketing company in Nigeria. The 9-item psychometric scale used for this study is composed of two main constructs; 1] Work factors composed of 6 indicator items namely: availability of work tools, regularity of training, incentive schemes, adequacy of marketing support, perceived impact of training programs, and reward system (Oamen, 2021). They are assumed to be the very basic or normal work conditions and tooling expected from working in an organization. While 2] Implied factors are reflected by 3 indicators such as Job security, work-life balance, and career prospects which implicitly relate to considerations outside direct work functions but the impact on job satisfaction and employees' perceived support and benefits from the organization (Belete, 2018; Maan et al., 2020; Oamen, 2021; Oamen & Omorenuwa, 2021). This study by using multigroup structural equation modeling aimed to; validate the psychometric scale and compare scale measures across subgroups of the study population. To the best of the authors' knowledge, these relationships have not been empirically

investigated in pharmaceutical marketing research using multigroup analysis.

Study Hypothesis

The study hypotheses were stated as follows:

H1: There is construct validity of the developed questionnaire

H2: There is an adequate model fit of the measurement model

H3: There is factorial invariance [configural, metric, scalar, and residual invariance] of the research instrument

H4: There is no significant weighted indicator/s of constructs based on the perception of respondents

METHOD

Study Design

A cross-sectional, self-reported quantitative study that used Employee Work Assessment Questionnaire administered to 369 sales professionals in the pharmaceutical supply network in Nigeria using random sampling. Data collection took place between January to March 2022.

Sample Population

Nigeria is a fast-developing economy with a rapidly growing pharmaceutical industry. According to McKinsey & Company (2017), the pharmaceutical industry in Nigeria is expected to grow exponentially within the next decade by 2027 (McKinsey, 2017). Nigeria has thirty-six states with a growing population of over two hundred million people and is comprised of six geographical zones namely; South West, South-South, South-east, South East, Northcentral, and northwest (National Bureau of Statistics, 2018).

Sample size determination and sampling

To achieve an optimal sample size adequate for a structural equation modeling study, the inverse square root method was adopted (Kock & Hadaya, 2018). It is based on the given probability that the ratio of the path coefficient and standard error is greater than the critical value of a test statistic for a pre-determined significance level (Kock and Hadaya, 2018). The computation assumed statistical power of 0.8, a p-value of 5%, and a path coefficient threshold of 0.2 denoted by X, the sample size [N] is given by;

$$N > \left[\frac{2.486}{X} \right]^2 = \left[\frac{6.1802}{0.2 * 0.2} \right] = 154.5$$

The calculated sample size was proximately 155 required to achieve valid and reliable SEM results. However, to achieve the generalizability of the results, a larger sample population of 369 was obtained. The ratio of sample size (N=369) to the number of indicator items (n=9) is more than ten times, hence supporting the adequacy of sample size requirements for SEM (MacCallum et al., 1999; Matsunaga, 2010). Simple random sampling was used to obtain respondents for the study.

Informed consent was obtained from respondents before the administration of the questionnaire.

Measurement of Variables

Construct 1- 'work factors' labeled WBF with 6 observed variables or items [WT-work tools; AT-adequate training; IS-Incentive scheme; MS-marketing support; IT-training impact; RS-reward system. Construct 2- 'implied factors' labeled IPF with 3 items [JS-job security; WL-Work-life balance, and CO-career prospects]. (Belete, 2018; Maan et al., 2020; Oamen, 2021]. The Multigroup analysis function in AMOS was used to assess parameter estimate differences at group levels: gender, profession, experience level, and company type. Factorial invariance criteria were based on chi-square test statistic/degree of freedom (χ^2/df), Comparative Fit Index (CFI), Tucker Lewis Index (TLI), root mean square error of approximation (RMSEA) measures for configural invariance, and change in comparative fit index (ΔCFI) criteria of less than 0.01 absolute differences between models for metric, scalar, and residual invariance according to Cheung and Rensvold (Bryne, 2010; Cheung & Rensvold, 2002)

Statistical Analysis

Data obtained were analyzed using the statistical package for social sciences version 25 to generate descriptive statistics of the respondents. Multi-group confirmatory factor analysis was to examine construct and model fit characteristics of the study model using Analysis of Moment Structures (AMOS) software version 24 (Arbuckle, 2014). Standardized and unstandardized regression coefficients were used to evaluate the importance of measurement paths in the multigroup analysis. Mean weighted average (MWA) methods were used to compute the weighted means of each indicator item of the constructs. MWA provides a quantitative medium to rate and rank responses of respondents based on the relative weight or importance of the variables (Chakrabartty, 2014).

RESULTS

Demographic Characteristics of Participants

A majority of respondents are male (244, 66.1%), and females (125, 33.9%). In terms of age distribution, 137 (34.4%) are aged between 20 to 30 years, 240 (65.1%) are aged between 31 to 50 years and 2 (0.5%) are above fifty years of age. Furthermore, the study population was dominated by non-pharmacists (83, 22.5%) while 289 representing 77.5% were pharmacists. Indigenous companies have the larger share of respondents (244, 66%), and multinational pharmaceutical companies were 125 in number (34%). In terms of the number of years spent in the pharmaceutical marketing industry, 339 (91.9%) had between 1 to 10 years of experience while 30 (8.1) had between 11 to greater than 15 years of experience.

Assessment of Measurement Model Reliability and Validity

The measurement model was assessed for convergent and discriminant validity. The composite reliability (CR) estimate was above the benchmark of 0.7 and the average variance explained (AVE) was less than the threshold of 0.5 for Construct 1, and greater for Construct 2 with 0.551 as shown in Table 1. Malhotra & Dash (2011) argued that CR is a sufficient measure of internal reliability even when AVE measures are violated. (Malhotra & Dash, 2011) Fornell & Larcker and Heterotrait Monotrait (HTMT) had adequate measures of discriminant validity established with a Heterotrait Monotrait value of 0.760 which is less than the strict threshold of 0.85. (Henseler et al., 2015; Hu & Bentler, 1999; Schumacker & Lomax, 2010). Therefore, hypothesis (H1) is supported by the study findings.

Model fit of the Measurement model

The measurement model fit was attained by drawing or linking covariances between the error terms of JS and CO (e7 and e9),

Table 1. Construct Validity of Measurement Model

Constructs	Convergent Validity		Fornell & Larcker		Heterotrait Monotrait	
	CR	AVE	1	2	1	2
1	0.834	0.460	0.679			
2	0.774	0.551	0.653	0.742	0.760	

The mean weighted average per indicator was calculated using the formula:

$$MWA = \sum_{i=1}^n \frac{WiXi}{Wi}$$

Where:

MWA= mean weighted average
 Wi= relative weights applied to responses [Good=5, Fair=3, and Poor=1]
 Xi= number of responses per indicator
 n= number of responses to be averaged

AT and IT (e2 and e5), and AT and RS (e2 and e6). The modification of the measurement model was informed by the modification indices suggested by the software and relevant theoretical underpinnings (Arbuckle, 2014; Collier, 2020). The linkages between indicators were premised on; 1] covariances must occur between indicators of the same construct, and 2] theoretical basis for covariance between error terms or residuals must be justified by the relationships presented thus; job satisfaction (e7) is related to improved career prospects (e9); adequate training (e2) is linked to impactful training (e5); employee perception is enhanced by adequate training (e2) and reward system (e6); and improved marketing support (e4)

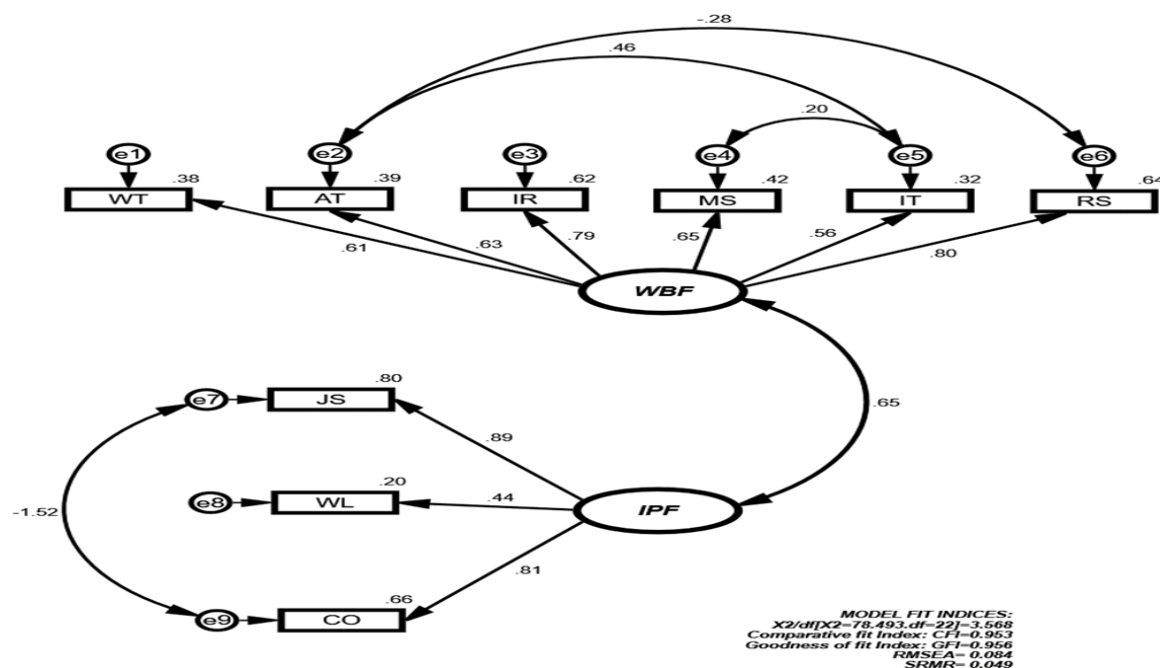


Figure 1. Measurement Model Showing Standardized Regression Weights and Model Fit Indices

suggests the sufficient attention is given to yield impactful training (e5) (Ahmad et al, 2020; Batura et al., 2016; Collier, 2020; Oamen, 2021; Oamen & Omorenuwa, 2021). Figure 1 fit estimates showed the ratio of chi-square test/degree of freedom; $\chi^2/df=3.568$ ($\chi^2=74.493$, degrees of freedom $df=22$) which is less than the benchmark of 5: root mean square error of approximation (RMSEA)=0.084. Although above the 0.08 baseline, it is lower than the absolute cutoff value of 0.1, hence acceptable (Browne & Cudeck, 1993; Fabrigar et al., 1999). The square root means error (SRMR) value of 0.049 was adequate compared to the cutoff value of 0.08. Other goodness of fit indices were the comparative fit index of 0.953, and the goodness of fit index of 0.956 which fell above the strict benchmark value of 0.95 (Hu & Bentler, 1999; Kline, 2016; Schumacker & Lomax, 2010). Hence, hypothesis (H1) was supported.

Factorial Invariance test

The multigroup confirmatory factor analysis was used to assess factorial invariance validity of the questionnaire to determine- 1] actual uniformity of understanding of the instrument by respondents, and, 2] to provide a basis for realistic and valid group comparisons across gender, professional training, experience level, and type of pharmaceutical company. The two-factor model was evaluated independently based on the demographic variables. Results revealed configural invariance (B1) across each group with satisfactory goodness of fit indices: χ^2/df , CFI, TLI, RMSEA. This implies that the model structure is equal, equivalent, or invariant across each group. Furthermore, as shown in Table 2, metric (B2), scalar (B2) and residual (B3) invariance measures were obtained for: gender (B2: $\Delta CFI=0.002$; B3: $\Delta CFI=0.001$; B4: $\Delta CFI=0.003$), profession (B2: $\Delta CFI=0.000$; B3: $\Delta CFI=0.006$; B4: $\Delta CFI=0.007$), experience level (B2: $\Delta CFI=0.003$; B3:

$\Delta CFI=0.008$; B4: $\Delta CFI=0.006$), and type of company (B2: $\Delta CFI=0.003$; B3: $\Delta CFI=0.017$; B4: $\Delta CFI=\text{not computed}$).

In table 3, the path coefficients (standardized) of the indicators of the measurement model revealed significant values across constructs 1 and 2- Work factors and Implied factors: this finding confirms the relevance of each indicator in the model.

Table 3. Path Coefficients of Measurement Model

Constructs	Construct ID	Indicators	β coefficients	Critical Ratio	p-value
Work Factors [1]	WBF	WT	0.614	(constrained)	0.001
		IR	0.789	11.671	0.001
		MS	0.646	10.137	0.001
		IT	0.563	9.010	0.001
		RS	0.798	11.570	0.001
		AT	0.626	9.631	0.001
Implied Factors [2]	IBF	JS	0.894	(constrained)	0.001
		CO	0.811	9.444	0.001
		WL	0.442	5.607	0.001

Note: β =beta, p-value significant at 0.01, ID=identification

Table 2. Factorial Invariance testing across demographic subgroups (N=369)

Model	χ^2/df	CFI	Model diff.	Δ CFI	Hypothesis (H3)
GENDER					
B1:		0.951		0	supported
Configural	2.352				
B2:		0.953	B1	0.002	supported
Metric	2.114				
B3:		0.952	B2	0.001	supported
Scalar	1.989				
B4:		0.955	B3	0.003	supported
Residual	1.807				
PROFESSION					
B1:		0.955		0	supported
Configural	2.217				
B2:		0.955	B1	0.000	supported
Metric	2.054				
B3:		0.949	B2	0.006	supported
Scalar	2.027				
B4:		0.951	B3	0.007	supported
Residual	1.847				
LEVEL OF EXPERIENCE					
B1:		0.935		0	supported
Configural	2.842				
B2:		0.938	B1	0.003	supported
Metric	2.515				
B3:		0.930	B2	0.008	supported
Scalar	2.469				
B4:		0.924	B3	0.006	supported
Residual	2.387				
TYPE OF COMPANY					
B1:		0.955		0	supported
Configural	2.195				
B2:		0.957	B1	0.002	supported
Metric	1.973				
B3:		0.940	B2	0.017*	not
Scalar	2.159				supported
B4:		0.943	B3	0.003*	not

Table 4 showed that MWA and their corresponding ranking based on the weights of each indicator with WT with the highest score of 3.53 and RS with the lowest weight value of 2.92.

DISCUSSION

The study empirically tested the construct and invariance validity of the developed psychometric scale across key demographic subgroups of pharmaceutical sales representatives. Furthermore, quantitative techniques were used to estimate the relative importance of constructs defining employee perceptions. The factorial invariance measures obtained from the study support the useability of the developed tool to assess perception across various demographic groups of pharmaceutical sales executives (as shown in Table 2). In survey research, factorial invariance measures ensure that a diverse group of respondents comprehend the indicators of the constructs equally or equivalently and hence avoid biased and error-prone estimations of perception (French & Finch, 2008; Hair et al., 2010; Milfont & Fischer, 2010). Scalar and residual factorial invariance criteria were not supported for the type of company measure. Therefore, hypothesis (H3) was only supported for gender, professional training, and level of industry experience. Despite the violation of scalar and residual invariance for the type of company category, the presence of configural and metric invariance is often considered sufficient for validation and reporting (Putnick & Bornstein, 2016).

In determining the relevance of each indicator based on respondents' perception, results showed that working tools (WT) are the most important contributor to their estimation of the sales professional's perception of their working conditions. This implies that human resource managers should place adequate efforts to ensure the availability of essential tools such as functional cars, and work materials, to support the operations and performance of sales professionals. Furthermore, this finding is corroborated by studies that show that turnover intentions, job satisfaction, and motivation are linked to the adequacy, availability of work tools, and enabling work environments (Oamen, 2021; Oamen & Omorenuwa, 2021; Parvin & Kabir, 2011; Wang & Brower, 2019). Therefore, hypothesis (H4) was supported.

Implications of the study

The study adds to the extant literature in that it presents the need to include factorial invariance measures in the development of scales for use in pharmaceutical sales management. This ensures that respondents from various subgroups or demographics are not assumed to comprehend the contents of the questionnaire. Furthermore, it reinforces the need for researchers involved in scale development to include factorial invariance measurement in their methodological process. Finally, human resource managers are encouraged to focus on providing enabling and well-resourced environments for the sales workforce to support optimal performance and employee satisfaction.

Table 4. Mean weighted averages and ranking of Indicators [N=369]

Indicators	Good	Fair	Poor	MWA	Ranking
WT	155	157	57	3.53	1
AT	132	164	73	3.32	4
IR	90	179	100	2.95	8
MS	110	177	82	3.15	6
IT	152	153	64	3.48	2
RS	84	186	99	2.92	9
JS	99	173	93	3.00	7
WL	112	216	41	3.38	3
CO	114	177	78	3.20	5

**The questions were rated on a 3-point Likert scale of 1=poor, 3=fair, and 5=good.

Limitations of the study

The study is cross-sectional in design, there is the need to run a longitudinal study to evaluate probable changes in perception over time. The 3-point Likert scale could be expanded to capture inherent variations in the rating of their working conditions. RMSEA value although marginally above the threshold (0.08) but less than the absolute cutoff of 0.1 can be further improved

CONCLUSION

The application of factorial invariance measures in questionnaire development is essential to generating valid and generalizable scales. The nine-item questionnaire provided a brief tool for human resource managers to measure valuable feedback from sales personnel as regards their working environment. The study provided critical feedback for human resource managers to ensure adequate work tools are provided for the workforce. Making available basic resources such as functional vehicles, working float to cover expenses, as well as incentivizing performance and sales output are strategies that can enhance performance and long-term organizational productivity, reduce turnover rate, cost of hiring or recruitment, and improve job satisfaction.

Conflicts of interest statement: The author declares that he has no conflicts of interest

Funding: No funds, grants, or other support was receiving.

Ethical Approval: The study was performed in accordance with the ethical standards laid in the 1964 Declaration of Helsinki and its following updates

Consent to participate: Informed consent was obtained from all the individual participants that were included in the study.

Data Accessibility statement: Data will be available on request

REFERENCES

- Ahmad, N. F., Jye, A. K., Zulkifli, Z., & Bujang, M. A. (2020). The development and validation of a job satisfaction questionnaire for the health workforce. *Malaysian Journal of Medical Sciences*. 27(6): 128-143. <https://doi.org/10.21315/mjms2020.27.6.12>
- Arbuckle, J. L. (2014). Amos (version 24) [Computer Program]. Chicago: IBM SPSS
- Batura, N., Skordis-Worrall, J., Thapa, R., Basnyat, R., & Morrison, J. (2016). Is the job satisfaction survey a good tool to measure satisfaction amongst health workers in Nepal? Results of a validation analysis. *BMC Health Services Research*. 16:308. <https://doi.org/10.1186/s12913-016-1558-4>
- Belete, A. K. (2018). Turnover Intention Influencing Factors of Employees; An Empirical Work Review. *Journal of Entrepreneurship & Organization Management*. 7;3. <https://doi.org/10.4172/2169-026X.1000253>
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen and J. S. Long (Eds), *Testing structural equation models* (pp. 136-162). Newbury Park, CA: Sage
- Bryne, B. M. (2004). Testing for multigroup invariance using AMOS Graphics: a road less traveled. *Structural equation modeling: a multidisciplinary journal*. 11(2): 272-301. https://doi.org/10.1207/s15328007sem1102_8.
- Byrne, B. M. (2010). *Structural equation modeling with AMOS. Basic concepts, applications, and programming*. New York London: Routledge Taylor & Francis Group
- Chakrabarty, S. N. (2014). Scoring and analysis of Likert scale: few approaches. *Journal of Knowledge Management and Information Technology*. 1(2):31-44
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness of fit indexes for testing measurement invariance. *Structural Equation Modeling*. 9(2): 233-255
- Collier, J. E. (2020). *Applied structural equation modeling using AMOS: Basic to advanced techniques*. Routledge
- Fabrigar, L. R., MacCallum, R. C., Wegener, D. T. & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*. 4(3):272-299. <https://doi.org/10.1037/1082-989X.4.3272>
- French, B. F., & Finch, W. H. (2008). Multigroup confirmatory factor analysis: locating the invariant referent sets. *Structural Equation Modeling*. 15(1): 96-113. <https://doi.org/10.1080/10705510701758349>
- Hair J. F, Black W. C, Babin B.J., & Anderson R. E (2010). *Multivariate data analysis: A global perspective*. Pearson: Upper Saddle River, NJ
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A New Criterion for Assessing Discriminant Validity in Variance-based Structural Equation Modeling. *Journal of the Academy of Marketing*. 43(1): 115-135
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2016). Testing measurement invariance of composite's using partial squares. *International Marketing Review*. 33(3): 405-431
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling*. 6:1-55. <https://doi.org/10.1080/10705519909540118>
- Inayat, W., & Khan, M. J. (2021). A study of job satisfaction and the effect on the performance of employees working in private sector organizations, Peshawar. *Education Research International*. Article ID: 1251495:1-9. <https://doi.org/10.1155/2021/1751495>
- Khaled, B. M., Kimmel, L., & Trung, K. L (2018). Assessing the factor structure and measurement invariance of the eating attitude test (EAT-26) across language and BMI in young Arabian women. *Journal of Eating Disorders*. 6:14. <https://doi.org/10.1186/s40337-018-0199-x>.

- Kline, R. B. (2016). *Principles and Practice of Structural Equation Modeling*, 4th Edn. New York, NY: Guilford Press
- Kock, N., & Hadaya, P. (2018). Minimum sample size estimation in PLS-SEM: The inverse square root and gamma-exponential methods. *Information Systems Journal*. 28(1):227-261. <https://doi.org/10.1111/isj.12131>
- Maan, A. T., Abid, G., Butt, T. H., Ashfaq, F., & Ahmed, S., (2020). Perceived organizational support and Job satisfaction; a moderated mediation model of proactive personality and psychological empowerment. *Future Business Journal*. 6;21
- MacCallum, R. C., Widaman, K. F., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods*. 4: 84-99
- Malhotra, N. K., & Dash, S. (2011). *Marketing Research: An Applied Orientation*. London: Pearson Publishing. 6th ed, Pearson-Doring Kindersley, Delhi
- Matsunaga, M. (2010). How to factor-analyze your data right: Do's, Don'ts, and How-tos. *International Journal of Psychological Research*. 3(1); 97-110.
- McKinsey (2017). *Winning in Nigeria: Pharma's next frontier*. McKinsey & Company, May 2017. [mckinsey.com] [Accessed January 2022]
- Milfont, T. L., & Fischer, R. (2010). Testing measurement invariance across groups: Applications in cross-cultural research. *International Journal of Psychological Research*. 3:111-121
- Mundongo, T. H., Ditend, Y. G., VanGillie, D., & Malonga, K. F. (2014). The assessment of job satisfaction for the health providers in university clinics of Lubumbashi, Democratic Republic of Congo. *Pan African Medical Journal*. 19:265. <https://doi.org/10.11604/pamj.2014.19.269.3138>
- National Bureau of Statistics. (2020) 2017 Demographic Statistics Bulletin. Published May 2018. <http://nigerianstat.gov.ng>. (Accessed April 2021)
- Oamen, T. E. (2021). Analysis of factors influencing pharmaceutical sales workforce engagement in pharmaceutical marketing in Nigeria: a structural equation modeling approach. *Global Journal of Pure and Applied Sciences*. 27(4):405-410. <https://doi.org/10.4314/gjpas.v27i4.7>
- Oamen, T. E., & Omorenuwa, S. O. (2021). The nexus of perceived organizational support, job satisfaction, and job motivation on turnover Intentions of pharmaceutical sales executives using structural equation modeling. *Global Journal of Management and Business Research*. 21(9). <https://doi.org/10.34257/GJMBRAVOL21/S9PG45>
- Parvin, M. M., & Kabir, M. M. (2011). Factors affecting employee job satisfaction in the pharmaceutical sector. *Australian Journal of Business and Management Research*. 1(9): 113-123.
- Putnick, D. L., & Bornstein, M. H. (2016). Measurement invariance convention and reporting: the state of the art and future directions for psychological research. *Development Review*. 41:71-90. <https://doi.org/10.1016/j.dr.2016.06.004>
- Schumacker RE & Lomax R. G (2010). *A beginner's guide to structural equation modeling* (3rd ed.). New York, NY: Routledge Academic
- Sittisom, W. (2020). Factors affecting job satisfaction of employees in the pharmaceutical industry: a case study of Thailand. *Systematic Reviews in Pharmacy*. 11(3):125-133. <https://doi.org/10.5530/srp.2020.3.14>
- Wang, T. K., & Brower, R. (2019). Job satisfaction among federal employees: the role of employee interaction with the work environment. *Public Personnel Management*. 48(1): 3-26. <https://doi.org/10.1177/0091026018782999>