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ANALYSIS OF FACTORS INFLUENCING PHARMACEUTICAL SALES WORKFORCE ENGAGEMENT IN PHARMACEUTICAL MARKETING IN NIGERIA: A STRUCTURAL EQUATION MODELING APPROACH

THEOPHILUS EHIDIAMEN OAMEN

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ABSTRACT

In the pharmaceutical sales and marketing industry, human capital in terms of the sales workforce is essential to organizational success. However, there is a need to ensure that the task-environment is adequately resourced. The application of structural equation modeling (SEM) techniques such as factor analysis is necessary to further understand the underlying relevance of these factors. The objective of the study was to explore the factors influencing pharmaceutical sales personnel's work engagement in pharmaceutical companies using factor analysis. A cross-sectional, qualitative research study used an 11-item literature-guided questionnaire administered online to 406 medical sales professionals in the pharmaceutical supply network in Nigeria using random sampling. The factors evaluated include regularity and impact of training, marketing support, job security as perceived by the employee, incentives, reward for performance, and the prospect of promotion. Others include; minimal work stress, improved career prospects, and an enabling work environment provided for employees involved in pharmaceutical sales operations. The questions were rated on a 3-point Likert scale of 1=fair, 3=poor, and 5=good, to evaluate respondents' estimation of factors. Exploratory factor analysis (EFA) was executed on the dataset and thereafter, confirmatory factor analysis (CFA) was conducted on the dataset using SPSS AMOS. Statistical significance was set at p-value < 0.05. The majority of respondents were male (72.2%, 293) and female (27.8%, 113). Respondents from Indigenous firms were predominant (249, 61.3%) compared to Multinational firms (157, 38.7%). There were 289 (71.2%) non-pharmacists and 117 (28.8%) pharmacists. EFA measures of adequacy were satisfactory (Kaiser-Meyer-Olkin=0.878, Goodness-of-fit=0.023, Cronbach alpha=0.859, Total variance explained= 51.6%) and produced a 2-factor solution consisting of 9-items (work factors=6, implied factors=3). CFA solution from EFA output produced satisfactory fit estimates (RMSEA=0.044, CMIN/DF=1.787, GF1=0.977, AGFI=0.957, RMR=0.029, and TLI=0.981). The final model had acceptable convergent and discriminant validity values. Job security was considered as the most influential factor (regression coefficient=0.859) and the least was work-life balance (regression coefficient=0.559). The study provided a validated tool to evaluate the pharmaceutical sales workforce's estimation of the key factors influencing job performance. This serves as an operational template for strategic managers in pharmaceutical companies to improve employee's perception of management support

KEYWORDS: Factor analysis, Exploratory factor analysis, Confirmatory factor analysis; Pharmaceutical marketing, normative; Healthcare, Structural Equation Modeling

INTRODUCTION

In pharmaceutical marketing companies, the human resource is critical to organizational success. Therefore, as a minimum requirement, the organization shall provide employees with operational toolkits. This is premised on the concept of organizational support which expresses an exchange of value between the employee and employer, which is oftentimes perceived by the employee as normative resources for optimum job performance**. [Eisenberger, et al., 2001: Belete, 2018: Maan et al., 2020]** Such resources include; training, marketing support, job security as perceived by the employee, incentives, reward for performance, and the prospect of promotion. **[Belete, 2018: Maan et al., 2020]** Conversely, it is an implied expectation that factors such as work-life balance, minimal work stress, improved career prospects, and an enabling work environment, are provided for the employee involved in pharmaceutical sales operations. How the average employee perceives these attributes, influences their estimation of support from management. **[Eisenberger, et al., 2001: Maan et al., 2020]** Structural equation models are very relevant multivariate tools for analyzing relationships between variables and are applicable in

Theophilus Ehidiamen Oamen, Department of Clinical Pharmacy and Pharmacy Administration, Obafemi Awolowo University.

creating and testing the validity of theoretical, empirical models**. [Goretzko et al., 2019: Matsunaga, 2010: Relo & Shuck, 2015: Schreiber, 2020: Watterson et al., 2020]** The objective of this study was to explore the factors influencing pharmaceutical sales personnel's work engagement in healthcare organizations using factor analysis.

METHODOLOGY

A cross-sectional, qualitative study made use of 11-item literature-guided self-administered questionnaires to 406 medical sales professionals in the pharmaceutical supply network in Nigeria using random sampling. The questions were rated on a 3-point Likert scale of 1=fair, 3=poor, and 5=good, to evaluate respondents' estimation of working resource conditions. The sample size was estimated from a sample population of over 20,000 using the Raosoft calculator at a 95% confidence interval. **[Raosoft, 2016]** Inclusion criteria were set for pharmaceutical sales executives currently employed with either a local or multinational pharmaceutical companies in Nigeria. Nigeria is a developing country with over two hundred million people and comprised of six geopolitical zones namely; South West, South-South, South-east, South East, Northcentral, and northwest. [**National Bureau of Statistics, 2018]** Informed consent was obtained from respondents before the administration of the questionnaire**.**

STATISTICAL ANALYSIS

Data obtained were analyzed using both exploratory factor analysis and confirmatory factor analysis using both SPSS and Analysis of Moment Structures (AMOS) software respectively. Exploratory factor analysis is a dimension reduction tool that deployed principal axis factoring extraction method with Promax rotation to reduce the initial 11-item questionnaire to a 9-item with a 2-factor structure. Thereafter, Confirmatory factor analysis, a structural equation modeling tool, was used to confirm and validate the 2-factor solution produced by EFA using Analysis of Moment Structures (AMOS). Preliminary assessment of the dataset was performed using tests of internal validity and criteria for acceptability were set at ≥ 0.7 inclusive of statistical measures of data adequacy. Exploratory factor analysis (EFA) was performed after subjecting the dataset to tests of measures of adequacy.

RESULTS AND DISCUSSION

The majority of respondents were males (72.2%, 293) and females (27.8%, 113). Indigenous firms were predominant (249, 61.3%), and Multinational firms (157, 38.7%). There were 289 (71.2%) non-pharmacists and 117 (28.8%) pharmacists in the sample and the majority were aged between 31 to 40 years (235, 57.9%). Based on Geographical spread of territory revealed that 237 respondents (58.4%) covered the South West, 55 (8.6%) covered South-South, 42 (10.3%) from South East), 26 (6.4%) South East, 35 (8.6%) Northcentral, and 31 (7.6%) covered Northwestern regions of the country.

Table 1: Measures of Reliability (Cronbach Alpha test)

Internal reliability	Threshold values	Results	Conclusions
Item 1 & 11	**≥ 0.7**	**0.859**	**acceptable**
Items 2 to 7	**≥ 0.7**	**0.868**	**acceptable**
Items 8 to 10	**≥ 0.7**	**0.717**	**acceptable**

Table 1 showed that the 11-items had acceptable internal reliability value (Cronbach values >0.7); thus confirmed the internal validity of study data

Table 2: EFA and CFA Measures of study variables

Exploratory Factor Analysis- Measures of Adequacy			
Measures	**Threshold values**	**Results**	**Conclusions**
Kaiser=Meyer-Olkin (KMO)	Marvelous>0.9, Unacceptable < 0.5	0.878	acceptable
Bartlett's Test of Sphericity	< 0.05	0.0001(chi-square= 1515.138, df=36)	acceptable
Cronbach Alpha (Internal reliability	≥ 0.7	0.859	acceptable
Goodness-of-fit	p< 0.05	0.023	acceptable
Communalities	> 0.3	≥ 0.3	acceptable
Total Variance explained	>50%	51.60%	acceptable
Confirmatory Factor Analysis- Model Fit Estimates			
Measures	**Threshold values**	**Results**	**Conclusions**
Model chi-square (X2)	p-value <0.05	0.01	Fair (sensitive to sample >300)
(Adjusted) Goodness-of-fit (A) GFI	GFI>0.95; AGFI>0.90	GFI=0.98, AGFI=0.96	satisfactory
Tucker Lewis Index (TLI)	NFI>0.95; NNFI>0.95	TLI=0.98	satisfactory
Comparative Fit Index (CFI)	CFI>0.90	CFI=0.99	satisfactory
Root-mean-square-error-of-approximation (RMSEA)	RMSEA<0.08	0.04	satisfactory
CMIN/DF	Less than < 5	X2=42.893, df=24 (=1.787)	satisfactory
(Standardized) Root mean square residual	SRMR<0.08	0.03	satisfactory

Principal axis factoring with Promax rotation was the preferred extraction-rotation method used because it is assumed that the items are correlated with each other as supported by several studies. **[Relo & Shuck, 2015: Schreiber, 2020: Watterson et al., 2020: Oamen, 2021]** As shown in Tables 2 and 3, a two-factor solution structure was obtained; Items 2 to 7 and 8 to 10 respectively (eigenvalues ≥1) with an overall variance explained of 51.6%. The final factor solution had two distinct factors with a total of 9 items. The factor solution excluded two items; 'performance targets (item 1) and 'work-stress (item 11) as they did not meet the minimum requirement for inclusion (that is, they had factor loadings less than 0.5).

Confirmatory Factor Analysis (CFA) was used to confirm the final factor structure produced from EFA, using the default maximum likelihood estimation method in IBM Amos. **[Matsunaga, 2010]** Model fit gaps were identified by using the model modification indices. Adequacy was obtained by drawing covariance between the error terms in item 'adequate training' and 'impact of training'.

Table 3: Factor Structure and Regression Coefficient scores

	Study Variables	Factor 1	Factor 2	Regression coefficients	
Items	Observed variables	Work Factors (1)	Implied Factors (2)	Scores	Ranking
1	Performance targets				
2	Work Tools	0.528		0.693	6
3	Regularity of Training	0.882		0.636	7
4	Incentive Scheme	0.617		0.764	5
5	Marketing Support	0.752		0.764	4
6	Impact of Training	0.781		0.609	8
7	Reward System	0.524		0.787	3
8	Job security		0.762	0.859	1
9	Work-Life Balance		0.704	0.556	9
10	Career Prospects		0.556	0.810	2
11	Work stress				
	Eigen Value	4.432	1.187		
	% of Variance explained	44.004	7.586		
	Cumulative Variance Explained	44.004	51.586		

CFA produced regression coefficient scores (standardized) for each of the items in the two factors. Comparatively, higher scores indicated a higher potential effect on respondents. Results showed that 'Job security had the highest impact while the least effect came from item 'work-life balance' as shown in Figure 1

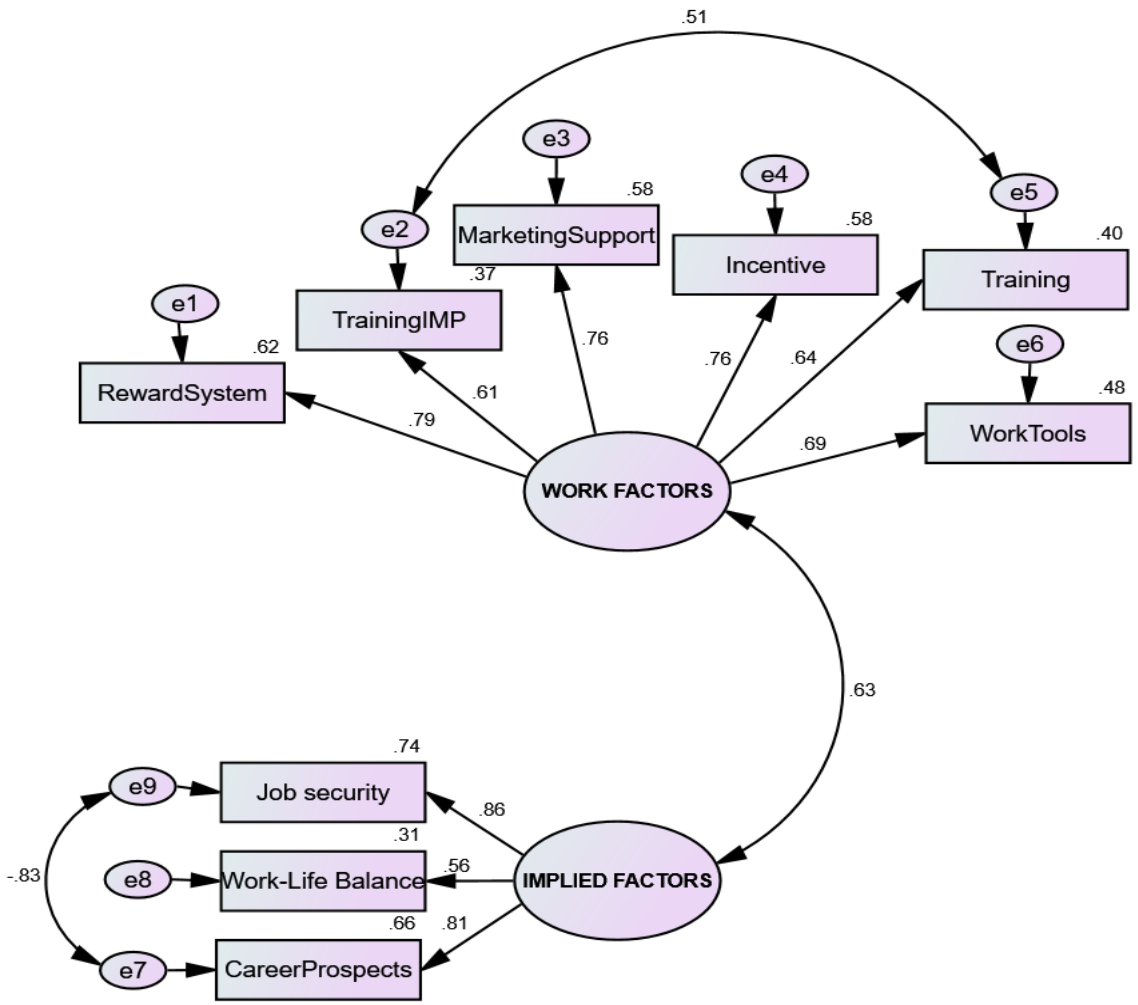

Figure 1. CFA output with standardized regression coefficients

In pharmaceutical companies, the success of firms is hinged on the sales and marketing efforts which should be supported with adequate resources required by the sales workforce. Therefore, the average employee considers the provision of operational working tools as basic or normative, to enhanced job performance. Conversely, pharmaceutical marketing employees also expect progressive career paths, stable work conditions, and healthy private lives as well as the security of their jobs. These expectations are not directly linked to normative resource requirements. In this study, the factor structure produced from EFA provided a concise, classified format of the key factors or constructs influencing pharmaceutical sales staff assessment of their operational conditions (based on responses from respondents).

Moreso, CFA was used to confirm the underlying structure of the factors created from EFA; into 2 distinct groups or Factors- Factor 1- 'work factors', and Factor 2- 'implied factors' from the employee's perspective. **[Eisenberger et al, 2001]** This methodological approach provided a simple way to determine the key attributes that define how pharmaceutical sales professionals consider the relative importance of these factors, to their overall welfare. The model fit parameters as shown in Table 2 confirmed the validity of the underlying latent structure of the model produced from the EFA. As shown in Table 3, the least important item was 'work-life balance' which implicitly is a function of the individual employee's capability to balance the demands of work and family life. Hence, this is implicit as it is primarily the responsibility of the individual. Job security was considered as the most impactful and influential factor, which suggests that this is an issue of utmost concern to respondents in the study. Hence, management should formulate policies that will provide stability and cater to the prevailing needs of their staff. Therefore, this would reduce employee turnover rates due to a lowered level of feelings of job insecurity **[Belete, 2018: Maan et al., 2020: Afriyie et al., 2019]**

In pharmaceutical companies involved in the marketing of pharmaceutical products and services, sales personnel must be given the optimum working environment/tools to engender optimum performance of their assigned duties. The focus of the study was to provide a validated tool to evaluate sales executives' assessment of their work environments from two (2) unique perspectives [work-factors and implied factors]. This serves as a template for strategic managers to improve the operational working conditions of sales staff.

Test of Validity of CFA Model

To validate the measurement model produced from CFA, convergent and discriminant validity evaluations [Kenny et al., 2015; Henseler et al., 2015] were conducted using the model fit plugin in SPSS AMOS. In Table 4, the reliability of the final model showed that

composite reliability (CR) was above the threshold set for a valid model (greater than 0.7; Factor 1=0.859, Factor 2=0.793). Conventional measures of construct validity such as Convergent validity expressed by Average Variance Explained (AVE) of greater than 0.5 and Discriminant validity expressed by Maximum Shared Variance (MSV) greater than AVE and $(AVE)^2$ > inter-construct correlations. [**Henseler et al, 2015: Hu & Bentler,1999]**

Table 4: Test of Measurement Model Validity

Factors	Name	CR	AVE	MSV	Factor 1	Factor 2
Factor 1	**Work-factors**	**0.859**	**0.507**	**0.401**	**0.712**	
Factor 2	**Implied-factors**	**0.793**	**0.568**	**0.401**	***0.634**	**0.754**

Note: *p<0.001,
Convergent validity was achieved as the AVE is above the minimum threshold of 0.5 for both Factors. In the same vein, Discriminant validity was confirmed with MSV values (0.401 for each factor) less than AVE. [**Gaskin & Lim, 2016**]

LIMITATIONS OF THE STUDY

There were limitations to the study, firstly, the same dataset was used for both EFA and CFA and hence may impact on extrapolation of study results. Secondly, the sample size determination was based on a hypothetical study population of 20,000 pharmaceutical sales executives. This is due to the paucity of employee databases to compute from.

CONCLUSION

This study explored the factors influencing pharmaceutical sales personnel's work engagement in pharmaceutical companies in Nigeria using a structural equation modeling approach. CFA solution from EFA output produced satisfactory estimates Model validity measures of the final measurement model were acceptable. Job security was considered as the most influential factor and the least was work-life balance. The study provided a validated tool to evaluate the pharmaceutical sales workforce's estimation of the key factors influencing job performance. This methodological approach (SEM) provided a simple way to determine the key attributes that define how pharmaceutical sales professionals consider the relative importance of the factors This serves as an operational template for strategic managers in sales and marketing organizations to improve employee's perception of management support

CONFLICTS OF INTEREST STATEMENT

The author declares that he has no conflicts of interest

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APPENDIX

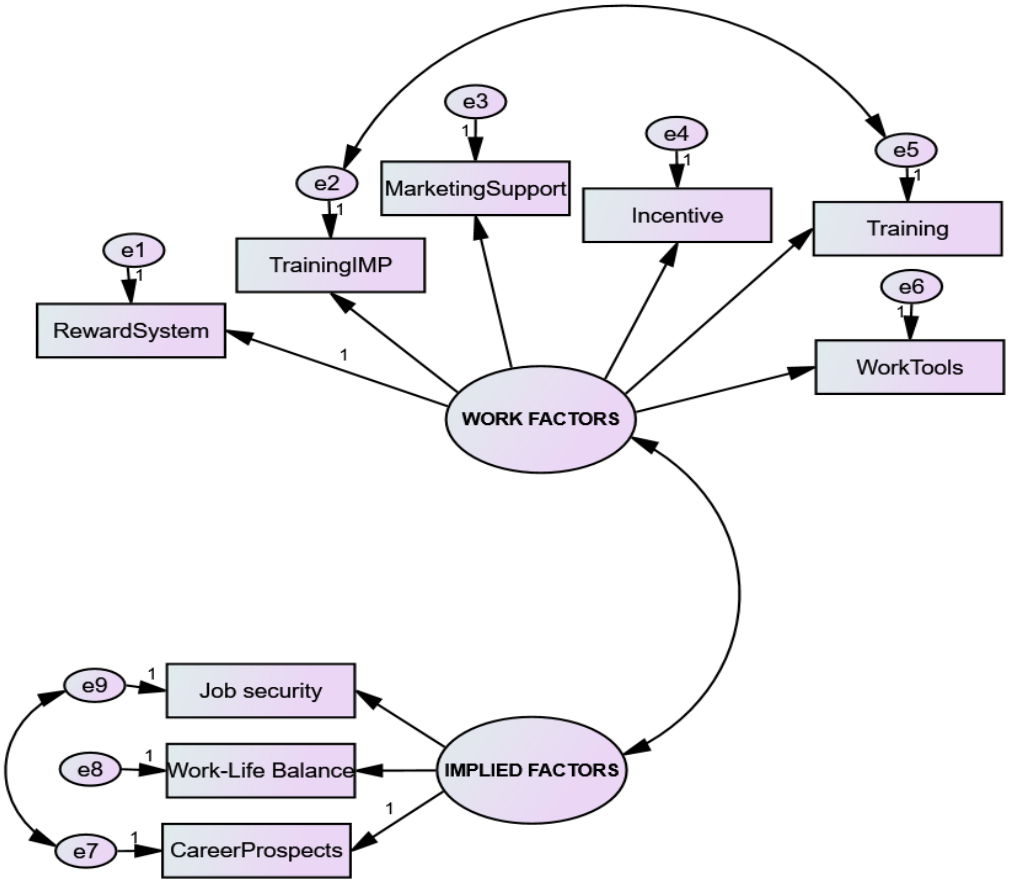

Figure 2. CFA Output showing the 2-factor solution