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Determinants of turnover intention among women in science and technology: A study of work-family role conflict

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Abstract

Work and family are two focal aspects of life that most women struggle with, especially women in engineering, information technology (IT) and medicine. It is well documented that there is a high attrition rate of women from the science and technology occupation. The years of gaining tenure in scientific career coincides with child bearing and rearing age for majority of women. Research suggests that the attrition of women in science and technology occupations is exacerbated by the demanding nature of the work environment, and also the challenge of managing home and family responsibilities. This study examined the factors associated with turnover intention among female professionals across the three fields of engineering, information technology (IT) and medicine. Data were obtained from 173 professional women in 20 engineering and IT firms and one public and one private hospital in Lagos State, Nigeria. The findings indicated that work-family role conflict is experienced across the three fields of engineering, IT and medicine. Family responsibilities, job demand, work role

overload and work-family role conflict were significantly correlated with turnover intention. Multiple linear regression analysis showed that only work role overload, work-family role conflict significantly predicted turnover intention. Working women in the science and technology industry who are experiencing work-family role conflict are more inclined to have turnover intentions. Employers and policymakers are suggested to pay attention to workplace issues that create strain for women in science and technology career. Also, employers without work-family 'friendly' policies should consider creating this as one of the means of reducing work-family role conflict of female employees. Policymakers have the onus of implementing intervention programmes that cater to the retention of professional women in science and technology.

Keywords: Work-family role conflict, predictive factors, turnover intention, women in science and technology, Nigeria.

1. Introduction

Debate on women' participation in science and technology is assuming the centre stage of development discourse, thus generating worldwide awareness both at the masses and policy levels. Scholars hold that there is a mismatch in the number of female scientist graduates and their numbers on the job (Clark 2005; Rosenbloom et al., 2008; Abur et al., 2013; Aderemi et al., 2013; Polkowska 2014; Yansen, Zukerfeld, 2014). Despite the increased participation of women in the labour force, they are still considerably underrepresented in most science and technology occupations – an issue of concern to researchers, practitioners and educators (Taeb et al., 2005; Mendick, Moreau, 2013). As S. L. Dolan et al. (2011: 3147) puts it, 'the underrepresentation of women in the science, engineering, and technology labour forces, is troublesome, as it contributes to inequality of opportunities and contributes to continuing skill shortages as well as the gender wage gap'. Skill gaps are one of the hindrances to growth, productivity, innovation and economic development, particularly the shortage of professional women in science technology and related disciplines (Tacsir et al., 2014).

A wide gender gap continues to increase across the globe in science and technology disciplines. Education statistics between men and women in Sub-Saharan African countries is not at par; women continue to trail behind men in education generally, especially in science and technology fields (Masanja 2010). There exists

a gap in gender enrolment in science, mathematics, and technology in Nigeria, with females being underrepresented (Udeani 2012). This phenomenon can inhibit the ability of a nation to maximise innovation and growth because the unexploited potential of these trained professionals does not amount to a loss for the women only, but also the entire country (Erinosho 1994).

Generally, women make up half of the populace, school candidates, college ex-students, users of technology merchandises and workforce, yet they are sparingly involved in the services that drive the change which has a much significant effect on their existence (Taeb et al., 2005; Rezaei 2012). During primary, middle and high school, boys and girls acquire science and mathematics subjects in almost the same numbers, and approximately an equal amount of boys and girls pass out of high school, ready to take up science and engineering majors in a tertiary institution. Nevertheless, a smaller number of women than men pursue these majors; as such, the number of graduated males in science and technology disciplines far outnumber the females. This decline persists through the graduate level, and it transcends into the workplace. Even though women consist of approximately 47% of the workforce these days, only 27% are conservational scientists, 31% chemists, 20% engineers and 27% computer and mathematical professionals (Clark 2005; Hill et al., 2010). E. K. Yakura (2008) described this declining trend as a 'pipeline metaphor', that is the underrepresentation of women in science disciplines is a leaky pipeline, depicting the continuous leakage that occurs through the educational stages of women from elementary school, high school and further up. Several reasons abound why the leakage occurs, one of which is 'leakages by choice', this notion assumes that women drop out of information technology (IT) career by choice of having to manage home and children, since the years of gaining tenure at work for young professional women coincide with their childbearing and rearing and caring years. This single factor may pose a critical challenge to their career advancement in their respective fields of work (Polkowska 2014).

This paper reports a quantitative exploration of factors associated with turnover intention among women in engineering IT and medicine. The aim is to determine the factors that are associated with turnover intention, as well as the predictive

effect of factors like work-family role conflict, job demand, work-role overload, family responsibilities, gender role ideology and socio-demographics on turnover intention among female professionals in the field of engineering, IT and medicine in Lagos state, Nigeria. The following research questions are raised to assess the factors associated with turnover intention.

(1) Is there a relationship between work-family role conflict, socio-economic variables, work role overload, job demand, and gender role ideology with the turnover intention of women in science and technology field in Lagos state, Nigeria?

(2) Does work-family role conflict, job demand, work-role overload, family responsibilities, gender role ideology and socio-demographics, have a predictive effect on turnover intention among female professionals in the field of engineering, IT and medicine in Lagos state, Nigeria.

A considerable aspect of this research engages with social space's subject field of *spaces of culture*, particularly the gender spaces subfield. Also, this study is one of the few examining the factors associated with turnover intention among women in science and technology careers from a developing country perspective – as studies of this kind are done mainly in developed countries; hence, this study contributes to the limited available literature on this subject.

2. The problem

2.1. Women and the science and technology work arena

With the ever-increasing surge of technological advancement, the workplace arena continuously demands employees' total engagement, particularly in the science and technology industry where the nature of work is relatively demanding. Scholars posit that there are variations in work strain associated with different aspects of science and technology occupations (Lingard, Lin, 2004; Armstrong et al. 2007; Dolan et al., 2011). Therefore, physicians' work experiences differ from those of engineers and information technology professionals. For instance, the nature of activities in the IT work environment is categorised most often by late nights and long hours of work, after-hour meetings, on-call duty and a continuous demand to work hurriedly, as well as a continual change of technical skills, which is different

from other fields, e.g. medicine. As such, work-family role conflict issues influence advancement opportunities and voluntary turnover of female IT professionals (Armstrong et al., 2007).

The underrepresentation of women generally in science and technology can be attributed to women's consciousness of their role and function in the society and the society's expectations of women's contribution (Taeb et al., 2005). This reality further buttresses the fact that home and family management are two main aspects of life most women struggle with, as well as the fulfilment of job responsibilities. Women's ability to meet their potential is decreased by their choice of adhering to the cultural obligations of tending to family, and this becomes significantly disadvantageous to them in many jobs related to science and technology, which are exceptionally vigorous and competitive (Taeb et al., 2005). Consider, for instance, a science and technology job like medicine and engineering wherein the work nature is presence demanding, it would pose a challenge for women to do their jobs from home. Also, science and technology occupations are often considered inappropriate for women, for several explanations like lack of intellectual ability, the masculinity of the science profession and expectations that women should work in the home (Orser et al., 2012). Studies have also found a significant relationship between turnover intention and factors such as work-family role conflict, work-role overload, job demand, gender role ideology and family responsibilities (Jones et al., 2007; Akintayo 2010; Porter, Ayman, 2010).

Role expectation emanates from gender roles and stereotypes. The term 'gender' refers to the socially constructed attributes of the roles behaviour that is suitable for women and men within society; it is changeable over time and has a wide variation between and within cultures. It encompasses economic, social, political and cultural attributes and opportunities associated with being women and men (Lindsey 2011). Gender role is a theoretical construct involving a set of social and behavioural norms that, within a specific culture, are widely considered to be socially appropriate for individuals of a particular sex, it includes the rights and obligations that are normative for the sexes within a given society (Trauth et al., 2006; Lindsey 2011). Gender roles are culture-based, and while most cultures distinguish only two gen-

ders, some recognise more. From birth, children learn gender stereotypes and roles from their parents and the environment. Despite the changing roles of men and women, gender role stereotypes are still firmly held (Heru 2005; Trauth et al., 2006). Additionally, gender stereotypes ascribe sex-based normative traits – women are likened to be more feminine exhibiting softness and sensitivity, while men are likely to be more masculine showing aggressiveness and decisiveness. This clearly expresses the cultural expectation in Nigerian society and define the expected roles and attribute a typical Nigerian woman should exude. These gender roles and stereotypes are inculcated during infancy by socialisation and are strengthened during later life by expectation confirmation process (Powell, Greenhaus, 2010).

2.2. Work-family role conflict

Family and work are two important focal points in an adult's life, and the conflict that exists between them has become an issue drawing the attention of scholars and researchers alike across the globe, thereby making work-family role conflict a famous area of research in the 21st century. This trend arose because of changes in the demographic structure of the workforce in the sense of dual-career couples and increased numbers of working mothers (Gurbuz et al., 2013). The conflict that exists between work and family roles is bi-directional, in that, just as work factors affect family roles, family factors also affect work roles (Netemeyer et al., 1996; Gurbuz et al., 2013). The definition of work-family conflict is based on the integration of inter-role conflict concept; in which inter-role conflict exists when an individual holds two or more roles at the same time (Posig, Kickul, 2004). R. G. Netemeyer et al. (1996) defined work-family role conflict as a form of inter-role conflict in which the general demands of time devoted to and strain created by the job interfere with performing family-related responsibilities. Work-family conflict exists when (1) time devoted to the requirements of one role makes it difficult to fulfil requirements of another, (2) strain from participation in one role makes it difficult to meet requirements of another, and (3) specific behaviours required by one role make it challenging to meet the needs of another (Greenhaus, Beutell, 1985).

Time-based conflict does occur when work-related activities encroach on the time available to be spent in the home, likewise when family-related activities impinge on the time allotted for work. Some of the associated sources of this type of conflict include long hours of work in a week, overtime, irregular shift work, inflexible work schedule, presence of young children, other family dependents, large family size and both spouse working (Beutell, Wittig-Berman, 1999; Elloy, Smith, 2003; Stier et al., 2012). Strain-based conflict occurs when stressor like tension, anxiety, fatigue, depression, and irritability generated from work or home-related activities affect an individual's ability to perform well in either of the domains. Job demand affects strain-based conflict as certain stressful events at work can produce fatigue and restlessness that may affect the individual's ability to function well at home (Greenhaus et al., 1987). Whereas behaviour-based conflict emanates when specific patterns in role behaviour are incompatible with expected behaviour in another role.

It is well documented that women experience work-family role conflict in their bid to keep up with the demands of their jobs and managing their families (Posig, Kickul, 2004; Powell, Greenhaus, 2010). Several authors have suggested that there is a lack of empirical studies of work and family role conflict in cultures where the family is placed highly as an institution, and in which there is a high influx of women in the labour market (Calvo-Salguero et al., 2008). Nigeria is a country with such a culture. Nigerian women are confronted with challenges in regards to attending to pressures from both their jobs and homes. This is brought about by the different role expectation manned by women. Role conflict at individual levels does not exist in a vacuum; most often, peripheral influences such as cultural and socio-economic factors within the national framework where the organisation functions may likely have impact on either the struggle or accomplishments that workers experience in their quest of finding a right blend in harmonising their work and family life (Elloy, Smith, 2003).

In most evolving cultures where social philosophy accentuates male-controlled orientations (male supremacy), there is usually a marked division of labour based on gender, which generally gives rise to gender stereotypes. This standpoint espouses a traditional division of labour for sexes, in which females are

expected to take up a great deal of family and household tasks, whereas males are expected to work and provide a livelihood for the family (Biggs, Brough, 2005), and these in most cases have an undesirable impact on the female gender in employment. Such a masculine model society relegates women to the background and in work-life, sometimes showcases the female gender as a perpetual home keeper and burdened by almost all family responsibilities. It is evident that role conflicts, and pressures between roles are grim realities for such working mothers in these places (Agbalajobi 2010; Lee et al., 2013). This scenario is typical for a Nigerian woman; the primary duty of a woman is first to cater to her husband, children, and the home, as enshrined in the societal culture. When other things take priority over these, it results in role conflict.

Furthermore, the Nigerian cultural setting is characterised by an apparent sexual division of labour both inside and outside the family (Adekola 2010). Married women are mostly burdened with a significant volume of household chores even when they are productively engaged in paid employment, and their husbands would usually be less involved with childcare and domestic errands. More so, there has been limited support from employers and the government regarding childcare (Adekola 2010). Thus, this results in work and family role conflict which perhaps is an issue encountered by most women in the fields of science and technology in Nigeria, and may likely inhibit their complete dedication to their paid employment in some respects.

Studies have shown that work-related demands impact employee's well-being (Glavin, Schieman, 2011). There are many measurements of work demands, e.g. time pressure, i.e. tight deadlines, high speed of work, and the quantity of work (Skinner, Pocock, 2008). Job demands are those physical, psychological, social, or organisational aspects of the job that require sustained physical and mental (i.e. cognitive or emotional) effort and are therefore associated with specific physiological and psychological costs (Schaufeli, Bakker, 2004). Job demand is related to work interference with home activities, and when there is no reasonable amount of job resources present to buffer the effect of high job demands, employees may experience

adverse outcomes like burnout and turnover intention (Bakker et al., 2011; Tims et al., 2013).

Role overload is described as a form of personal role conflict, that is, a perception by individuals when role demands are not at par with the available abilities and resources (Jones et al., 2007). Role overload frequently manifests as a form of inter-sender conflict, in which individuals are expected to meet the expectations of multiple role senders. Both employees and their organisations endure many pervasive effects of role overload, which may include poorer physical and mental health, absenteeism and lower performance and reduced enthusiasm for the job at hand. Ultimately, role overload has been attributed to be a significant strain on an organisation's general lucrativeness (Jones et al., 2007; Gurbuz et al., 2013). Role overload is regularly mentioned as a source of stress in the organisational setting and has been defined as the degree to which individuals perceives themselves to be under time pressure due to the number of responsibilities they have in life (Reilly 1982). In other words, when an employee realises that he or she has received too many commitments and duties to complete in a period, excessive role overload is perceived (Gurbuz et al., 2013).

The decision of a working woman and mother to remain in paid employment has an impact on the family and can generate both emotional and material effects since women are traditionally charged with the responsibility of childcare (Jang et al., 2014). Women with higher family demand with less help will spend more time on housework, and this may result in strain, tension and role incompatibility, and in most cases family crises or the woman quitting her job if not properly handled. Family responsibilities affect the careers of females disproportionately, which prompts women with children to be less ambitious than those without children (Heru 2005; Shakil et al. 2011). Many women employees are burdened with the task of having to juggle paid work and family responsibilities, especially women with heavy role demands. This phenomenon is usually partly emanated from gender role expectations, the burden of which sometimes results in depression, anxiety, stress and lack of productivity at work. It is the wives who get disapproval from society if, for any reason, the children suffer when both parents are fully involved in

paid employment (Jang et al. 2014). Nonetheless, women whose marriage is preceded by the completion of their education and commencement of career are more likely to have little or no expectation from their spouses to terminate their job. The acting out of the roles of being a mother and employee places an expectancy on women to be accessible at given times (Lindsey 2011).

2.3. Turnover intention

Turnover intention is conceptualised as the antecedent to the act of leaving a job (Porter, Ayman, 2010). Employees decide in advance whether to leave an organisation or not before their actual exit. Research interests is increasingly covering the antecedents of turnover intentions among employees and the impact of actual turnover on organisational growth, specifically among IT and engineering professionals and work organisations (Jones et al., 2007; Spector et al., 2007; Akintayo 2010; Babajide 2010; Porter, Ayman, 2010; Abrar, Rashidi, 2014; Nohe, Sonntag, 2014). Concerns about the disparity between employee's wants and management's means of fulfilling them and job satisfaction are used to predict turnover intentions of employees (Ahuja et al., 2007). High turnover rates impact organisations extensively in terms of; the strain produced by recruitment, training, time and costs incurred in the process of replacement, and an excess burden on remaining employees, as well as operation interruption. Many healthcare organisations face the challenge of employee turnover, and it has direct consequences for the organisation and indirect implications for the profession (Abrar, Zaki, 2014). Employees leave organisations for several reasons, top on the list being work discontentment and stress; with strain from balancing work and family responsibilities being the principal source of stress. This burden of balancing work and family demands may impact more on women because they are mostly preoccupied with child-rearing obligations (Porter, Ayman, 2010).

Also, findings suggest that work-family role conflict is a crucial source of stress for IT workers, and issues in their work context, relate to turnover intention; depicting a significant relationship between turnover intention and work-family role conflict (Ahuja et al., 2007; Spector et al., 2007; Akintayo, 2010; Porter, Ayman, 2010). Women scientists at some level of their professional career decide to leave the scien-

tific pipeline in a bid to curtail work-family role conflict and strike a work-life balance. On the other hand, some decide to delay childbearing or give up having children altogether, while those who choose to manage both family and work demands pay the price of high workload, strain, and exhaustion. This consequently prompts leakage in the pipeline and invariably influences the career salience of women (Polkowska 2014).

3. Methods

3.1. Sampling and procedures

A cross-sectional survey was conducted among women in the field of science and technology (engineering, information technology (IT) and medicine) in 20 engineering and IT firms including two hospitals, one public and one private in Lagos state, Nigeria. Lagos state was stratified to Lagos Island and the mainland for the study area because they constitute the commercial hub of the state and many science and technology industries are predominantly situated there. Randomly selected engineering and IT firms and hospitals were approached for the study and all the women employed there were invited to participate as most of the firms had few or no women employed in their IT and engineering departments. A total of 200 questionnaires were given out, but only 173 copies were returned and analysed, making it an 87% response rate. Written informed consent was obtained from all the participants, and ethics approval for the study was obtained from the University of Malaya Research Ethics Committee.

Table 1 shows a description of the participants' socio-demographic characteristics.

Table 1. Socio-demographic characteristics of participants by different fields of science and technology

Characteristic	Engineering	Information Technology	Medicine	Total
Age				
≤ 34 years	36	37	27	99
≥ 35 years	18	40	16	74
Total	54	77	42	173
Marital Status				
Single	13	20	7	40
Married	38	54	34	126
Separated/Divorced/Co-habiting	3	3	3	7
Total	54	77	42	173
Number of children				
≤ 2 children	24	32	25	81
≥ 3 children	17	25	10	52
Not Applicable	13	20	7	40
Total children	54	77	42	173
Age of youngest child				
≤ 3 years	15	38	22	75
≥ 4 years	26	19	13	58
Not Applicable	13	20	7	40
Total	54	77	42	173
Age of oldest child				
≤ 6 years	7	20	17	44
≥ 7 years	34	37	18	89

Not Applicable	13	27	7	40
Total	54	77	42	173
Educational qualification				
Diploma/ First degree	28	49	24	101
Masters	26	28	18	72
Total	54	77	42	173
Years of work				
≤ 7 years	38	43	29	110
≥ 8 years	16	34	13	72
Total	54	77	42	173
Hours of work a week				
≤48 hours	34	46	20	100
49 hours	20	31	22	73
Total	54	77	42	173
Monthly income				
≤250,000 NGN	19	41	19	79
250,000–500,000 NGN	16	22	10	48
500,000–1,000,000 NGN	15	9	11	35
>1,000,000 NGN	4	5	2	11
Total	54	77	42	173

1 EUR (€) = 404 nairas (NGN) (9th July 2019)

3.2. Measures

The questionnaire used for this research was developed using existing validated instruments from previous studies in literature, which addressed the variables in the study. The questionnaire was comprised of two main sections; the first section contained the demographic characteristics of the participants while the second section included all the study constructs as indicated below.

Work and family role conflict scale developed by R. G. Netemeyer et al. (1996) was used to measure work-family role conflict. It consists of five items (α.87). Responses were obtained using a seven-point Likert-type scale where 1=strongly disagree to 7=strongly agree. A sample item from this scale is 'The demands of my work interfere with my home and family life'. The score ranges from 5 to 35; as such, the higher the score, the more work-family role conflict experienced.

Work role overload scale, developed by M. D. Reilly (1982), was used to measure work role overload. This scale consists of 13 items (α.89), and responses were obtained using a five-point Likert-type scale where 1=strongly disagree to 5=strongly agree. A sample item from this scale is 'I have things to do which I don't really have the time and energy for'. The score ranges from 13 to 65, with a higher score indicating a high work role overload.

Job demand was measured using five items (α.61) developed by S. L. Boyar et al. (2007). The items are ranged on a five-point Likert scale of 1=strongly disagree to 5=strongly agree. A sample item from this scale is 'My job requires all of my attention'. The score range from 5 to 25. Hence, the higher the score, the more job demand experienced.

Family responsibilities were measured using a five-point Likert scale consisting of four items (α.63) developed by A. Shakil et al. (2011); items ranged from 1=strongly disagree to 5=strongly agree. A sample item from this scale is 'The mundane housework I have to perform positively affects the role conflict I face at work'. The score ranges from 4 to 20, and a high score indicates more family responsibilities.

Gender role ideology was measured using six items (α.65) Likert scale developed by H. Mendick (1979). Items were measured on a scale of 1=strongly disagree to 5=strongly agree. A sample item from this scale is 'A woman's most important task in life should be taking care of her children'. The score range from 6 to 30, so the higher the score, the more gender role ideology.

Turnover intention was measured using five items (α.82) on five points Likert scale developed by O. M. Karatepe and A. Sokmen (2006). Items were measured on a scale of 1=strongly disagree to 5=strongly agree. A sample item from this scale is

'I think about quitting all the time'. The scale score ranges from 5 to 25, with a higher score indicating a high level of intention to quit.

3.3. Data analysis

Data were analysed using Statistical Package for Social Sciences (SPSS), version 21.0. Statistical analysis used includes: simple descriptive statistics for characterising the respondents, Pearson product-moment correlation, one-way analysis of variance (ANOVA), and multiple linear regression analysis. Research question one was answered using the Pearson product-moment correlation, which tested the association between the study variables. Research question two was answered using multiple linear regression analysis of variance. Only variables with statistically significant relations were added to the regression model, which aimed to find which of the variables had the most predictive effect on turnover intention

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4. Results

The socio-demographic characteristics of the respondents by the three fields of engineering, IT and medicine are presented in Table 1. More of the respondents fell in the IT profession. The dominant age range across the three fields of work is 34 years or less. The majority of women across the different fields were married and had one child or two children who are less than three years old. A good number of the women have completed a tertiary degree and have worked for up to seven years, at an average of 48 hours a week. There was no much disparity in the level of household income of the respondents across the three fields of work.

Table 2 displays the correlation coefficients among all variables, at 0.05 significance level (2-tailed). None of the demographic variables correlated significantly with turnover intention and not all the independent variables were significantly correlated with turnover intention. Work-family role conflict, work role overload, job demand and family responsibilities were positively but weakly correlated with turnover intention. This indicates that the more work-family role conflict, gender role ideology, job demand and family responsibilities experienced, the higher the turnover intention. Finally, there was a moderate positive correlation between job demand with work role overload.

Correlation describes the relationship between two variables and provides validity and reliability in studies. Since only variables with significant associations can be tested in a regression model, only family responsibilities, gender role ideology, job demand, work role overload and work-family role conflict which were significantly correlated with turnover intention, $P<.05$, were subsequently used in the stepwise multiple linear regression analysis.

Table 2. Correlation matrix for all study variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.Work-family role conflict	1													
2. Age	0.036	1												
3. Number of children	-0.041	-0.109	1											
4. Age of youngest child	0.035	-.182*	.793**	1										
5. Age of oldest child	0.041	-0.122	.828**	.856**	1									
6. Years of work	.152*	.511**	-.211**	-.256**	-.234**	1								
7. Hours of work	.234**	-0.053	0.004	0.009	-0.039	-0.063	1							
8. No of people at home	0.13	.310**	-0.105	-0.063	-0.036	.343**	-0.031	1						
9. Monthly income	-0.069	0.03	-.215**	-.201**	-.241**	0.089	-0.021	0.05	1					
10. Family responsibilities	.405**	0.071	-0.11	-0.012	-0.07	0.096	0.056	0.065	0.066	1				
11. Work role overload	.651**	-0.051	-0.05	0.004	-0.002	0.114	.217**	.189*	-0.012	.427**	1			
12. Job demand	.357**	-0.109	-0.037	0.042	-0.011	-0.003	.202**	.161*	0.035	.348**	.591**	1		
13. Gender role ideology	0.008	0.099	-0.14	-.182*	-0.146	0.041	-0.097	0.071	0.079	0.107	0.092	.217**	1	
14. Turnover intention	.330**	-0.028	-0.035	-0.024	-0.046	0.027	0.052	0.004	0.037	.261**	.328**	.188*	0.05	1

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Table 3 displays the results of stepwise multiple linear regressions of predictor factors (family responsibilities, job demand, work role overload and work-family) on turnover intention, only work-family role conflict and work role overload were predictors of turnover intention. The overall correlation between the two predictor variables and the criterion variable was 0.362. In model 1, the R^2 value 0.109 indicates that 10.9% (r=0.330) changes in turnover intention were caused by changes in work-family role conflict. Work-family role conflict was the main factor in turnover intention.

Model 2 shows the R^2=.131 (r=0.362). This suggests that 13.1% of changes in turnover intention is caused by changes in the combination of work-family conflict and work role overload. The two predictor variables combined contributed 13.1% (r=0.362) changes of variants in the criterion variable. However, the remaining 86.9% of the total variance of turnover intention is not predicted as it may be caused by other factors not studied in this research. The result suggests that work-family role conflict and work role overload are factors that may influence the turnover intention decision of professional women in engineering, IT and medicine.

Table 3. Model summary of predictors on turnover intention

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.330[a]	.109	.104	4.23961
2	.362[b]	.131	.121	4.19846
[a] Predictors: (Constant), Work-family role conflict				
[b] Predictors: (Constant), Work-family role conflict, work role overload				

The result of the ANOVA test analysis in the regression model in Table 4 shows that the two variables – work-family role and work role overload – were significant predictor variables of turnover intention [$F(2,167)=2.85$, $p<.05$].

Table 4: Results of One-way ANOVA for predictors on turnover intention

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	376.251	1	376.251	20.933	.000[a]
	Residual	3073.610	171	17.974		
	Total	3449.861	172			
2	Regression	453.255	2	226.628	12.857	.000[b]
	Residual	2996.606	170	17.627		
	Total	3449.861	172			
[a] Predictors: (Constant), Work-family role conflict						
[b] Predictors: (Constant), Work-family role conflict, Work role overload						

The Regression Model for turnover intention derived from the data is:

Turnover intention = .202 (Work-family role conflict) + .197 (work role overload)

The data in Table 5 indicates that two variables – work-family role conflict (β =.202, P <.05 and work role overload (β .197, P<.05) – were significant predictor factors of turnover intention. The two predictor variables contributed 13.1% (r=.362) of variants in turnover intention [F (2,167) = 12.857, P<.05]. The other predictor variables (family responsibilities and job demand) were not predictive of turnover intention.

Table 5. Standard coefficients for predictors on turnover intention

Model		Unstandardised coefficients		Standardised coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.901	1.074		10.147	.000
	Work-family role conflict	.214	.047	.330	4.575	.000
2	(Constant)	8.691	1.500		5.794	.000
	Work-family role conflict	.131	.061	.202	2.148	.033
	Work role overload	.093	.045	.197	2.090	.038

5. Discussion

This research shows that there was a significant positive relationship between work-family role and turnover intention. This means that, among the study participants, the higher the work-family role conflict experienced, the higher the level of turnover intention being nurtured.

Several authors have highlighted the adverse effects of high turnover intentions and actual turnover, both to the organisation and the nation as a whole, in regards to human resources and economic loss. Many healthcare organisations face the challenge of employee turnover, and it has direct consequences for the organisation and indirect implications for the profession (Abrar, Zaki, 2014). As documented, employees leave organisations for several reasons, top on the list being work discontentment and stress, strain from balancing work and family responsibilities being the principal source of stress. This burden of balancing work and family demands may impact more on women because they are mostly preoccupied with child-rearing obligations (Porter, Ayman, 2010). Studies have shown that numerous work base and home base factors trigger

work-family role conflict for working women, these factors include job demand, hours of work and family responsibilities (Yildirim, Aycan, 2008, de Janasz et al., 2013; Foster, Ren, 2014), as such these possess barrier for female career advancement in science and technology occupations.

The finding is in tandem with the result of the study done by B. Buddeberg-Fischer et al. (2010) which indicates that female physicians especially those with children have lower career success as they would usually opt for part-time jobs or quit their jobs when they need to take a break for raising a family. Also, studies done by M. K. Ahuja et al. (2007) suggests that work-family role conflict is a crucial source of stress for IT workers and issues in their work context, relates to turnover intention. Other studies have also found a significant relationship between turnover intention and work-family role conflict (Spector et al., 2007; Akintayo 2010; Porter, Ayman, 2010).

This study has successfully established that work-family role conflict and work role overload, were predictors of turnover intention. This corroborates the findings of E. Jones et al. (2007), whose study shows a positive relationship between turnover intention and role overload. Given the relationship between work-family role conflict and work role overload, women scientists are likely nurturing job turnover tendencies because of the degree to which they are overworked cognitively, and as a result of being under time pressure and having too many commitments and responsibilities. In cognisance that women are significant contributors to development among nations, it will be unfavourable to a country as a whole if professional women in science who are already nurturing turnover intention do quit their jobs. M. K. Ahuja et al. (2007) highlight the harmful effects of turnover of IT professionals on an organisation by examining the impact it has on a clients-organisation relationship and the cost of hiring and retraining new staff.

The age range of a majority of the participants in this study is 30 to 39 years; an indication that most of the female professionals in science and technology occupations in Lagos state, Nigeria were in their childbearing and rearing stage. Family responsibilities are the only family-based factor that positively correlated with turnover intention.

Likewise, hours of work did not influence turnover intention. One can presume that factors like the number of children, the age of youngest child and hours of work would affect their turnover intention; the cultural realities obtainable in Nigeria is perhaps a good reason for the disparity. In that, the extended family system still obtains, and married women probably receive help in regards to childcare and home management from relatives – parents, sibling, aunties, and in-laws who reside with them. This reality may in a way reduce the level of role conflict between work and family. N. J. Beutell (1985) opines that time-based conflict will occur when work-related activities encroach on the time available to be spent in the home, likewise when family-related activities impinge on the time allotted for work. When a woman is assured of proper care for her children while away at work, she will be less troubled by the number of hours she must put in at work. This may provide explanations for why hours of work did not correlate with turnover intention in this study.

Numerous ideologies have attempted to explain the underrepresentation of women in science and technology, especially in regards to their low representation in the work arena and at higher positions within organisations. Some scholars have related it to some cultural influences within a society, and that most females in science and technology often encounter challenges like lack of suitable position in science and technology-based workplaces, thereby prompting them to take non-science and technology-based jobs (Trauth et al., 2009; Yansen, Zukerfeld, 2014). Other factors, e.g. socio-cultural attitudes, strongly influence the level of women's participation in science and technology; for instance, the preference of male workers over females- masculinisation of science by some employers can also contribute to the attrition of women on the job (Erinosho, 1994; Aderemi et al., 2007).

Within IT-based companies, women are employed to occupy roles that complement the actual activities within such companies. These roles border around administrative duties rather than participating in core IT or software programming (Yansen, Zukerfeld, 2014). In another study, A. M. Heru (2005) reports gender role and socialisation patterns as other key hindrances to women in their quest to reaching lead-

ership positions within organisations. She also pointed out that although women do observe obstacles to attaining promotion and career growth, they, however, do not necessarily report that they are dissatisfied career-wise.

Nonetheless, this study has empirically demonstrated that work-family role conflict is an essential focus in the discourse of attrition of women in science and technology. To reinforce women excellence in the world of science and technology, it's pertinent for employers and policymakers alike to give enormous attention to work-family and work overload issues faced by female workers. Also, the study supports the 'leaky pipeline' metaphor described by E. K. Yakura (2008), in which there exists a continuous leakage occurring through the educational stages of women in science and technology to the practice of the occupation. Besides these positions, some authors (Katarina, Metka, 2014) have called for the need to examine work-family role conflict issues, not only in relations to situational variables that do points at work and family domains respectively as sole agents of role conflict, but also in regards to some other dispositional variables, e.g. personality characteristics of individuals. They argue that employees who have personality traits that aid them to make more efficient utilisation of time will have more energy and positive perception and adoption of coping mechanism that causes a reduction in stress level, hence, a reduced level of role conflict as well for the individual.

This is a cross-sectional quantitative study which explored some factors affecting turnover intention among women in science. As with typical quantitative research, it does not have an in-depth analysis of the factors associated with turnover intention, and also several other potential antecedents of turnover intention were not included in this research; an in-depth exploratory qualitative analysis can provide more results. Additionally, the sample size for the study was small due to the low presence of female employees at the firms where the research was conducted, and this thereby limits the generalisability of the findings.

6. Conclusion and recommendation

The global awareness about the attrition of women in science and technology formed the primary basis of this study, particularly in regards to the dearth of empirical studies about women in science and technology industries, and the impact of work-family role conflict on the career progression of female scientists in Nigeria. The study explores the factors associated with turnover intention, and whether work-family role is a subsequent predictor of turnover intention among professional women in science and technology industries in Lagos state. Although the aim of this study was not to establish if role conflict amounts to an actual turnover for women in science, further research among women experiencing role conflict is recommended. Findings from the study demonstrate that, although family responsibilities, job demand, work role overload, and work-family role conflict significantly correlated with turnover intention, only work-family role conflict, and work role overload predicted turnover intention.

Generally, efforts are being made to create gender parity in the enrolment of girls and boys into science and technology-based disciplines from high school through tertiary education. More girls are responding to the call to take up more science and technology-based subjects and courses. The numbers keep diminishing as they progress, and this attrition is even more observed in the workplace arena; exacerbated by various work and non-work related factors, e.g. too much work demand, work role overload, and family responsibilities, with the resultant effect being high work-family role conflict, that that further impacts high turnover intention. Employers and policymakers are, therefore urged to consider paying attention to workplace issues peculiar to women. Proactive measures, which provide for participatory management-employee engagement and participation in decision making within the organisation, should be enacted, as this strategy is useful for employee retention. Also, employers without work-family 'friendly' policies should consider creating this as one of the means of reducing work-family role conflict of female employees. Policymakers have the onus of implementing intervention programmes that cater to professional women in science and technology.

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