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Quality of Working Life organization Commitment and Turnover Intention in Information Technology Industries: Structural Equation Modeling and Fuzzy Approach

[1]T. Ramya and [2]R. Sudhakara Pandian
[1]Anna University, Chennai, India
[2]SACS MAVMM Engineering College, Madurai, Tamil Nadu, India

Abstract: Achieving a high quality of working life is essential for employees working in organizations. A different conception for studying the quality of working life practice in information technology industries, based on structural equation modeling and the fuzzy approach is propounded by authors of the study. The study is worked out in two sections. In the first section a structural equation model is developed and based on the model hypotheses are framed. These hypotheses mainly measure the impact of quality of working life on organization commitment and the impact of organization commitment on turnover intention. In order to test the model and these hypotheses, a study was conducted among 1030 information technology professionals in the state of Tamil Nadu in India. On the research revealed that quality of working life has a positive impact on organization commitment and organization commitment has a negative impact on turnover intention. Also, the absolute fit indices fit the sample data and reveals that the proposed model has the acceptable fit, by way of satisfying the recommended values. Based on results of the study researchers construct rule statements in the second section which are then converted into fuzzy rules and a fuzzy inference system for this process is constructed with the help of graphical user interface tools of the fuzzy logic toolbox built using MATLAB numeric computing environment. In Mamdani-type inference the output membership functions are expected to be fuzzy sets and the implication of the process is shown as plotted by the toolbox in surface and rule views. Based on these results the study argues that quality of working life is an important factor in determining the organization commitment and turnover intention among information technology professionals.

Key words: Quality of working life organization commitment, turnover intention, information technology professionals, structural equation modeling, fuzzy inference system

INTRODUCTION

The term Quality of Working Life (QoWL) is one of the most discussed terms in Human Resource Management and is getting its space in the human resource discussions. The presence of QoWL in organization, leads to numerous positive outcomes. So much of research and experiments have been undertaken to study human beings at work and the ways to improve their QoWL. The improvement of quality at the work environment is an idea that has caught the creative energy of managers and workers much the same. Various analysts and scholars have been intrigued by the significance of the QoWL concept and have attempted to distinguish the kinds of factors that focus such an experience at research (Khan and Afzal, 2011; Kalra and Ghosh, 1984; Mirvis and Lawler, 1984; Kerce and Kewley, 1993). Determining the QoWL of employees is an imperative thought for managers intrigued in enhancing employee's employment fulfillment and duty. The issue of work life quality has gotten to be discriminating in the most recent two decades because of expanding requests of today's business surroundings and family structure (Akdere, 2006). Specifically, QoWL is impacted by o ccupation fulfillment that comprehensively reflect life f ulfillment and general emotions o f prosperity (Danna and Griffin, 1999). Investigations of QoWL and execution or profit demonstrate subjective and objective affiliations. Reflecting best practice in administration of human assets, thoughtfulness regarding QoWL is essential for bosses who have a lawful obligation to look after the health and wellbeing of their employees.

Definitions of QoWL have kept on fluctuating about whether and to be impacted by the theoretical stance of researchers. Accordingly, different models of QoWL have been proposed, each one drawing upon distinctive blends

Corresponding Author: T. Ramya, Anna University, Chennai, India

of a wide run of factors. Psychological growth needs could be utilized as a part of the conceptualization of QoWL. A few such needs were recognized are skill variety, task identity, task significance, autonomy and feedback (Hackman and Oldham, 1976). In a further study, key components important to QoWL were recognized as task, physical work environment, social environment within the organization, administrative system and relationship between life on and off the job (Cunningham and Eberle, 1990). Baba and Jamal likewise investigated routinisation of job content, recommending that this should be explored as a feature of the concept of quality of working life (Jamal and Baba, 1992). QoWL construct can best be seen as being dynamic and as including measurements, for example, job security, reward system, training and career advancement opportunities and participation in decision making (Lau and May, 1998). The most essential elements of employee QoWL spring from speculations of need fulfillment. Higher QoWL reflected fulfillment of these key needs through assets, exercises and conclusions originating from investment in the research environment (Sirgy *et al*., 2001). Maslow (1943)'s Needs were seen as significant in underpinning this model, covering key angles; wellbeing and security, economic and family, social, esteem, actualization and information and style.

Organizational Commitment (OC) has been a famous point of examination in organizational behavior (Meyer and Allen, 1997). Allen and Meyer characterize OC as a mental condition that relates the criteria in the employee relationship in the organization and the suggestions on the choice to remain in the organization. This implies that committed employee will stay in the organization as contrasted with non-committed employee. In India, examines on OC have been viewed as a paramount zone in understanding employee behavior. Many researchers have inspected and created the criticalness of OC in their studies. The aggregated research findings on OC to date have joined this build to different precursors and results. On the other hand, with the exemption of Mohd Hanefah et al, little is thought about the relationship in the middle of QoWL and OC in Indian and Asian nation's different firms. The present study characterizes QoWL as ideal conditions and situations of work and life viewpoints, for example, development and improvement, cooperation, physical environment, supervision, pay and profits, social significance and work environment reconciliation. Better work experience may sustain employees' commitment to their organizations. Therefore, it is expected that there is a solid positive relationship between QoWL and OC, intending to say the higher the QoWL the stronger will be the OC of employees. Various studies have constantly demonstrated the impact of OC on Turnover Intentions (TI). OC is seen as a key segment of turnover models in light of the fact that their empirical association with intentional turnover has been made through various meta-analyses, in which a negative association with TI has constantly been outlined (Cohen, 1996; Lee *et al*., 2000; Mathieu and Zajac, 1990; Steel and Ovalle, 1984; Tett and Meyer, 1993).

Artificial Intelligence application such as fuzzy logic inference for these type of studies in today's environment which is highly competitive are undeniable principles of organizations and helps managers in framing useful policies that help the growth of organization and employees. Among various fuzzy methodology Mamdani's fuzzy inference method proposed by Mamdani and Assilian (1975) is the most commonly seen fuzzy methodology. Amidst the first control systems built using fuzzy set theory Mamdani's method was one and his effort was based on fuzzy algorithms for complex systems and decision processes by Zadeh (1973). Variety of utilizations in view of fuzzy logic has developed quickly in the previous couple of years and building a Mamdani framework for deciding on QoWL in organization is new of this sort. This study vigorously depends on Graphical User Interface (GUI) of Fuzzy Logic Toolbox to fulfill the work which is collection of functions built on the MATLAB numeric computing environment.

This study is devoted to the management process of exploring the relationship between QoWL and OC with employee TI in the organization. Based on the literature the key factors that contribute to the QoWL in an organization are identified and discussed in detail. A Structural Equation Model (SEM) is developed to study the inter relationship between the factors of QoWL, the impact it has on OC of employees and employee TI in an organization.The hypothetical establishment, emulated by a framework for fuzzy rules computing and implementation using GUI tools is discussed. Subsequently, examinations of results in light of current hypothesis from the utilization of MATLAB and GUI are conveyed and suggestions are given. The graphical tools such as Fuzzy Inference System (FIS) Editor, membership function editor, rule editor, rule viewer and surface viewer are used to build, edit and view the fuzzy inference system.

MATERIALS AND METHODS

Stratified random sampling (N = 1030) was carried out to collect data from employees working in Information Technology industry in Tamil Nadu. The questionnaire

Table 1: Demographical features of participants in the study

Gender	F-value	Percentage
Male	588	57.1
Female	442	42.9
Marital status		
Single	620	60.2
Married	410	39.8
Age group in years		
Below 25	556	54.0
25-30	337	34.7
Above 30	117	11.4
Educational qualification		
Undergraduate	805	78.2
Postgraduate	117	11.4
Others	48	4.7
Experience in years		
Below 3	405	39.3
3-6	476	46.2
Above 6	149	14.5
Employee organization status		
Tier 1	378	36.7
Tier 2	470	45.6
Tier 3	182	17.7

was distributed to employees working in Information Technology (IT) industries in Chennai, Tamilnadu. The survey was conducted on June-December 2015. Both male and female employees actively participated in the study. All factors of QoWL such as General Well Being (GWB), Home Work Interface (HWI), Job Career Satisfaction (JCS), Control at research (CAW), Working Conditions (WCS), Stress at Work (SAW) and Employee Engagement (EEE) are given due consideration in the questionnaire. In GWB, the happiness and life satisfaction of employees is studied with six questions which have reliability value (α) of 0.82. Three questions with $\alpha = 0.82$ discuss the issues that arise out of work and family commitments in HWI. The satisfaction of employees in relation with their job and the career opportunity available for them in their organization is studied using six questions with $\alpha = 0.86$ in JCS. The involvement of an individual to have control over decisions at work is discussed in CAW with three question, $\alpha = 0.81$. In WCS, three questions, $\alpha = 0.75$ concentrates on the physical working facilities available in the organization. It is important to discuss the amount of pressure an individual has in an organization, SAW factor concentrates on this with two questions,$\alpha = 0.81$. The engagement levels of employees related to their research in the organization is discussed in EEE with four questions, $\alpha = 0.80$.The OC of employees is studies with the help of thirteen questions, $\alpha = 0.79$ and TI is analyzed with the help of three questions, $\alpha = 0.80$.

All the variables will be measured by the participants responses based on the 5-point Likert-type scales (1 = Strongly Disagree to 5 = Strongly Agree). Data collection was carried via the internet through mailed questionnaire forms. The interest of IT professionals in this subject can be judged by the high response rate to our emails. The e-mail addresses of our sampling groups were obtained from the Human resource department of the IT companies. The participants were asked to respond in a month's time. After this period, we called participants by phone and requested that they return the completed forms. Out of the 1500 questionnaire emailed 1030 responses were obtained (Table 1). In this way, we achieved a response rate of 68.7%.

Structural Equation Modeling (SEM) is the most popular technique used in research. This model includes unobservable exogenous or endogenous variables in addition to the unobservable disturbances. Using SEM, Confirmatory Factor Analysis (CFA) model, Regression Models and complex path models can be specified, model fit represents the data in this technique. SEM is generally a technique of multivariate analysis. The flow of variables is represented by path diagrams. A linear relationship explaining X causes Y is interpreted and shown as a visual representation. A path diagram consists of boxes and circles which are connected by arrows. The observed variables are represented by rectangle or square box and latent or unobserved variables by circle. Single headed paths represent regression coefficients and double headed arrows represent covariance. The statistical analysis is carried out with the SPSS program and the Amos program. SEM methods as implemented in AMOS are used to test the proposed model of QoWL. Hypothesized relationships are tested empirically for goodness of fit with the sample data. Among the fit indices produced by the AMOS program is the Chi-square statistic (χ^2) which is the test of absolute fit of the model. However, the χ^2 value is sensitive to sample size. Therefore, additional goodness-of-fit indices such as the Goodness of Fit Index (GF), the Adjusted Goodness of Fit Index (AGFI), the Comparative Fit Index (CFI), Root Mean Square Residual (RM) and the Root Means Square Error of Approximation (RMSEA) are used in this study. Based on the findings using SEM the authors propose statements which are converted into fuzzy rules and a FIS for this process is constructed using the GUI tools of the Fuzzy Logic Toolbox built using MATLAB numeric computing Environment. Figure 1-7 and illustration of the figures are sourced from Ramya. The proposed model is shown in Fig. 1.

The hypotheses are:

- H_1: The general well being of employees in IT industries is positively correlated with the quality of working life among them
- H_2: The levels of home work interface of employees in IT industries is positively correlated with the quality of working life among them

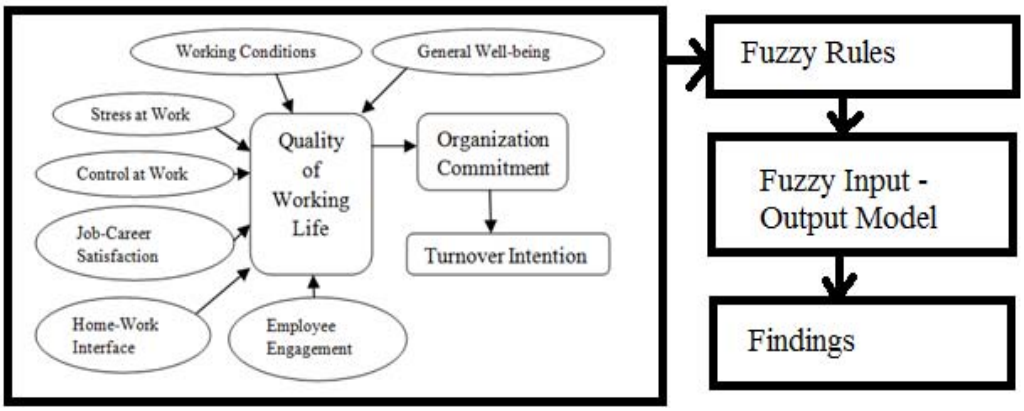

Fig. 1: The Hypothesized model

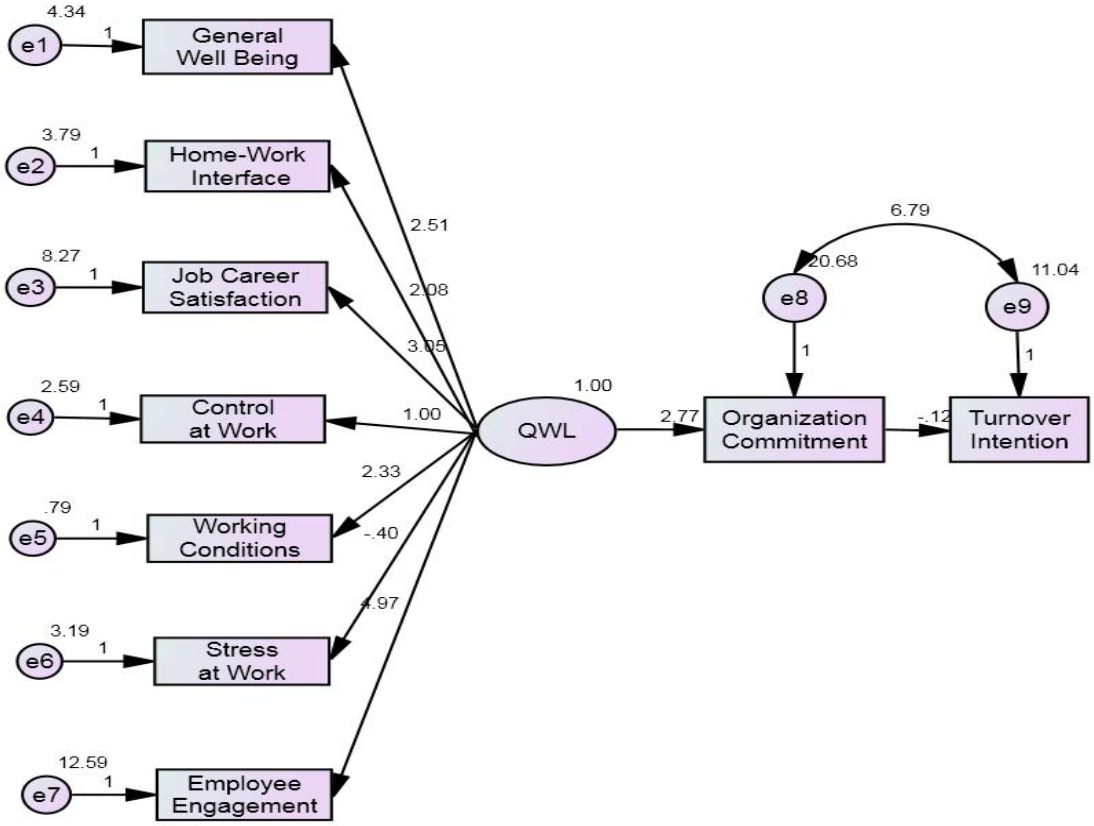

Fig. 2: Structural equation modeling on the impact of quality of working life of employees in IT industries

- H_3: The job career satisfaction of employees in IT industries is positively correlated with the quality of working life among them
- H_4: The amount of control at work among employees in IT industries is positively correlated with the quality of working life among them
- H_5: He satisfaction in working conditions of employees in IT industries is positively correlated with the quality of working life among them
- H_6: The levels of Stress at Work among employees in IT industries is negatively correlated with the quality of working life among them

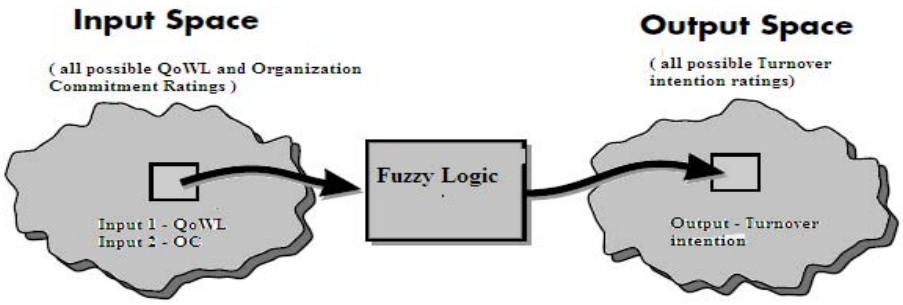

Fig. 3: A graphical example of an input-output map

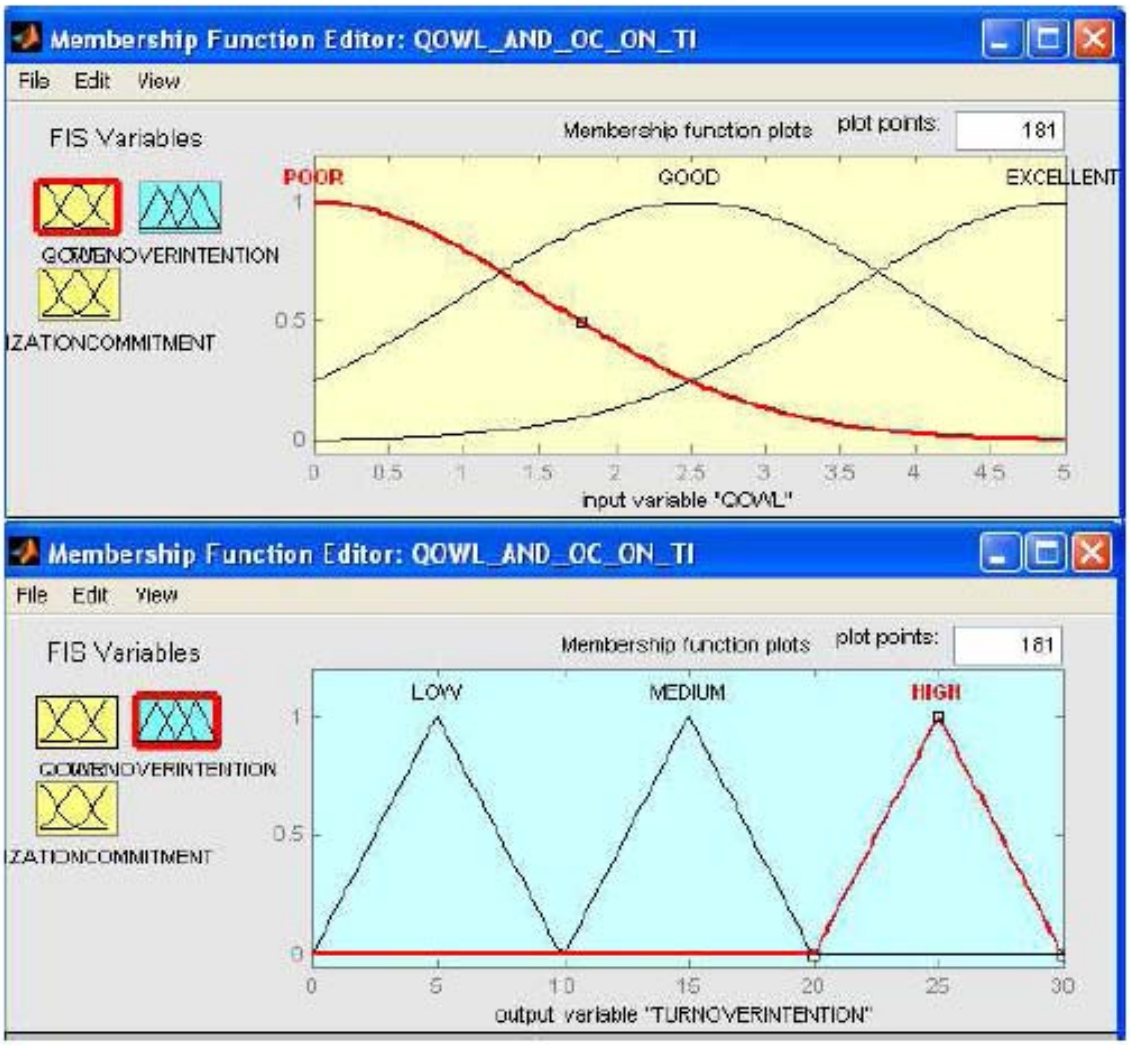

Fig. 4: Membership function plot (QoWL,TI)

- H_7: The Organizational Engagement of employees in IT industries is positively correlated with the quality of working life among them
- H_8: The levels of organization commitment of employees in IT industries is positively correlated with quality of working life among them

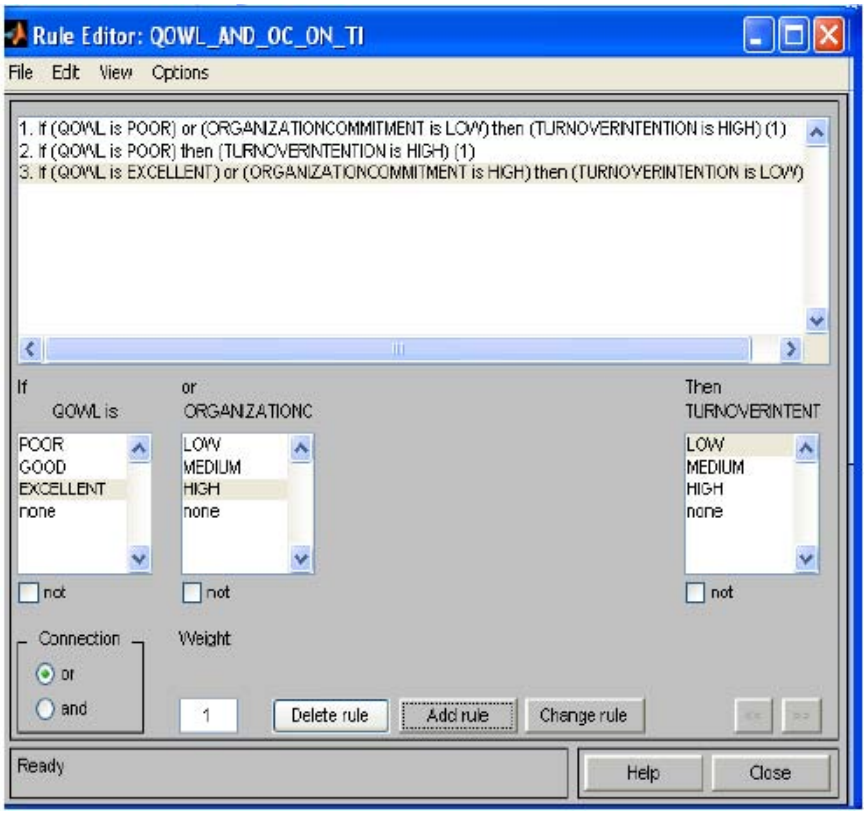

Fig. 5: Rule editor

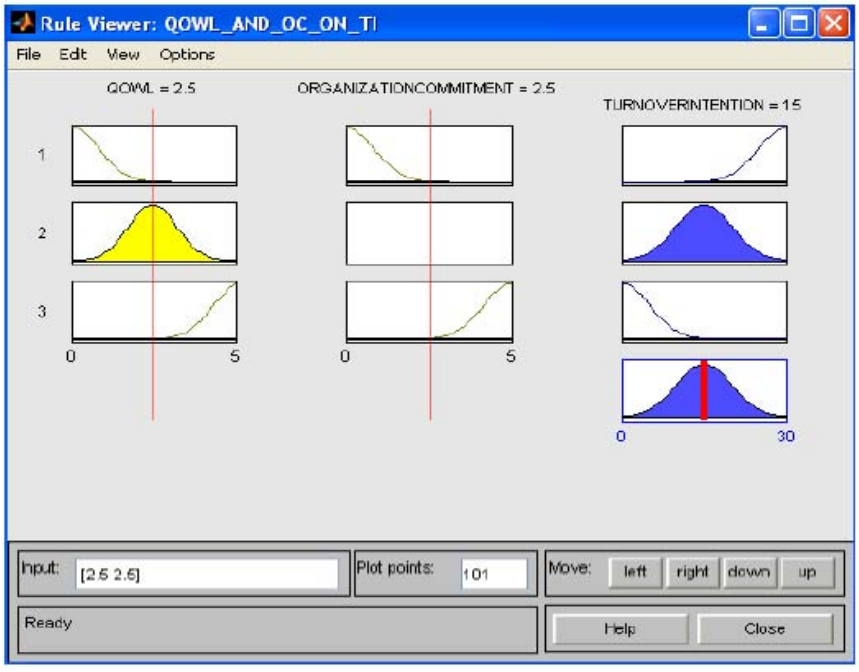

Fig. 6: Rule viewer

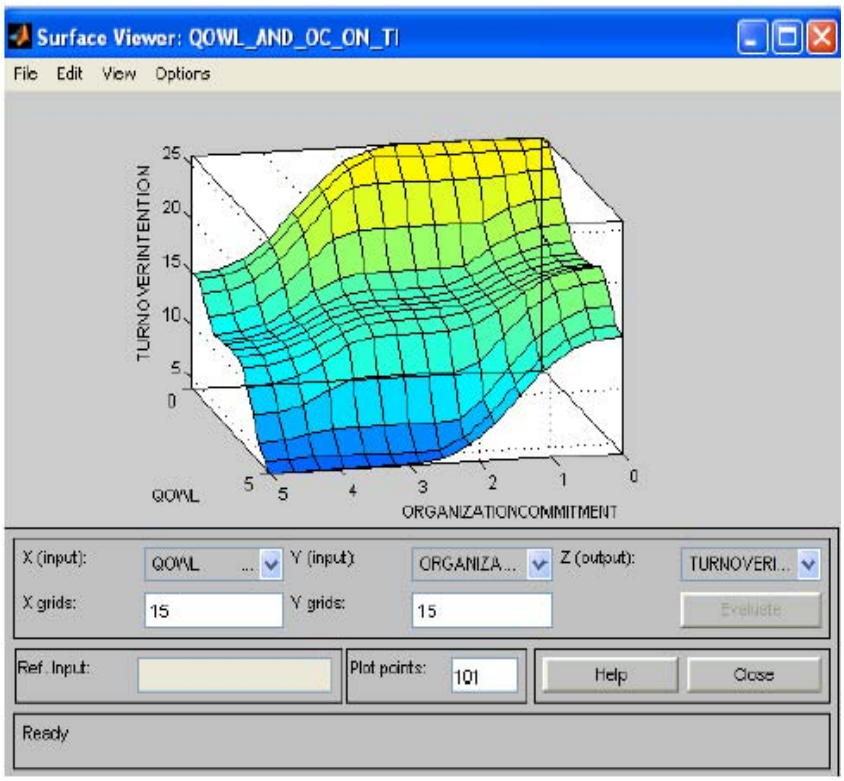

Fig. 7: Output of process (surface viewer)

- H_9: The turnover intention of employees in IT industries is negatively correlated with the levels of organization commitment among them

RESULTS AND DISCUSSION

The variables used in the Structural Equation Model are (Table 2; Fig. 2).

Observed, endogenous variables:

- General well being
- Home-work interface
- Job career satisfaction
- Control at work
- Working conditions
- Stress at work
- Employee engagement
- Organization commitment
- Turnover intention

Unobserved, exogenous variables:

- e1: error term for general well being
- e2: error term for home-work interface
- e3 : error term for job career satisfaction
- e4: error term for control at work
- e5: error term for working conditions
- e6: error term for stress at work
- e7: error term for employee engagement
- e8: error term for organization commitment
- e9: error term for turnover intention
- quality of working life

Hence number of variables on SEM are:

- Number of variables in the model: 19
- Number of observed variables: 9
- Number of unobserved variables: 10
- Number of exogenous variables: 10
- Number of endogenous variables: 9

In this study we developed and tested a model exploring the relationship between QoWL, OC and TI in IT industry. The model test for absolute fit of dataset and confirms that the model is stable. It is found that general well being, home work interface, job career satisfaction, working conditions, employee engagement play a strongest role in determining the QoWL of employees in

Table 2: Variables in the structural equation model analysis

Variables	Un-standardised co-efficient	SE	Standardised co-efficent	t-value	p-value
General well being←QoWL	2.511	0.088	0.770	28.6440	<0.001**
Home work Interface←QoWL	2.076	0.078	0.729	26.5600	0.002**
Job career satisfaction←QoWL	3.053	0.115	0.728	26.4910	<0.001**
Control at work←QoWL	1.003	0.057	0.529	17.7240	<0.001**
Working conditions←QoWL	2.327	0.060	0.934	38.8340	<0.001**
Stress at work←QoWL	-0.402	0.058	-0.219	6.8740	<0.001**
Employee engagement←QoWL	4.966	0.160	0.814	31.0900	<0.001**
Organization commitment←QoWL	2.768	0.159	0.520	17.3640	<0.001**
Turnover intention←Organization Commitment	-0.122	0.039	-0.208	3.1480	<0.001**

**significant at 1% level

Table 3: Model fit indices

Variable	Value	Suggested values
χ^2	34.816	
p-value	0.116	>0.05 (Hair)
GFI	0.969	>0.90 (Hu and Bentler, 1999)
AGFI	0.926	>0.90 (Hu and Bentler, 1999)
CFI	0.972	>0.90 (Hu and Bentler, 1999)
RMR	0.048	>0.05 (Hair)
RMSEA	0.039	>0.05 (Hair)

IT industry (H_1, H_2, H_3, H_5, H_7). In our study we found the direct negative effects of stress on QoWL (H_6).A strongest relation is found between QoWL and OC compared to OC and TI. There is plenty of literature supporting the beneficial effects of QoWL on OC. Thus one of the possibilities to improve OC levels among employees is to improve their QoWL practice in their respective organization (H_8).On the other hand improving the commitment levels among individuals decreases their tendency to leave the organization (H_9).

Structural Equation Modeling (SEM): Model fit assessment: Structural equation modeling evaluates whether the data fit a theoretical model. In order to evaluate the model, emphasis is given to Chi-square, GFI, AGFI,CFI, RMR and RMSEA.

As per the result, Chi square statistics with p = 0.000 does not show a good fit of the model. Nevertheless according to Schumacker and Lomax (2004), a sample size of over 200 (1030 in this research) could affect Chi-Square statistics to indicate a significant probability level (p = 0.00). Consequently, this model is considered for further interpretation in the goodness of fit measures. Common model-fit measures like chi-square, Goodness of Fit (GFI), Adjusted Goodness of Fit (AGFI),Comparative Fit Index (CFI), Root Mean Square Residual (RMR), Root Mean Square Error of Approximation (RMSEA) were used to estimate the measurement model fit. The estimates of the model fit indices from AMOS structural modeling is shown (Table 3).

According to Hair, the criteria for an acceptable model is RMR and RMSEA of 0.08 or lower; CFI of 0.90 or higher, The fit between the data and the proposed measurement model can be tested with a chi-square Goodness-to-Fit (GFI) test where the probability is greater than or equal to 0.9 indicates a good fit (Hu and Bentler, 1999). The GFI of this study is 0.969 more than the recommended value of 0.90 the other measures fitted satisfactorily; AGFI = 0.926, CFI = 0.972, RMR = 0.048 and RMSEA = 0.039. This indicate a good absolute fit of the model. Goodness of fit indices support the model fit and these emphasized indices indicate the acceptability of this structural model.

The fuzzy input output model: Based on the finding of the stastical analysis here, we construct a two-input, one output system (Fig. 3). The two inputs are Quality of Working Life (QoWL) and Organization Commitment (OC). The one output is Turnover Intention (TI):

- Statement 1; If (QoWL is poor) or (Organization Commitment is low) then (Turnover Intention is High)
- Statement 2; If (QoWL is good) then (Turnover Intention is medium)
- Statement 3; If (QoWL is excellent) or (Organization Commitment is high) then (Turnover Intention is Low)

A particular range of 0 to 5 is assumed for the QoWL and OC of employees in an organization (where 5 is excellent) in such a case the TI of employees whose range is fixed between 0-30 is determined using any of the two operators namely the "OR" and "AND" logic available in the fuzzy system. Gaussian membership function is chosen for QoWL, OC and for TI it is triangular (Fig. 4). The rules that are framed from the findings of the study are entered and 'OR' logic is utilized here (Fig. 5). The entire fuzzy inference process is shown by the Rule Viewer with 10 plots settled in it (Fig. 6). The three plots over the highest point of the figure speak to the predecessor and ensuing of the first rule. Each rule is a line of plots and each column is a variable. The rule numbers are shown on the left of each row. We can click

on a rule number to view the rule in the status line. The membership functions referenced by the antecedent or the if-part of each rule is indicated in the first two columns of plots (the six yellow plots). The membership functions referenced by the resulting or the then-part of each rule is demonstrated in the third column of plots (the three blue plots). Notice that under OC, there is a plot which is spotless. This compares to the characterization of none for the variable OC in the second rule. The fourth plot in the third column of plots speaks to the total weighted choice for the given inference system. This choice will hinge on upon the input values for the framework. The defuzzified output is shown as a striking vertical line on this plot.

The entire mapping of two input and one output curve can be obtained in one plot in a surface viewer which shows a three dimensional curve representing the mapping form QoWL and OC to TI (Fig. 7). Cases with two or more inputs and one output can also be handled with the special capacity inbuilt in Surface Viewer that is very helpful in grabbing the axes, with the help of mouse and can be repositioned to get a different three dimensional view on the data.The Surface Viewer can create a three-dimensional output surface where any two of the inputs differ, however two of the inputs must be held steady on the grounds that computer screens can't show a five-dimensional shape. The three dimensional curve produced by the Surface Viewer represents mapping form QoWL, OC to TI among IT professionals. When moving beyond overall three dimensions there might be a trouble in displaying the results. To address this issue Surface Viewer is equipped with pop-up menus which permit us to select any input and output required for plotting. The number of x-axis and y-axis grid lines can be determined with the help of two text input fields below the pop-up menus with which help to keep the calculation time reasonable for complex problems. Calculation is carried out using the Evaluate button and plots are generated. From the Rule views it can be clearly inferred that if QoWL and OC levels among IT professionals are low then the intention among them to leave the organization is higher and simultaneously if the QoWL and OC levels are high then the intension to stay with the organization is higher.

Achieving a high QoWL is essential for employees working in organizations. An organization can be successful if it knows how to attract, recruit, motivate and retain its workforce. A deeper understanding of the inter relationship among the factors of QoWL provides an opportunity for improved analysis of cause and effect in the workplace. An opportunity for more cost effective interventions can be gained from this recognition of QoWL as the greater context for the factors in the workplace such as GWB, HWI, JCS, SAW, CAW, WCS, EEE. An organization need to review relevant policies and services, clarify responsibilities of employees and ensure that monitoring of employee well being, work ife balance is effective. Flexibility on both sides is often needed with discussion and compromise within practical constraints fostering the identification of solutions. Organization should find alternatives to avoid longer working hours and demanding deadlines. For example, they could reduce job strain by increasing worker control, without reducing actual workload. Organizations could change their administrative structure to reduce employee stress and protect employees' mental health without cutting productivity. Employees must be provided with good physical working conditions such as health and safety, work hygiene. Concentration on these factors of QoWL helps to increase the psychological attachment between an employee and organization which leads to increased commitment and interest to stay in the organization for a long term. This would help to address the major problem of turnover that IT industry is encountering since the days of computing.

This research speaks to the first venture of a continuous procedure to guarantee better QoWL for employees. However, given the limited measure of exploration led in Tamilnadu here to date, the study does give some understanding into what is occurring at present in this state which is one of the important IT hub in India and in that capacity, it does make a commitment to new information in this field.

CONCLUSION

Information Technology professionals desire pleasant working conditions, participation in making decisions that influence their employments and profitable help offices like promotion and better wages. From this research it can be reasoned that QoWL is one of the attitudinal variable which has an incredible positive effect on OC which in turn impacts TI. Higher QoWL brings about more elevated amount of OC and higher OC brings about lower level of TI. For fuzzy inference implications in this case, flexible features for adjustments wherever required is provided by the toolbox. Defined three-dimensional surface views are obtained in the study with modifications done within the input and output variables. From the findings of the study it is suggested that IT industries in Tamil Nadu ought to explore the more prominent utilization of flexible work practices in their organizations, especially against the foundation of profits got from this for the employer, the employee and the community at large.

NOMENCLATURE

QoWL = Quality of Working Life
OC = Organization Commitment
TI = Turnover Intention
IT = Information Technology
FIS = Fuzzy Inference System
GUI = Graphical User Interface

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