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A Study of Personality Influence in Building Work Life Balance Using Fuzzy Relation Mapping (FRM)

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Abstract **-**Personality plays an important role in work life balance irrespective of the organizational setups and other factors. It has become a subject of concern in terms of technological, market and organizational changes associated with an individual's personality. Here in this study an attempt is made to study about the holistic picture of personality influence in work-life balance on the basis of experts' opinion. The influence of personality is studied from the big five factors of personality traits. The data were analyzed using Fuzzy Relational mapping (FRM) model and conclusions arrived for which personality has more influence in building work life balance and which one is more vulnerable for work life imbalance.

Keywords - Personality, Work Life balance, Fuzzy Relational mapping.

I. INTRODUCTION

A. Personality

Personality is made up the characteristic patterns of thoughts, feelings, and behaviors that make a person unique. In different situations personality and our responses are generally stable. Personality is psychological, but is influenced by biological needs and processes. Personality of an individual is a set of qualities that make the person distinct from another and assume a role or manner of behavior. Within ones personality the complex of all the attributes such as behavioral, temperamental, emotional and mental are considered. Guest (2002) defined the personality as the extent to which family or work is a central life interest influences the perceptions of balance of every individual. "Personality is the entire mental organization of a human being at any stage of his development. It embraces every phase of human character: intellect, temperament, skill, morality and every attitude that has been built up in the course of one's life", (Warren & Carmichael 1930, Elements of human psychology)**. "**Personality is the essence of a human being", (Gordon Allport 1957, Hall & Lindzey, 1957, p. 9, characterizing statements by Gordon Allport). **"**Personality is a result of interaction between the individual and the environment". (B. F. Skinner (1953) Science and Human Behavior). **"**The poor ego has a still harder time of it; it has to serve three harsh masters and it has to do its best to reconcile the claims and demands of all three...The three tyrants are the external world, the superego, and the id", (Sigmund Freud, 1923, The Ego and the Id). "An individual's pattern of psychological processes arises from motives, feelings, thoughts and other major areas of psychological function. Personality is expressed through its influences on the body, in conscious mental life and through the individual's social behavior", (Mayer, 2005, Comprehensive handbook of personality and psychopathology CHOPP Vol. 1: Personality and everyday functioning).

B. What Are the Big Five Dimensions of Personality?

Today, most of the researchers believe that there are five core personality traits. Support to this theory has been increasing for the past 50 years, beginning with the research of D. W. Fiske (1949) and later expanded upon by other researchers including Norman (1967), Smith (1967), Goldberg (1981) and McCrae & Costa (1987). The "big five" are broad categories of personality traits. While there is a significant body of literature supporting this five-factor model of personality, some of the researchers don't always agree on the exact labels for each dimension. However, these five categories are usually described as follows:

- Extraversion: This trait includes characteristics such as excitability, sociability, talkativeness, assertiveness and high amounts of emotional expressiveness.
- Agreeableness: This personality dimension includes attributes such as trust, altruism, kindness, affection, and other pro-social behaviors.
- Conscientiousness: Common features of this dimension include high levels of thoughtfulness, with good impulse control and goal-directed behaviors. Those high in conscientiousness tend to be organized and mindful of details.
- Neuroticism: Individuals high in this trait tend to experience emotional instability, anxiety, moodiness, irritability and sadness.
- Openness: This trait features characteristics such as imagination, inventive and insight and those high in this trait also tend to have a broad range of interests.It is important to note that each of the five personality factors represents a range between two extremes. For example, extraversion represents a continuum between extreme extraversion and extreme introversion. In the real world, most people lie somewhere in between the two polar ends of each dimension.

C. Work Life Balance

Work life balance is about people having measure of their control over when, where and how they work. Most of the people view this as work life balance is what the organization allows for an individual to experience. However, work-life balance is a bi dimensional approach. The other dimension of work-life balance, which many individuals

overlook, relates to what individuals do for themselves. The success of work life balance is always sustain with achievement along with enjoyment. Achievement and enjoyment at work is a critical part of work-life balance. Moreover, achievement and enjoyment in the other three quadrants of one's life (e.g. family, friends and self) is critical as well. New modern life work culture is forcing the individuals for inflexibility to flexibility. The importance of the balance between personal life and work life is ignored today. There is a life at work and at home and also a life having space for leisure. Due to the modernization practices and globalization the work life imbalance became hot topic for discussion. Work-life 'imbalance' is a big concern in this century because of increasing problems related to employee health, monotony at work place, declining levels of productivity and efficiency at the employee level. The imbalance also has a negative impact in the personal life of working people, some of which have even become social hazards- increasing number of divorces, infertility due high stress levels, advent of nuclear families etc.

D. Personality influence on work life balance

An individual should be able to strike a proper balance between work and life, there are many factors which are influencing the work life balance, however and individual's personality also plays a vital role in balancing the work life. The approach of psychology of individual differences may be also fruitful for research of Work Life Balance due to the fact that studying aspects of different personality types can enhance our understanding of perceptions of work life balance. It is easy to be realized that the Personality of an individual can have effects on his/her own balance between work and life. Consequently, purpose of this study is to identify the impact of personality on Work Life Balance and the vulnerability of a particular personality to work life imbalance.

II. DEFINITION AND ILLUSTRATION OF FUZZY RELATIONAL MAPS (FRMS)

Fuzzy relational mappings are constructed analogous to FCMs. In FCMs correlations between causal associations among concurrently active units are promoted. But in FRMs the very causal associations are divided into two disjoint units. Thus a domain space and a range space which are disjoint in the sense of concepts are needed to define an FRM.The elements of the domain space are taken from the real vector space of dimension n and that of the range space are real vectors from the vector space of dimension m (m in general need not be equal to n). D denotes the nodes $D_1, D_2, \ldots, D_n$ of the domain space where $D = \{(x_1,\ldots, x_n) / x_j = 0 \text{ or } 1\}$ for i = 1, 2,…, n. If $x_i = 1$ it means that the node D_i is in the on state and if $x_i = 0$ it means that the node D_i is in the off state. We denote by R the set of nodes $R_1,\ldots, R_m$ of the range space, where $R = \{(x_1,\ldots, x_m) / x_j = 0 \text{ or } 1 \}$ for j = 1, 2, …, m. If $x_i = 1$, it means that the node R_i is in the on state and if $x_i = 0$ it means that the node R_i is in the off state.

A. Definitions

a) Definition

A FRM is a directed graph or a map from domain space D to range space R with concepts like policies or events etc, as nodes and causalities as edges. It represents causal relations between spaces D and R. Let D_i and R_j denote that the two nodes of an FRM. The directed edge from D_i to R_j denotes the causality of D_i on R_j called relations. Every edge in the FRM is weighted with a number in the set $\{0, \pm1\}$. Let e_{ij} be the weight of the edge D_iR_j, $e_{ij} \in \{0, \pm1\}$. The weight of the edge D_i R_j is positive if increase in D_i implies increase in R_j or decrease in D_i implies decrease in R_j i.e., causality of D_i on R_j is 1. If $e_{ij} = 0$, then D_i does not have any effect on R_j . We do not discuss the cases when increase in D_i implies decrease in R_j or decrease in D_i implies increase in R_j .

b) Definition

When the nodes of the FRM are fuzzy sets then they are called fuzzy nodes. FRMs with edge weights $\{0, \pm1\}$ are called simple FRMs.

c) Definition

Let $D_1, \ldots, D_n$ be the nodes of the domain space D of an FRM and $R_1, \ldots, R_m$ be the nodes of the range space R of an FRM. Let the matrix E be defined as $E = (e_{ij})$ where e_{ij} is the weight of the directed edge D_iR_j (or R_jD_i), E is called the relational matrix of the FRM.

d) Definition

Let $D_1, ..., D_n$ and $R_1,\ldots, R_m$ denote the nodes of the FRM. Let $A = (a_1,\ldots,a_n)$, $a_i \in \{0, 1\}$. A is called the instantaneous state vector of the domain space and it denotes the on-off position of the nodes at any instant. Similarly let $B = (b_1,\ldots, b_m)$, $b_i \in \{0, 1\}$. B is called instantaneous state vector of the range space and it denotes the on-off position of the nodes at any instant $a_i = 0$ if a_i is off and $a_i = 1$ if a_i is on for i= 1, 2,…, n Similarly, $b_i = 0$ if b_i is off and $b_i = 1$ if b_i is on, for i= 1, 2,…, m.

e) Definition

Let $D_1, \ldots, D_n$ and $R_1,\ldots, R_m$ be the nodes of an FRM. Let D_iR_j (or R_j D_i) be the edges of an FRM, j = 1, 2,…, m and i= 1, 2,…, n. Let the edges form a directed cycle. An
FRM is said to be a cycle if it possess a directed cycle. An FRM is said to be acyclic if it does not possess any directed cycle.

f) Definition

An FRM with cycles is said to be an FRM with feedback.

g) Definition

If the FRM settles down with a state vector repeating in the form $A_1 \rightarrow A_2 \rightarrow A_3 \rightarrow \ldots \rightarrow A_i \rightarrow A_1$ (or $B_1 \rightarrow B_2 \rightarrow \ldots \rightarrow B_i \rightarrow B_1$) then this equilibrium is called a limit cycle.

B. Method of determining the Hidden pattern

Let $R_1, R_2, \ldots, R_m$ and $D_1, D_2, \ldots, D_n$ be the nodes of a FRM with feedback. Let E be the relational matrix. Let us find a hidden pattern when D_1 is switched on i.e. when an input is given as vector $A_1 = (1, 0, \ldots, 0)$ in D_1, the data should pass through the relational matrix E. This is done by multiplying A_1 with the relational matrix E. Let $A_1E = (r_1, r_2, \ldots, r_m)$, after thresholding and updating the resultant vector we get $A_1 E \in R$. Now let $B = A_1 E$ we pass on B into E^T and obtain BE^T. We

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update and threshold the vector BE^T, so that $BE^T \in D$. This procedure is repeated till we get a limit cycle or a fixed point.

III. DESCRIPTION OF THE STUDY

The expert's opinion on the personality types are not statistical model in nature. That makes the study more complex and difficult to make use of other mathematical model like data interpretation and operational research, etc.

The subject is linguistic in nature and does not have the mathematical or statistical data associated with it. In this study, the influence of personality in building work life balance is analyzed using Fuzzy Relational Maps.The experts' opinions are taken to study the impact of personalities on work life balance issues using FRM. The following attributes are taken as the nodes of the domain space of FRM. $D = \{D_1, D_2, D_3, D_4, D_5\}$ where D_1, D_2, D_3, D_4, D_5 are described as

D_1 – Openness
D_2 – Neuroticism
D_3 – Extraversion
D_4 – Conscientiousness
D_5 – Agreeableness

The attributes taken for the range space are $\{R_1, R_2, R_3, R_4, R_5, R_6, R_7, R_8, R_9, R_{10}\}$ where $R_1, R_2, R_3, R_4, R_5, R_6, R_7, R_8, R_9, R_{10}$ are listed below.

R_1 – Good in coping skills
R_2 – Compassionate towards spouse
R_3 – Spending time with family
R_4 – Time management
R_5 – Social involvement
R_6 – Physically and mentally well being
R_7 – Child care
R_8 – Spend time for hobbies
R_9 – Having fun in leisure time
R_{10} – Emotionally balanced

The related graph based on the experts' opinion is given in Figure 3.1

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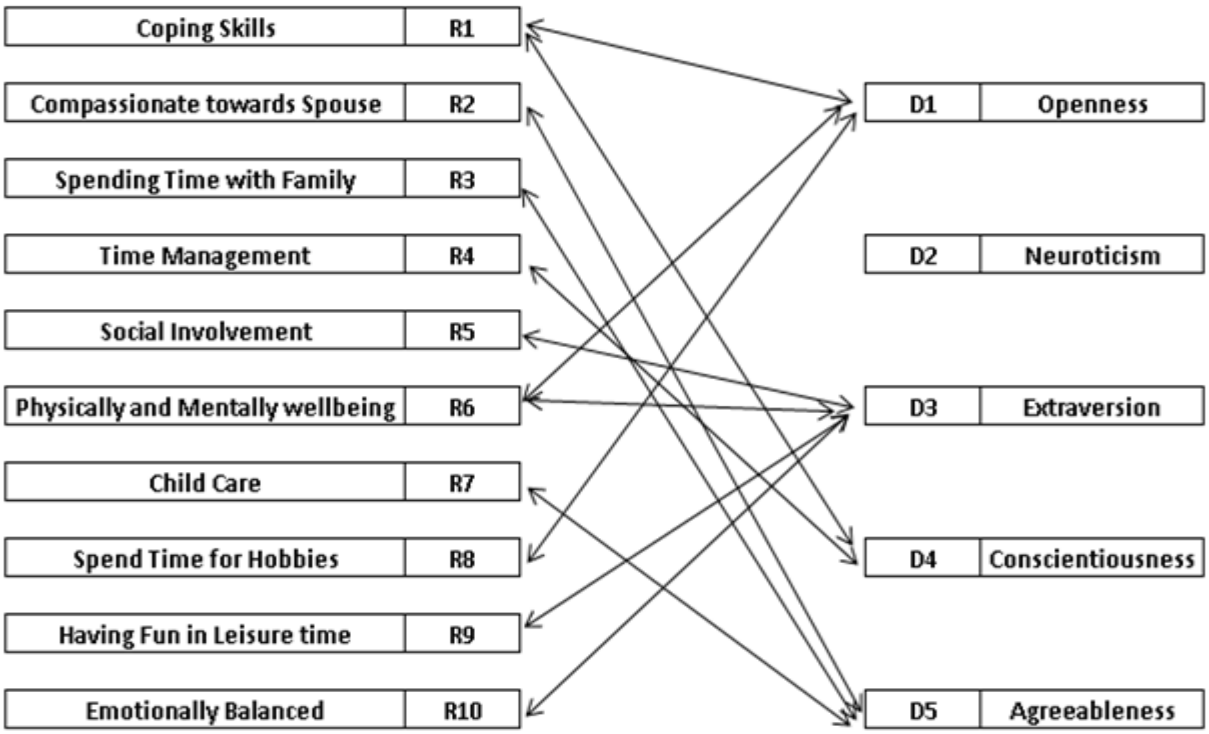

Figure 3.1 Illustrates the related graph given by experts

A. Determining the hidden pattern of the model

The related matrix E of the directed graph given in Figure 2 is as follows

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	R_1	R_2	R_3	R_4	R_5	R_6	R_7	R_8	R_9	R_{10}
D_1	1	0	0	0	0	1	0	1	0	0
D_2	0	0	0	0	0	0	0	0	0	0
D_3	0	0	0	0	1	1	0	0	1	1
D_4	1	0	0	1	0	0	0	0	0	0
D_5	0	1	1	0	0	0	1	0	0	0

The attributes associated with personality are taken as the rows of the matrix E and attributes associated with work life balance characteristics are taken as the columns of the matrix. Thus we obtain a 5 × 10 related matrix of the directed graph. In order to study the effect of each attribute on the dynamical system E, the hidden pattern of the dynamical system E (related matrix) for each state vector is to be found.Suppose node D_1 is in the on state i.e., the personality Openness is in the on state and all other nodes are in off state, the effect of the state vector X = (1 0 0 0 0) on the dynamical system E is given as follows:

X = (1 0 0 0 0)
XE ↪ (1 0 0 0 0 1 0 1 0 0) = Y say
YE^T ↪ (1 0 1 1 0) = X_1 say
X_1E ↪ (1 0 0 1 1 1 0 1 1 1) = Y_1 say
Y_1E^T ↪ (1 0 1 1 1) = X_2 say
X_2E ↪ (1 1 1 1 1 1 1 1 1 1) = Y_2 say
Y_2E^T ↪ (1 0 1 1 1) = X_3 say = X_2

The resultant vector is a fixed point given by the binary pair {(1 0 1 1 1), (1 1 1 1 1 1 1 1 1 1) }. This resultant vector shows that all nodes in the domain space except the node D_2 and all the nodes in the range space are in the on state.
Now consider the node D_2 is in the on state i.e., the personality Neuroticism is in the on state and all other attributes are in off state. Let the state vector of this node is C = (0 1 0 0 0).

The effect of C on E is as follows
C = (0 1 0 0 0)
CE ↪ (0 0 0 0 0 0 0 0 0 0) = K say
KE^T ↪ (0 0 0 0 0) = C_1 sayThe resultant vector is the fixed vector given by the binary pair {(0 0 0 0 0), (0 0 0 0 0 0 0 0 0 0) }. This shows all the nodes in the domain and the range space are in the off state.Suppose to find the effect of the node D_3 on the dynamical system E, let the state vector be A = (0 0 1 0 0). i.e, the personality Extraversion is in the on state and all other nodes are in off state. The effect of A on E is given by

A ↪ (0 0 1 0 0)
AE ↪ (0 0 0 0 1 1 0 0 1 1) = B say
BE^T ↪ (1 0 1 0 0) = A_1 say
A_1E ↪ (1 0 0 0 1 1 0 1 1 1) = B_1 say
B_1E^T ↪ (1 0 1 1 0) = A_2 say
A_2E ↪ (1 0 0 1 1 1 0 1 1 1) = B_2 say
B_2E^T ↪ (1 0 1 1 0) = A_3 say = A_2
Thus the fixed point is a binary pair given by {(1 0 1 1 0), (1 0 0 1 1 1 0 1 1 1) }. The on state of D_3 makes R_1, R_4, R_5, R_6, R_8, R_9, R_{10}, D_1 and D_4 on state.Now to study the effect of the state vector G = (0 0 0 1 0) i.e., only the node D_4 is in the on state and all other nodes in the off state. The effect of the personality Conscientiousness on the dynamical system E is given by

G ↪ (0 0 0 1 0)
GE ↪ (1 0 0 1 0 0 0 0 0 0) = H say
HE^T ↪ (1 0 0 1 0) = G_1 say
G_1E ↪ (1 0 0 1 0 1 0 1 0 0) = H_1 say
H_1E^T ↪ (1 0 1 1 0) = G_2 say
G_2E ↪ (1 0 0 1 1 1 0 1 1 1) = H_2 say
H_2E^T ↪ (1 0 1 1 0) = G_3 say = G_2

Thus the hidden pattern is a fixed point of the dynamical system given by the binary pair {(1 0 1 1 0), (1 0 0 1 1 1 0 1 1 1)}. Now consider the node D_5 is in the on state i.e., the personality Agreeableness is in the on state and all other attributes are in off state. Let the state vector of this node is R = (0 0 0 0 1).

R ↪ (0 0 0 1 0)
RE ↪ (1 0 0 1 0 0 0 0 0 0) = S say
SE^T ↪ (1 0 0 1 0) = R_1 say = R
The hidden pattern of the dynamical system is a fixed point given by the pair {(1 0 0 1 0), (1 0 0 1 0 0 0 0 0 0)}.

IV. RESULTS AND DISCUSSIONS

The result of the study indicates that the on state of the personality openness in the domain space leads to the on state of all the work life balance characteristics in the range space. Next to openness the personality conscientiousness and extraversion each makes seven of the attributes in the range space to on state. The on state of the personality agreeableness leads to the on state of just two attributes in the range space. Finally the on state of the personality neuroticism has no role to play in building work life balance since it leads to the off state of all the attributes in the range space.

V. CONCLUSION

The result provides clear evidence that the personality type 'openness' is able to strike a proper balance between work and life, this is due to the positive impact of the personality at work and family. Also, neuroticism is in a bad shape of maintaining a balance between work and life. Hence, it is concluded that the personality type 'neuroticism' is more vulnerable to work life imbalance.A broad area of personality type behavioral difference at work and outside of work still left unstudied. It is noticeable that each personality behavior is not unique at work and outside of work. This is making the analysis of psychometric tests to be more complex than it appears. This area can be studied to find out which personality tends to show more difference at professional and personal life and which personality shows less difference.

REFERENCES

[1]Adrian Furnham, " Personality at Work: The Role of Individual Differences in the Workplace" (1994).
[2]Chan Suk-fun, Isabella, "Work life balance: A study on the effect of conflict and facilitation amongst life roles on psychological well being and quality of life of individuals in Hong Kong"(2007).
[3]Clifford Morgan, Richard King, John Weisz, John Schopler, "Introduction to psychology" McGraw- Hill Education (India) Pvt Limited, (2001).
[4]Fiona Jones, Ronald Burke and Mina Westman**, "**Work-Life Balance: A Psychological Perspective". Psychology press (UK), (2006).
[5]Frank Bauer, Hermann Grob, Gwen Oliver, Georg Sieglen, Mark Smith "Time use and work–life balance in Germany and the UK".(July 2007)
[6]Jim Taylor,. Work life balance: http://www.psychologytoday.com/blog/thepower-prime/2009/business-worklife-balance-part-i ,(2009)

International Journal of Data Mining Techniques and Applications
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ISSN: 2278-2419

[7] Jerry S. Wiggins, "The Five-Factor Model of Personality: Theoretical Perspectives". (1996).
[8]Mohammad Niaz Asadullah and Rosa M. Fernández, **"**Work-Life Balance Practices and the Gender Gap in Job Satisfaction in the UK: Evidence from Matched Employer-Employee Data"(2008).
[9]Morgan and King C.T, "Introduction To Psychology". Tata McGraw-Hill Education (2001).
[10]Niharika Doble and Supriya, M.V, "Gender differences in the perception of work life balance".(2010)
[11]Vasantha Kandasamy W.B, Florentin Smarandache and Ilanthenral, "Elementary fuzzy matrix theory and fuzzy models for social scientists".(2007).
[12]Vasantha Kandasamy W.B and Florentin Smarandache, "Analysis of social aspects of migrant labourers living with HIV/AIDS using fuzzy theory and neutrosophic cognitive maps"(2004).
[13]Vasantha Kandasamy W.B and Florentin Smarandache, "Fuzzy and Neutrosophic Analysis of Women with HIV/AIDS" (2005).
[14]Big five factor personality traits: http://www.psychometric-success.com/personality
[15]Big five personality aspects: http://www.themotivator.in/bigfive_Profile.pdf