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Employee retention in post COVID scenario: A graph theoretic approach

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Abstract---The impacts of COVID-19 on employees and workplaces across the globe have been dramatic. There is a major shift in work practices and employees' mind-sets like working from home, virtual teamwork, social distancing, stress, and unemployment. Human resource is the active factor on which the success and failure of an organization are dependent and organizations are striving hardtop in maintaining and motivating a talented pool of employees to save on their cost, time, efficiency, and effectiveness. The present research aims to study the employee retention in the ITeS sector in the post-Covid scenario i.e., after the second wave when the turnover rate of employees was very high due to varied reasons like high demand for IT professionals, data security, and privacy, etc. Data was collected using a self-administered questionnaire, circulated through the mail, Google links, WhatsApp and LinkedIn. A graph-theoretical approach is used to analyze the retention of employees in the ITeS sector to obtain an employee retention index which helped in comparing the retention of employees within the industry and outside the industry.

Keywords---employee retention, IT enabled services (ITeS), virtual team work, digraph matrix, permanent matrix, employee retention index.

Introduction

During COVID-19 outburst, lakhs of people started facing severe health issues and death rates augmented. Lockdown was imposed all across the globe resultant all industries were completely stopped. The lockdown wedged almost all sectors in

varied degree e.g., the airlines; hospitality, hotel, manufacturing industry etc. were completely stopped and will take a long time to come out of this situation. Millions of people in these sectors lost their jobs. To get over the situation, companies operated their offices in “Work from Home” mode. Even today companies are coping with economic turbulence caused due to COVID 19. The biggest business change that is seen today, is forced by the global spread of the pandemic, is that many companies have implemented Work from Home mode for their employees. Post Covid Scenario, companies have found significant shift in employees from one company to another or from one job to another job.

As businesses in India rebound from the impact of the pandemic, changes to their talent strategy are helping to bolster recovery not only within their organisation but also in the overall ITeS job market. As per Recruitment Outlook (2022) survey there is 47% surge in candidate's withdrawal rate post Covid 19. Employees are the pillar of an organisation and their presence is indispensable for them. Lot many companies took serious measures to retain employees and maintain a healthy output with their employees (Bisht, Chaubey & Thapliyal, 2016). The employee retention is directly associated with the policies made and executed by the HR Department of a company. It is obligatory for an organization to deliver their every employee the mean to placate their requirements professionally and ethically. Employee retention is an important aspect of Human capital management, and also for performance and success of an organisation.

When the pandemic end, we had seen a new world, a new lexicon, a new social norm with far reaching economic and social destruction. Especially during second wave of Covid'19 pandemic i.e. from May 2021 to Nov. 2021, employees became more strategic asset for any organization that has to be managed, well-looked-after and engaged, with focus on experienced and skilled ones. When employees feel dissatisfied with the current job, because of lack of several variables, organizations lose their invested resources for competitors. Employees organizational relationship are then dented and more over the morale goes down radically, which leads directly to low level of retention.

Elsafty (2018) (2019) proposed a 9-element model to analyze and define business anatomical models in business element research work. The model is clearly presented online (Elsafty, Dr. Ashraf Elsafty Channel, 2020), and the two published papers used the 9-element model (Elsafty, Elsayed and Shaaban, Egyptian student technical education). According to Elsafty, for proper and effective research, one need to consider 9 factors that determine the business structure to be included in this business analysis and review. 9 elements helps to understand and integrate all functions of business and management (Elsafty, Business Research Methodology, 2019), which is used to analyze and present the context and the introduction for the current research.

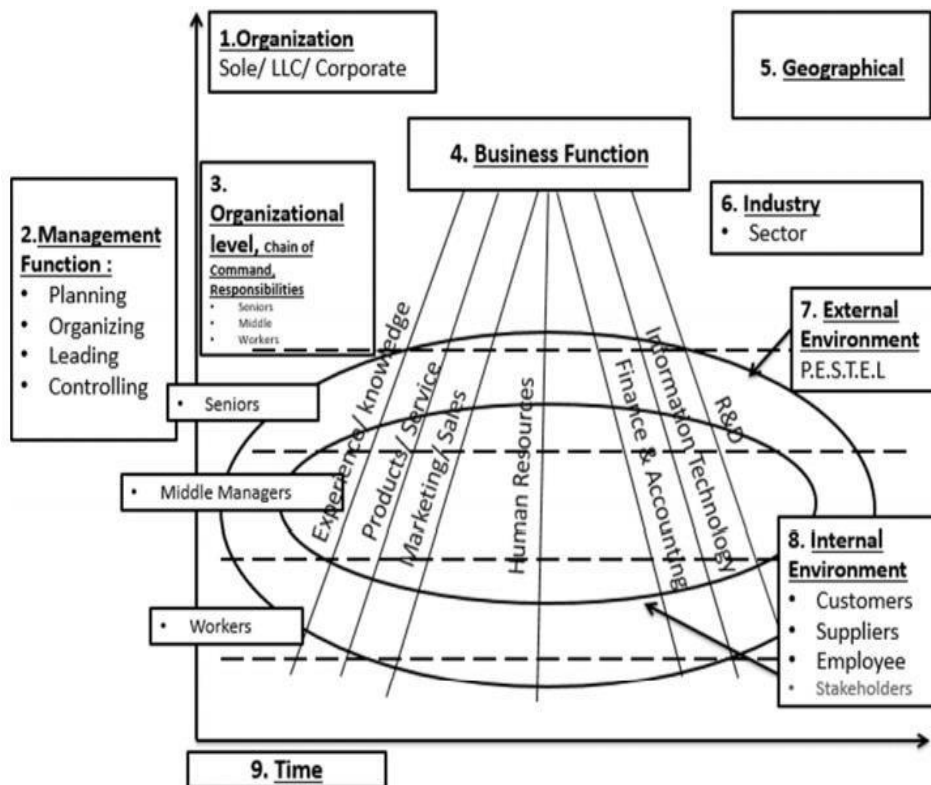


Fig 1: The 9 elements model proposed by Elsafty (2018)

The organisations track the employee turnover rate continuously and manage it. The ITeS sector, uses the applications of information technology for delegating business processes to a third external party, which may perform all or few functions of the organisation. Organisations contract with the ITeS for Back office and Front office operations. Back-office operations include quality management, payments, information technology services whereas front office operations include marketing, sales etc. Organisations outsource for cost saving, increasing efficiency, and to focus on their specialised skills rather than concentrating on all function of the organisation.

In this study the employee retention in ITeS sector in post Covid scenario is analysed through the relationship between various factors influencing employee retention obtained through factor analysis. The relationship is established using secondary data and derived relationship is used to form a matrix and lastly the permanent of this matrix is obtained to get the employee retention index in selected ITeS firms.

Literature Review

Regus states that the current generation of employees look for more autonomy towards where, when and how they work. This autonomy is determined by the “physical and psychological” need to stable their work-life balance They expect that such balance will help them to lessen their stress, burnout and eventually

enhance their job performance. COVID 19 has taught them about the, flexible work arrangements which gives flexibility and choice of control to the employees, where employees are permitted to adjust their working hours and the place of work. Flexible Work Arrangement helps employees to handle competing stresses between home and work demands by refining employees' experience of the interaction between their work and personal roles.

Employee Retention and ITes Industry

86% of employers experience difficulty attracting new employees and 58% experienced difficulty retaining their employees (Hales, 2021). In the study by Eva Kyndt et.al (2019) an analysis was done on 360 employees to ascertain the factors influencing employee retention during and post COVID and explored the factors of retention as hybrid work culture, work life balance, appreciation and stimulation, leadership skills, work pressure, and learning attitude. It was also found that the employees can be retained through appreciation and supportive leadership style. Robert Eisenberger et.al (2020) explored the relationships among employees' perception of supervisor support (PSS), perceived organizational support (POS), and employee turnover. It was found that PSS leads to POS after analysing the responses of 314 employees of different organisations. Responses of another 300 retail sales employees ascertained that the PSS-POS relationship increased with perceived supervisor status in the concerned organisation. With 493 retail sales employees responses it was found that POS completely mediated a negative relationship between PSS and employee turnover. These studies suggest that supervisors, to the extent that they are identified with the organization, contribute to POS and, ultimately, to job retention. A study by Sunil Ramlall (2013) explored the factors influencing employee retention and various strategies that can be used to retain the employees. James & Mathew (2020) found that if an employee leaves the organisation, it's a loss to the organisation. An organisation should develop different strategies for retaining its employees. The study by Diwakar Singh (2019) reveals that the organizations are developing different initiatives for employee retention. The study shows that the manager need to explore and understand the reason of employees leaving the organisation.

Applications of Graph Theory

GTMA (Graph theory matrix approach) is a decision-making tool (Geetha and Sekar, 2017) which helps in systematic and logical decision making by analysing the different aspects of a system. Rao and Padmanabhan (2007) used GTMA in rapid prototype selection and Blazewich et al. (2005) have used it for web mining and data analysis. This approach has been applied in areas like contractor rating (Darvish et al., 2008), TQM evaluation (Grover et al, 2006), supply chain risk mitigation (Faisal et al., 2007), explore the customer preferences in construction industry (R. Muruganandham et.al 2018)

Graph theoretic approach is a tool of multiple utility for application in various fields. Gandhi and Agrawal (1996) explained Graph theoretic approach as a systematic and logical approach that can be applied in various disciplines to make and analyse systems. It consists of using 'Digraph representation', 'Matrix

representation' and 'Permanent function' in a systematic way. Through Permanent function a Single Numerical Index is obtained. Graph theoretic approach is suitable for visual analysis and can be computer processed as a mathematical entity.

In 1736, graph theory, a mathematical tool, was employed for the long-standing problem of the Kongsberg Bridge by Leonard Euler. Subsequently, the graph theory has been applied in various fields of engineering such as physics, chemistry, mathematics, electrical engineering, sociology, computer technology, economics, operation research, linguistics etc. Digraphs under the name sociograms have been used to represent relationship among individuals in a society (or group). The areas in which the Graph Theory is applied in last decade are listed in the Table No.1 (Application of Graph Theory).

Table 1: Application of Graph Theory

S.No	Areas of Application	Researchers
1	Determining the Adoption Index of Electric Vehicles Using Graph Theory Matrix Approach	P. Goyal, P. Chhura, V. Khandelwal and S. Agrawal (2020)
2	"Developing a framework for evaluating sustainability index for logistics service providers: graph theory matrix approach	Gupta, A. and Singh, R.K. (2020)
3	Application of Graph Theory and Matrix Approach as Decision Analysis Tool for Smartphone Selection	Sumarni Abu Bakar et.al (2019)
4	Applying Graph Theory Matrix Approach method to identify the major influencing factor for customer preferences in construction industry	R. Muruganandham et.al (2018)
5	Determination of attributes permanent index on a compression ignition engine using graph theory matrix approach	N. K. Geetha and P. Sekar (2016)
6	Graph theoretic approach for evaluating Technology based self-service banking (TBSSB) service quality	Sindwani, Rajiv and Goel, Manisha (2015)
7	A graph theoretic approach to evaluate the intensity of barriers in the implementation of total productive maintenance (TPM)	Rajesh Attri, Nikhil Dev and Sandeep Grover (2014)
8	Assessment and selection of vendor in a manufacturing organisation – a graph theoretic approach	Mohit singh, I.A. Khan and Sandeep Grover (2013)
9	Development and comparison of quality award: based on existing quality awards	Mohit singh, I.A. Khan and Sandeep Grover (2012)
10	Quantitative Evaluation of Website Quality Dimension for Web 2.0 Environment	Saha and Grover (2011)
11	Digraph and matrix method to evaluate the	Jangra et. al.(2011)

	machinability of tungsten carbide composite with wire EDM	
12	Customer sensitivity and risk in supply chains	Faisal et. al. (2011)

Source: Secondary Data

Research Gap

Through the literature review, it can be concluded that employee retention is an important aspect for organisations' success and enhancing employees' performance. Several studies have been conducted during/post COVID scenario, on employee retention and factors influencing the same. The studies clearly showed that ITes sector is facing a high attrition problem after first Covid wave is over due to several reasons. Retaining employee is important for an organisation and moreover when ITes industry is facing shortage of skilled manpower, it is far more important to obtain the employee retention index.

Objectives of study

The present study aims to explore the different factors influencing employee retention in ITes Post Covid and to use these factors for framing a mathematical model, obtaining retention index related to employee retention by applying digraph theory.

Research Methodology

Research Design

The study is an exploratory and empirical in nature. The detailed study is performed and used for developing an employee retention index.

Data Collection Methods

The data was collected through primary and secondary sources. The primary data was collected through a structured questionnaire designed for this purpose using Google forms, E-mails, Whats App, linked In etc. The secondary data was obtained from the various websites such as Scopus, Research gate, Google scholar and print media. Self-administered questionnaire was designed to collect data from respondents and SPSS 20.0 Version was used for data analysis purpose.

Table 2: Reliability Test

Kaiser- Meyer – Olkin Measure of Sampling Adequacy	0.873
Barlett's Test of Sphericity	0.000 Sig.
Cronbach's Alpha of the scale	0.81

Cronbach's alpha test was applied to test the reliability (0.81) of the questionnaire. The result of Cronbach's alpha test shows that the variables are

reliable and can be used for further study. The data was collected using random sampling method from the middle management employees of ITeS situated in Delhi i.e Capital of India.

Sample Size and Scope of the study

For collecting the data, 350 questionnaires were distributed and 260 questionnaires were received back, making a response rate of 80 percent, which is an acceptable percentage (Nulty, 2008). Out of which 250 questionnaires were found to be useful for further analysis. The recommended sample size is 250 participants (Combrey and Lee, 1992). The Kaiser– Meyer–Oklin (KMO) value is 0.873, which is higher than the recommended minimum of 0.5 (Field, 2005) indicating that the sample size is adequate for applying factor analysis. Barlett's test of sphericity was found to be significant, supporting the factorability of the correlation matrix and hence factor analysis is performed for finding the factors.

Analysis and Interpretation

Demographic analysis

The data collected in response to the 82 variables (in the questionnaire) was used to find the factors influencing employee retention in ITeS sector through Exploratory factor analysis (EFA), as shown in Table 2.

Table 3: Demographic variables

Demographic Variables	Categories	No. of Respondents	%age
Gender	Male	129	51.6
	Female	121	48.4
Age (in years)	Below 21	8	3.2
	Between 21-25	107	42.8
	Between 26-30	82	32.8
	Between 31-35	40	16.0
	Between 36-40	13	5.2
Total experience (in years)	Less than one year	42	16.8
	Between 1-3 years	49	19.6
	Between 3-5 years	103	41.2
	Above 5 years	56	22.4
Qualification	Graduate	106	42.4
	Post Graduate	129	51.6
	Diploma Holders	15	6.0
Association with the organisation (in years)	Less Than one Year	59	23.6
	Between 1-2 Years	54	21.6
	Between 2-3 Years	116	46.4
	More Than 3 Years	21	8.4
Type of ITES	Domestic	40	16.0
	International	210	84.0

Source: Primary Data

The present study makes extensive use of primary data gathered from 250 middle management employees serving in different organisations. The respondents were

between 20-40 years of age. Out of the total sample the respondents were found to be in the ratio of 51.6: 48.4 percent on gender basis i.e. the majority of the respondents were male. 51.6 percent of the respondents were Post Graduates and 42.4 percent were simply graduates whereas only 6 percent were holding diplomas of their concerned job fields. Total work experience of the respondents was also divided in to four categories with 41.2 percent falling in to the category of 3-5 years of experience, of which 46.4 percent had an experience of between 2-3 years in the present organisation. Further 23.6 percent had less than one year experience in the present organisation.

Table 4 depicts the factors obtained after using EFA approach, affecting employee retention post covid.

Table 4: Factors affecting employee retention Post Covid

Factors No.	Rank	Factors affecting Employee Retention	Mean	Std. Dev.
F1	II	Work Life Integration	4.25	0.473
F2	XIV	Group conformity and Team work	3.18	1.291
F3	XVIII	Proper matching between job and the person	2.90	1.505
F4	III	Rewards and Recognition	4.19	0.487
F5	IV	Compensation and Flexible Benefits	4.12	0.760
F6	XII	Employee Involvement	3.34	0.374
F7	VII	Career Advancement & Promotion Opportunities	3.84	0.656
F8	XIX	Fringe Benefits	2.88	0.961
F9	XX	Innovation	1.65	0.531
F10	XIII	Work place	3.27	0.765
F11	VIII	Supportive Leadership	3.75	0.801
F12	X	Overall effectiveness	3.64	1.254
F13	IX	Feedback and Performance Appraisal	3.74	0.918
F14	XI	Job Clarity	3.59	1.148
F15	XVII	Job Satisfaction	3.04	1.222
F16	XV	Job Security and Safety	3.08	0.853
F17	XVI	Transparency	3.08	0.853
F18	I	Organisation culture	4.29	0.501
F19	VI	Employee Training	3.86	1.504
F20	V	Information Management & Communication	3.90	0.750

Source: Primary Data

Application of Graph Theoretical Matrix Approach (GTMA)

The factors influencing employee retention in ITeS sector obtained through Exploratory factor analysis (EFA) are used through Graph Theory Matrix Approach (GTMA) to obtain the employee retention index.

GTMA has the following steps: (i) Digraph Representation (ii) Matrix Representation (iii) Permanent function Representation

Digraph Representation

The first step is to establish the interrelationships amongst the factors influencing retention of employees in ITeS sector. These interrelationships are established on the basis of secondary research and these interrelationships are illustrated through a digraph. A Digraph is a directed graph, it is prepared through the interrelationships among the factors. The representation is done in terms of nodes and edges. The nodes represent the factors and edges represent their interdependence. A node F_i represents the i th factor and the edges F_{ij} represent the interdependence between the factors.

For the Digraph the factors having high influence (having mean value more than equal to 3.75) on the retention of employees in ITeS sector are used for illustration. Factors used and their representation in the digraph is shown in the Table 5.

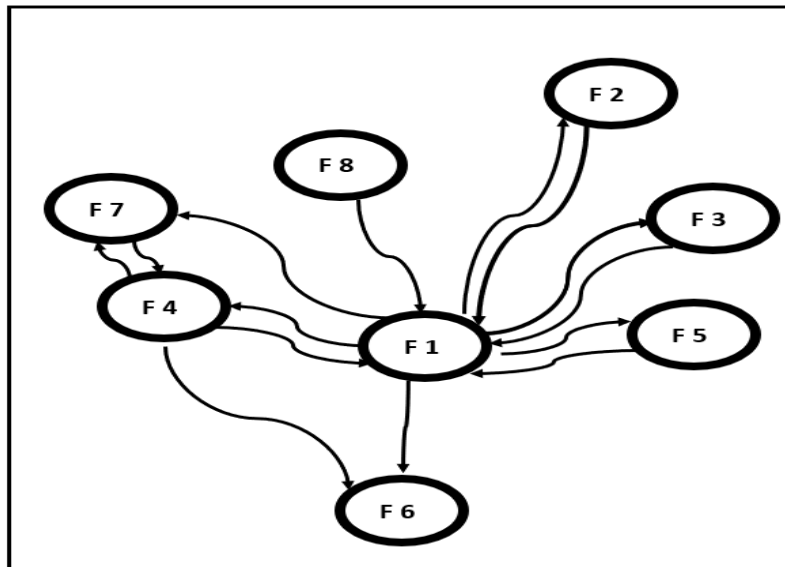
Table 5: Factors adopted for Digraph representation

Factor Representation	Factor Name	Mean Value
F1	Organisation culture	4.29
F2	Work Life Integration	4.25
F3	Rewards and Recognition	4.19
F4	Compensation and Flexible Benefits	4.12
F5	Information Management and	3.90
F6	Employee Training	3.86
F7	Career Advancement and Promotion	3.84
F8	Supportive Leadership	3.75

Source: Primary Data

In Digraph Figure 2, the arrow direction from one node (Factor) to the other node (Factor) shows the dependence of one factor on other factor. The factors influencing employee retention are related to each other. Also each of the factors has an influence on itself, as each factor has sub factors which are interrelated with each other. The relationships of the factors are as follows

Digraph Fig. 2: Employee Retention ITES Sector Post Covid Scenario



Factor F1: Organization Culture

Organization culture represents the values and beliefs on which the entire procedures of the organization are based. The culture of the organisation is critical component to attract good talent. This helps in retention of employees. This factor is represented by F1. Factor F1 is interrelated with Factor F2 (Work Life Integration), as culture of the organization impacts the balance between the personal and professional life of the employees. The Factor F3 (Rewards & recognition) influences F1 and is influenced by F1, as the need of employee motivation and retention leads to the development of a culture in the organization to reward and recognize efficient employees.

F1 influences F4 (compensation and benefits management), it's the specific aspect of an organization to design the compensation of its employees. Compensation policies have an impact on the organization culture as well as employee motivation. Factor F1 influences the F5 (Information management and communication), the way the information is managed in an organization influences the organization culture. Factor F6 (Employee training) is influenced by F1, as it is the culture of the organization which depicts the need of employee training from time to time. Lastly, it's the organization culture F1 which influences the career and promotion opportunities of employees of the organization.

Factor F2: Work Life Integration

ITeS jobs are highly stressful and the fact that mostly graveyard shifts doesn't make the matters easy. Employees suffer from exhaustion and burnout. Experts agrees that a night's sleep is always better for the body than a fitful sleep during

the day. For this reason, employees working night shifts develop medical complications. They suffer from anxiety, indigestion and other stress-related issues. They must work together to find the optimal balance between the organisations and individual's need. This requires support from all levels of the organisation to analyze the current strategy and identify innovative enhancements. When work begins to put pressure on one family, no pay package will keep an employee in the organisation. Therefore, there should be a balance between work and personal life. Factor F2 influences organisation culture F1 and simultaneously gets influenced by organisation culture.

Factor F3: Rewards and Recognition

Rewards and Recognition are tools for acknowledgement of the worth of its employees by the organisation. There is no more emotionally charged issue for employees than what they are paid for their contributions, especially when people are paid differently than just distributing generic items. Factor F3 influences (organisational culture) F1 and gets influenced by F1.

Factor F4: Compensation and Flexible Benefits

Although pay is not the prime motivator, it definitely influences one's decision to stay in the organisation or not, especially when it is not competitive. Employees also agree with the fact that if the pay levels do not match others or the best in the industry, it becomes the source of dissatisfaction. It is just like a hygiene factor of the Maslow's Need Hierarchy theory of motivation, presence does not make much difference but absence creates dissatisfaction. Apart from offering competitive salaries, introducing variable pay component in the total compensation package acts a morale booster for superior performers. Flexible pay system in which all the employees can design their own compensation package based on their individual needs like car, furnishings etc. also act as a stimulator and helps employees to design their own compensation as per their needs. Completely restructuring of a payroll is not a constant activity hence the employees feel that the best option is to move on to a place where they can get a better pay. F4 influences organisational culture (F1) and are influenced by F1.

Factor F5: Information Management and Communication

Transparencies in dealing as well as involvement in decision making are important communication channels that need to be open at all times. It is vital for resources to be aware of the directions that are being taken not only in their unit but also to be aware of the directions that are being taken not only in their unit, but also across the organization. As already discussed, F5 influences organization culture (F1) and is influenced by F1.

Factor F6: Employee Training

Training is an ongoing process improves the job incumbent's knowledge, skill and abilities. Successfully planning and implementing the employee training programme will help the organisation in reducing the employee turnover. Lastly, due to increasing pressure to maintain healthy bottom line, companies are keen

to encourage training as an investment proposition because the ROI on training is quite justified and warranted. F6 is influenced by organizational culture (F1), as it depends on the culture of the organisation to provide training to the employees for their upgradation.

Factor F7: Career Advancement and Promotion Opportunities

Opportunities to learn and grow are powerful motivators to inspire talented workforce. When work allows employees to use their minds, acquire new skills, and face situations that enables them to grow, they become enthusiastic about the work. The next factor of employee satisfaction with the policies and systems of the organization is Career Advancement and Promotion Opportunities. Transparent promotion policies facilitate the employees up to a great extent and enhance their satisfaction level. F7 is influenced by organizational culture (F1), as Career advancement and promotion opportunities depends on the policies of the organization and the type of the organization. Further F7 influences compensation and benefits management (F4), as with each advancement in career or with promotion, the compensation and benefits are increased. F7 is influenced by F4.

Factor F8: Supportive Leadership

Low perception of team leader support is one of the major determinants of employee intention to quit. Dissatisfaction in regard to this factor clearly indicates that “People leave bosses not organizations.” When leaders don’t appreciate his team member for his work, he feels lack of enthusiasm for the work performed and this appears to be the result of negative perception of procedural justice and the perceived lack of promotional opportunity that exists within the organization. A leader should value individual differences as each employee has its own strengths and weaknesses and have separate desires. So they should be dealt differently. Proper handling of each person and knowing traits and assets as well as boosting them to overcome drawbacks, identifying areas of improvement and mentoring them through the same are all important tasks to be carried out by team leaders/middle management. F8 influences the organization culture(F1). The main factor influencing the retention of the employees is organization culture(F1). All the eight factors are related to themselves as each factor is having subfactors which are related to each other.

Matrix representation

The second step of GTMA is the preparation of Matrix. Digraph is an illustration depicting relationship between factors influencing retention of employees. Through the digraph, matrices representing relationship between the factors influencing employee retention in ITes sector is prepared.

For matrix of employee retention (ER) representation the following aspects are followed: The factor F1 is represented by ‘A’, F 2 by ‘B’, F 3 by ‘C’, F 4 by ‘D’, F 5 by ‘E’, F6 by ‘F’, F 7 by ‘G’, F 8 by ‘H’, F 9 by ‘I’, F 10 by ‘J’, F 11 by ‘K’ and F 12 by ‘L’. Dependence of one factor on the other is represented by the numerical value in the subscript like the example: A₁, it means relationship of F1 with F1

(i.e., itself), A_2 is relationship of F 1 with F 2, A_3 is relationship of F 1 with F 3. '0' in the matrix represents 'no relationship' between the factors.

$$ER = \begin{matrix} & \begin{matrix} F1 & F2 & F3 & F4 & F5 & F6 & F7 & F8 \end{matrix} \\ \begin{matrix} F1 \\ F2 \\ F3 \\ F4 \\ F5 \\ F6 \\ F7 \\ F8 \end{matrix} & \left(\begin{matrix} A_1 & A & A_3 & A_4 & A_5 & A_6 & A_7 & 0 \\ B_1 & B_2 & 0 & 0 & 0 & 0 & 0 & 0 \\ C_1 & 0 & C_3 & 0 & 0 & 0 & 0 & 0 \\ D_1 & 0 & 0 & D_4 & 0 & D_6 & 0 & 0 \\ E_1 & 0 & 0 & 0 & E_5 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & F_6 & 0 & 0 \\ 0 & 0 & 0 & G_4 & 0 & 0 & G_7 & 0 \\ H_1 & 0 & 0 & 0 & 0 & 0 & 0 & H_8 \end{matrix} \right) \end{matrix}$$

The matrix ER is formed on the basis of the relationship amongst the factors as depicted in digraph. After the matrix is prepared, the values of extent of relationships between the factors (on scale of 5), is placed in the matrix. Now the matrix comes out to be as follows:

$$ER = \begin{matrix} & \begin{matrix} F1 & F2 & F3 & F4 & F5 & F6 & F7 & F8 \end{matrix} \\ \begin{matrix} F1 \\ F2 \\ F3 \\ F4 \\ F5 \\ F6 \\ F7 \\ F8 \end{matrix} & \left(\begin{matrix} 5 & 3 & 5 & 5 & 4 & 5 & 3 & 0 \\ 5 & 5 & 0 & 0 & 0 & 0 & 0 & 0 \\ 3 & 0 & 5 & 0 & 0 & 0 & 0 & 0 \\ 3 & 0 & 0 & 5 & 0 & 4 & 0 & 0 \\ 4 & 0 & 0 & 0 & 5 & 0 & 0 & 0 \\ 5 & 0 & 0 & 0 & 0 & 5 & 0 & 0 \\ 0 & 0 & 0 & 5 & 0 & 0 & 5 & 0 \\ 5 & 0 & 0 & 0 & 0 & 0 & 0 & 5 \end{matrix} \right) \end{matrix}$$

Permanent Function Representation

The next step is to evaluate the permanent of the matrix. The permanent is calculated as follows :

$$\text{perm} \begin{pmatrix} a & b & c \\ d & e & f \\ g & h & i \end{pmatrix} = aei + bfg + cdh + ceg + bdi + afh.$$

Employee retention index for the matrix ER is calculated as follows

$$\text{Perma ER} = \begin{matrix} & \begin{matrix} \text{F1} & \text{F2} & \text{F3} & \text{F4} & \text{F5} & \text{F6} & \text{F7} & \text{F8} \end{matrix} \\ \begin{matrix} \text{F1} \\ \text{F2} \\ \text{F3} \\ \text{F4} \\ \text{F5} \\ \text{F6} \\ \text{F7} \\ \text{F8} \end{matrix} & \left(\begin{array}{cccccccc} 5 & 3 & 5 & 5 & 4 & 5 & 3 & 0 \\ 5 & 5 & 0 & 0 & 0 & 0 & 0 & 0 \\ 3 & 0 & 5 & 0 & 0 & 0 & 0 & 0 \\ 3 & 0 & 0 & 5 & 0 & 4 & 0 & 0 \\ 4 & 0 & 0 & 0 & 5 & 0 & 0 & 0 \\ 5 & 0 & 0 & 0 & 0 & 5 & 0 & 0 \\ 0 & 0 & 0 & 5 & 0 & 0 & 5 & 0 \\ 5 & 0 & 0 & 0 & 0 & 0 & 0 & 5 \end{array} \right) \end{matrix}$$

ER Index = 2375000.

This ER index is the solution of permanent of matrix ER. The value of index obtained can be compared with value of permanent of the matrix ER maxima, which is having the maximum value of the relationship.

$$\text{PermaER max} = \begin{matrix} & \begin{matrix} \text{F1} & \text{F2} & \text{F3} & \text{F4} & \text{F5} & \text{F6} & \text{F7} & \text{F8} \end{matrix} \\ \begin{matrix} \text{F1} \\ \text{F2} \\ \text{F3} \\ \text{F4} \\ \text{F5} \\ \text{F6} \\ \text{F7} \\ \text{F8} \end{matrix} & \left(\begin{array}{cccccccc} 5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 \\ 5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 \\ 5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 \\ 5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 \\ 5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 \\ 5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 \\ 5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 \\ 5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 \end{array} \right) \end{matrix}$$

ER max index = 15750000000

Comparing the values of ER index and ER maxima index indicates the extent to which the employee retention can further be improved.

Implications of the Study

The study helps to quantify a qualitative aspect of employee retention in ITeS sector. This quantification may be useful for the management to determine the retention of the employees and also to further improve employee retention. The employee retention index obtained in this study can serve as effective tool for framing similar index in other industries also.

Limitations

The study is confined to the employees of ITeS organisations in Delhi/NCR of India. The results of the study are dependent on the sample of the study. The reason for an employee to leave or to remain in an organisation may vary from person to person.

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