Identification and Prioritization of Factors Affecting the Dropouts of the Employees: A case study of Fuzzy Analytic Hierarchy-Based Approach from Tehran

Davood Vahdat [1], Sevil farshid [2]

[1.] Lecturer, IT and Computer Engineering Department, Payame Noor University, 19395-4697, Tehran, Iran.
[2.] MSc. in Management of Information Technology, IT and Computer Engineering Department, Payame Noor University, 19395-4697, Tehran, Iran
se_farshid@yahoo.com

Abstract: If organizations wish to achieve their goals, they should have the capacity to attract, maintain and preserve their human resources. The desire to quit the job is one of the factors that make the organization face problems in achieving its goals. In this research, after the literature review and the background of the study, the dimensions and the components which force the employees to leave their jobs are identified. Then with the use of the fuzzy analytic hierarchy process (FAHP), the degree of importance of each of the components is specified. This research aims to determine the degree of importance of each of the factors causing the nurses to quit their jobs. The statistical population of this research consists of the nurses from the governmental hospitals of Tehran province. The findings of this study indicate that such factors as supervision style, job identity, job significance, job security, and salary have great effects on the decision of the nurses in the governmental hospitals of Tehran province to leave their jobs. It has also become known that the availability of resources, age and role conflict as well as role ambiguity have no significant influence on their decisions.

1. Introduction

One of the fundamental problems of organizations is the dropout of the employees especially the specialists. According to the organization managers and the human resources researchers, dropout is costly and problematic and this reduces the efficiency of the overall service of the organization. Thus, the topic of dropout of the employees has drawn the attention of researchers and managers in such a way that a huge number of studies have been conducted on the identification of the factors affecting the dropout of the employees. Quitting the job can represent a great social loss in terms of provision, training, social capital, replacement of the human workforce and many other side expenditures. Following these are the adverse effects on the morale and the efficiency of the remaining individuals in the organization (Mitchell, 1982).

Dropouts turn into a critical issue in a system of offering health and treatment services like in the nursing positions which bear commitment and liability just like other medical professions do for life settlement, securing health, prevention, controlling diseases, treatment and rehabilitation of personal, familial and social problems (Fletcher, 2001). One of the issues related to the dropout of the nurses is the high cost of training nurses. Nowadays, one of the points which is taken into consideration in planning

and budget allocation is whether it is economical to design and run a plan. If a project for the society is not economically and socially efficient, it is obvious that the planning department will never include it in its list of projects. However, there are some plans and programs which lack the economic outputs, but bear some social necessity. When the government invests in the nursing sector and trains nurses who should serve the country for 30 years, but the nurse quits her job, it clear that the economic resources are wasted in this way. Another issue of significant importance is that the ratio of the nurses to the hospital beds is low. This imposes an additional workload on the shoulders of the nurses and they choose to quit.

This research aims to study and determine the degree of importance of the factors which affect the dropouts in the employees. Considering the above-mentioned points and the importance of the nursing profession, this study reviews the effective factors in replacement and dropouts of the nurses in the governmental hospitals of Tehran province. The degree of importance of each of the factors will individually be specified. With respect to the determining factors in this study, it is expected that the people in charge will take the necessary measures to reduce the turnover among the nurses and increase the satisfaction level so that they will continue their service.

In order to investigate this issue, we need to make a series of comparisons for the different stages of the research. In order to make these comparisons among the various decision choices according to an index and in order to assess the importance of the decision index through the paired comparisons after the establishment of the hierarchy of the decision issue, the decision maker must determine the set of matrices which numerically measure the importance or the relative priority against each other and he should also determine each choice of decision based on the indices in comparison to other choices. This can be done through a paired comparison between the decision components (paired comparison) and through the allocation of numerical values which represent the priority or importance between the two components of decision. To do so, the choices comparisons with the indices of "i" against the choices with the indices of "j" are used. In Table 1, the method of valuing the indices has been comparably presented.

Table 1. Identification if the Fuzzy linguistic preference scale.

Verbal expressions for determination of priority	Fuzzy triangular number
Absolute importance or priority	(5.2, 3, 7.2)
Much higher importance or priority	(2, 5.2 , 3)
Higher importance or priority	(3.2, 2, 5.2)
Low importance or priority	(1, 3.2, 2)
Almost equal importance or priority	(1.2, 1, 3.2)
Absolutely equal importance or priority	(1, 1, 1)

2. Material and Methods

This research is an applied study in terms of the goal and a descriptive study in terms of the nature. The statistical population of this research consists of all the nurses in the governmental hospitals of Tehran province. As the size and the variance of the statistical population are not definite, the sample size has been estimated to be 1200 according to the sampling from an unlimited population and based on the following equation:

$$n = \frac{t_{\alpha/2}^t \cdot S^2}{\varepsilon^2}$$ and

$$\varepsilon = Z_{\alpha/2} \frac{\sigma}{\sqrt{n'}}$$

After reviewing the articles and the literature on this subject in order to determine the factors affecting the dropouts of the employees, four dimensions and thirty components were identified. Foloowing the interviews with the university professors and the nursing experts, the final research questionnaires were prepared based on four dimensions and twenty four components. The structure of the survey is based on Mqaysat paired value of analytic hierarchy process in which the paired comparisons were made between the four dimensions and also between each of the components of the four dimensions. To collect the views of the respondents about each of the paired comparisons, the geometric mean of the respondents' views was used. In addition, for the analysis of the data, Excel 2007 was applied. The dimensions and the components which affect the dropout of the employees according to the literature review and the background of the study are shown in figure 1. In fact, this figure represents the hierarchy.

3. Results
3.1 The calculation of the weight of each dimension

The paired comparison between the four organizational dimensions such as the organizational, professional, individual, and environmental factors has been calculated in order to determine the degree of importance for each of the components affecting the dropout of the employees with Fuzzy AHP Group Decision and by considering the method of Chang's extent analysis. Based on the points mentioned in the section of fuzzy AHP and after measuring the geometric mean from the fuzzy numbers of all the samples, following weights (Table 2) were derived.

Table 2: The geometric mean of the paired comparison for each of the four components

| Aim: Determining the degree of importance for each dimension	Professional factors	Individual factors	Environmental factors	Organizational factors
Professional factors	(1,1,1,)	(0,97,1,26,1,61)	(1,1,5,2)	(0,74,1,14,1,59)
Individual factors	(0,62,0,79,1,04)	(1,1,1)	(0,72,0,96,1,36)	(0,63,0,87,1,26)
Environmental factors	(0,50,0,67,1)	(1,0,4,1,38,0,74)	(1,1,1)	(0,50,0,67,1)
Organizational factors	(0,63,0,87,1,26)	(1,14,1,59,0,74)	(1,1,5,2)	(1,1,1)
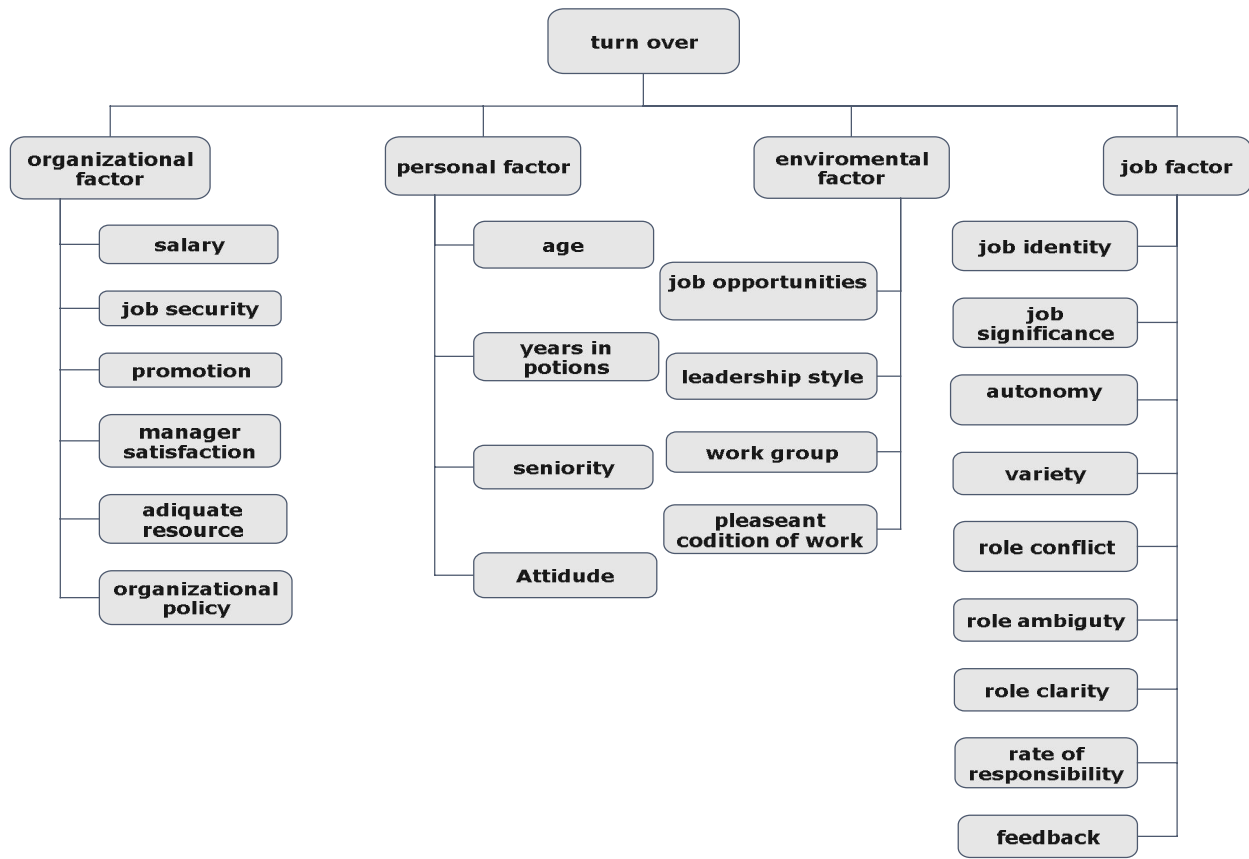
Figure 1. The dimensions and the components which affect the dropout of the employees.

Based on the results given in Table 2 and the process of Fuzzy AHP, we continued to calculate the weight of each of the four dimensions as presented below:

Step 1. The calculation of the fuzzy compound expansion for each of the dimensions:

$$\Sigma_{j=1}^{j} M_{g_i}^{j} = (l_{i1}, m_{i1}, u_{i1}) \oplus (l_{i2}, m_{i2}, u_{i2}) \oplus \ldots \oplus (l_{im}, m_{im}, u_{im})$$

In the following equation, S1 to S4 are related to the professional, individual, environmental, and organizational factors respectively:

$$S_i = \Sigma_{j=1}^{m} M_{g_i}^{j} \otimes [\Sigma_{i=1}^{n} \Sigma_{j=1}^{m} M_{g_i}^{j}]^{-1}.$$

Step 2. The calculation of the degree of possibility: S_i over S_k

$$V(S_i \geq S_k) = \underset{x \geq y}{SUP} (\min\{\alpha_{S_i}(x), \alpha_{S_k}(y)\})$$

Step 3. The calculation of the degree of preference (the degree of possibility) of convex fuzzy number S which is greater than convex fuzzy number k $S_i : i = 1, 2, \ldots, k$:

$$V(S \geq S_1, S_2, \ldots, S_K) = (V((S \geq S_1), (S \geq S_2), \ldots, (S, S_K))$$

$$= \min(V((S \geq S_1), (S \geq S_2), \ldots, (S, S_K)) = \min V(S \geq S_i)$$

$$i \ = \ 1,2,..., \ k$$

Step 4. The normalization of the vector W' and the calculation of the vector of the normalized weight W:

If we suppose $k = 1,2,...,n \ k \neq i$ where $d'(A_i) \ = \ \min V(S_i, S_k)$, Then the vector of weight will be as follows:

$$W' \ = \ (d'(A_1), d'(A_2),..., d'(A_n))$$

The normalization of the vector W' and the calculation of the vector of the normalized weight W:

$$W \ = \ (d(A_1), d(A_2),..., d(A_n))$$

3.2 The calculation of the weight of each of the components of the various dimensions

Likewise, after the collection of the respondents' views about the paired comparison between each of the components of the various dimensions by means of geometric mean, the weight of each of the components was calculated as presented below. It is necessary to mention that the order of the components of the normalized weight in each of the dimensions is given according to the order given for each component:

The vector of the normalized weight for the dimension of the professional factors:
(0.202,0.199,0.108,0.101,0.052,0.042,0.071,0.124,0.101)

The vector of the normalized weight for the dimension of the individual factors:
(0.133,0.279,0.371,0.127)

The vector of the normalized weight for the dimension of the environmental factors:
(0.237,0.369,0.185,0.209)

The vector of the normalized weight for the dimension of the organizational factors:
(0.201,0.211,0.124,0.144,0.129,0.052,0.139)

3.3 The Calculation of the final weight of each of the components affecting the dropouts

By multiplying the weight of each of the dimensions by the weight of the components of the same dimension, the final weight of each of the components is derived.

4. Discussions

The findings of this research indicate that among the four dimensions affecting the dropout of the nurses, the professional factor has the highest significance. The organizational, environmental, and individual factors are the next priorities respectively. Of all the various components studied in this research, the supervision style as one of the organizational factors has the highest impact on the dropout of the nurses. Meanwhile, the job identity, job importance, job security, and salary and wage are some of the items that greatly influence the dropout of the workers in this profession. In this research, it has been made clear that factors such as the sufficiency of the resources, age, and sex conflict and job ambiguity do not have a significant effect on the dropout of the nurses.

Due to its high degree of importance, the issue of employee dropouts has been numerously studied so far (Shaw et al, 1998). Iverson (1999) says that there have been over 800 researches in this regard. Despite the various researches conducted in this field, unfortunately, it is still not clear what the main causes of dropouts of the employees are (Lee and Mitchell, 1994). Voluntary dropouts have considerable cost for the organization. These expenses may be either part of the direct expenditures such as selection, and the temporary employment of the workers and the time management or they may be related to the indirect costs such as the cost of education, the costs of weakened spirit of the workers, and extra workload on other employees and the reduction in the quality of the products and the services given by the organization (Dess and Shaw, 2001). When there are some changes in the organization for example, the organization decides to become smaller in size; some of the competent employees quit their jobs to earn a better job opportunity in another organization (Jackofsky et al., 1986).

Although there is no definite and structured pattern for the dropout, some factors have been identified that affect it. Many organizations have made use of these factors in order to reduce the rate of the dropout of their own employees (Kevin, 2004). These factors include job satisfaction (Hom and Kinicki, 2001), work market variables (Kirschenbaum and Mano-Negrin, 1999), organizational commitment (Meyer, 2001), justness and fairness (Aquino et al., 1997, 1).

Various projects have identified the factors which affect the job satisfaction of the employees and prepared the ground for their retention in the organization or encouraged them to quit their jobs. These factors are generally classified into four groups: organizational factors, environmental factors, the individual factors, and the nature of the work which we have discussed. According to the studies conducted by the experts and the researchers of management science, the organizational factors which bring about the satisfaction and the retention of the employees in the organization include such items as salary and wage, job promotion and the policy of the organization. The studies show that among all the organizational factors, the salary is a determining element for job satisfaction especially when the payment is fair in the view of the employees. In addition, promotion and the organization's policy are considered as the other effective organizational factors. The promotions include such items that boost the employee's spirit like a positive change in salary, receiving less support, more job challenges, more responsibilities, freedom in decision-making because of his personality promotion in the eyes of the organization. The inflexible policies cause negative job attitudes in the employees while the flexible policies create positive job attitudes in them (Morrell, 2002; McKnight et al, 2009).

Based on the findings of this research, it is suggested a proper supervision style be followed in a participatory and supportive manner, but despotic styles be avoided. These can encourage the nurses to continue their services. Considering the hardship of the nursing profession, it is suggested that the salary and the payment to the employees in this profession be increased. Furthermore, appreciation of this valuable profession and determination of its real position in the group of the medical professions can help to retain the nurses in their workplaces.

Corresponding Author:
Sevil Farshid
IT and Computer Engineering Department
Payame Noor University, 19395-4697, Tehran, Iran
Tell: +98.9143458184

E-mail: se_farshid@yahoo.com

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