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Identifying and Ranking Implementation Strategies of Human Resources Productivity
Improvement Management in IRAN Insurance Company

Identificación y clasificación de estrategias de implementación de recursos humanos
Gestión de la mejora de la productividad en IRAN Insurance Company

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Abstrac

Improving quality of workforce, acquiring new skills, and identifying factors influencing on human resources productivity will help the organization to strive for its improvement. Deploying management strategies for productivity improvement enables productivity to be promoted as a continuous process, identifying productivity paths, and laying necessary groundwork. This study was conducted to identify and rank human resources management improvement strategies in Iran Insurance Company, with effective and impressionable indicators. To do this, two methods of non-probability and snowball sampling were used, opinions of 15 experts of Iran Insurance Company were considered as the largest insurance supply network in the country. Process of this research was consisted of five steps: a) Identifying factors influencing human resources productivity by studying relevant literature, b) Screening of identified factors using Fuzzy Delphi technique in Iran Insurance Company, c) Determining interactions and prioritizing factors influencing human resources productivity using Fuzzy Demetel; d) Determining deployment strategies for improving productivity through depth interviews with experts; and e) Ranking productivity deployment strategies using Fuzzy Victor method. Results showed that job satisfaction factor is the most effective and also the highest priority among 15 factors influencing human resources productivity in Iran Insurance Company. Results also showed that establishment of productivity research system ranked as the highest among 7 identified research strategies.

Keywords: Productivity Improvement, Human Resources, Insurance

Resumen

Mejorar la calidad de la fuerza laboral, adquirir nuevas habilidades e identificar los factores que influyen en la productividad de los recursos humanos ayudará a la organización a luchar por su mejora. La implementación de estrategias de gestión para mejorar la productividad permite promover la productividad como un proceso continuo, identificando rutas de productividad y sentando las bases necesarias. Este estudio se realizó para identificar y clasificar las estrategias de mejora de la gestión de recursos humanos en la Compañía de Seguros de Irán, con indicadores efectivos e impresionables. Para hacer esto, se utilizaron dos métodos de muestreo no probabilístico y de bola de nieve, las opiniones de 15 expertos de Iran Insurance Company se consideraron como la red de suministro de seguros más grande del país. El proceso de esta investigación consistió en cinco pasos: a) Identificar los factores que influyen en la productividad de los recursos humanos mediante el estudio de la literatura relevante, b) Selección de los factores identificados utilizando la técnica Fuzzy Delphi en la Compañía de Seguros de Irán, c) Determinar las interacciones y priorizar los factores que influyen en la productividad de los recursos humanos utilizando Fuzzy Demetel; d) Determinar estrategias de despliegue para mejorar la productividad a través de entrevistas en profundidad con expertos; y e) Clasificación de estrategias de implementación de productividad utilizando el método Fuzzy Victor. Los resultados mostraron que el factor de satisfacción laboral es el más efectivo y también la más alta prioridad entre los 15 factores que influyen en la productividad de los recursos humanos en Iran Insurance Company. Los resultados también mostraron que el establecimiento del sistema de investigación de productividad se clasificó como el más alto entre las 7 estrategias de investigación identificadas.

Palabras clave: mejora de la productividad, recursos humanos, Seguro

Introduction

According to statistics released by the Iranian Statistics Center, labor force's share of GDP (Gross Domestic Product) has been equal to 44% in recent years, showing attention to increasing labor productivity, which is so important for improving total factor productivity index (according to the report published by the National Iranian Productivity Association 2018). According to the latest statistics released by the Asian Productivity Organization (APO) in 2018, Iran ranks eighth in terms of labor productivity (per worker) (Asian Productivity Organization (APO), 2018). REICE | 573

Productivity is a broad concept, and it can be considered a thought process aimed at continuous improvement (Amini Khiyabani and Hamdi, 2018). Effective and efficient use of human resources or in other words, human resources productivity is one of major issues in any society. In fact, employing skilled and motivated workforce is a key factor in achieving competitive advantage (Casio & Baudrillo, 2016; Meyers and van Woerkom 2014).

Managing productivity improvement is a process in which, the best combination is achieved among a set of factors, and is manipulated to become suitable for internal and external organizational conditions; thus some changes are made in productivity. Establishing a productivity improvement management cycle causes productivity to be promoted as a continuous process, identifying specific productivity paths, and laying necessary groundwork. Productivity improvement is essential for growth and development of the organization and will lead to institutionalization of improvement in different organizational systems (Azizi, et al., 2014).

Herein, case of the study is Iran Insurance Company, which is a company with 205 active branches and insurance complexes across the country, 12 branches and agencies overseas, employing more than 3770 real estate agents and 156 legal agents under title of compaies of insurance services (Totally, 4256 agents working in grounder insurance services company), and is the largest insurance supply network in the country. Total

number of staff employed by the Iran Insurance Company (official, treaty, and contractor) is about 4739 people, 53% of whom have a university degree and the degrees higher than a diploma. In addition, due to expansion of insurance market, Iran Insurance Company has provided part of its staff through the Karghostran Rahbar Specialized Services Company (formerly called as Amin) over the past 10 years.

Insurance industry is among the largest industries in Iran, so that amount of insurance premiums produced by insurance industry was about 180.276 thousand billion rials in 2016. Considering this index, Iran is ranked 42nd among countries in the world, on the other hand, Iran has the 62nd and 68th position regarding the two indexes of Insurance Penetration and Insurance Density (Statistical Yearbook of Insurance Industry, 2016). Total productivity of insurance industry agents has dropped in long run so that, according to the latest data released on 2010; total productivity of insurance industry agents was reported as 99.2 %in 2011. This number increased to 120.8 %in 2012. But, it increased to 89 %in 2013. Also, total productivity of the industry reached 82.9 %in 2014. By the end of 2015, total insurance productivity had a 67.1 %change (Online Rank Database, 2017). In Iran, insurance companies face many challenges so that, despite their great potential, they have not reached their true status in the country yet. Human resources productivity is one of challenges in insurance industry, which has been main concern of the researchers so far. Accordingly, the present study was conducted to analyze ideas and perspectives in order to identify, determine interaction of effective factors on productivity of human resources in insurance industry, through an appropriate approach.

According to what was said, the present study aims to answer the following questions:

- 1) What are the factors influencing human resources productivity?
- 2) What are the factors influencing human resources productivity in Iran Insurance Company?
- 3) What are interactions of the factors influencing human resources productivity in Iran Insurance Company?
- 4) What is importance and prioritization of factors affecting human resources productivity in Iranian insurance company?

5) What are the strategies for deploying a productivity management process in Iran Insurance Company?

6) How is ranking of deployment strategies regarding productivity management process in Iran Insurance Company?

Materials and methods

This research is practical in terms of purpose, and is descriptive-survey in terms of method. Statistical population of this study was consisted of managers and experts of Iran Insurance Company as the largest insurance supply network in the country. They were experts in the field of research.

Statistical population of this study included masters and experts of Iran Insurance Company. In this study, a combination of two methods of non-probability (judgmental) and snowball sampling was used. Due to nature of sampling method, finally sample size of this study was determined among available and willing experts (15 people). This sample was selected so as to resemble characteristics of real community as much as possible. In this regard, the researcher, using his previous acquaintance (means a deep understanding of the phenomenon in question) chooses people whom their information and understanding on the field of study is great and deep through judgmental method. This method is essentially applicable when number of people with required characteristics or qualifications in the field under study is limited.

Research process consists of five steps

A) Identification of Factors Influencing Human Resources Productivity

At this stage, factors influencing human resources productivity were identified by studying related literature. For this purpose, to prepare a list of factors, first non-repetitive criteria were collected, and then one factor was mentioned in the list among the factors that were exactly repeated or were the same in terms of meaning (Table 1).

The following tools were used to identify the factors influencing human resources productivity:

- _ Library resources (including theses, required books, and research journals)
- _ Internet (scientific sites, ISI papers, Scopus papers, etc)

_ Interview with experts and masters of Iran Insurance Company and preparing a questionnaire for their consultation.

B) Screening of identified Factors

At this stage, Fuzzy Delphi technique was used to determine the most important factors. Therefore, the Fuzzy Delphi questionnaire was designed, and the research experts (n = 15) were asked to identify the indicators influencing each dimension of human resources productivity and to add other possible indicators to the list. Screening questionnaires and final confirmation of variables were provided to the experts, and they were asked to comment on factors identified in the first step.

In the Fuzzy Delphi method, it is assumed that ,fuzzy value of each query is expressed as $\tilde{A}_j = (L_j . M_j . U_j)$ such that L_j is lower limit, M_j is middle term ,and U_j is upper limit of this fuzzy number, will have:

$$L_j = \text{Min}(x_{ij}) \quad i = 1.2. \dots .n \quad j = 1.2. \dots .m$$

$$M_j = \left(\prod_{i=1}^{n.m} x_{ij} \right)^{\frac{1}{n}} \quad i = 1.2. \dots .n \quad j = 1.2. \dots .m$$

$$U_j = \text{Max}(x_{ij}) \quad i = 1.2. \dots .n \quad j = 1.2. \dots .m$$

After calculating fuzzy value of each research question, in order to be able to judge each question, it is necessary to first change fuzzy value obtained from every question to the D-fuzzy to allow comparison and evaluation. To change real value of every question from fuzzy to D-fuzzy, the following method is used:

$$S_j = \frac{L_j + 2 \times M_j + U_j}{4} \quad) 1($$

Finally, to extract desired criteria, we consider a limit to accept or reject that criterion. In this study, according to Rule 30-70, an acceptable limit for a criterion is about 7 (Hsu¹ et al., 2010). If the D-fuzzy value of triangular fuzzy number is 0.7 or higher according to expert's idea, then it is accepted as an acceptable criterion, otherwise it is unacceptable.

C) Determining Interactions and Weight of the Indices

At this stage, FDEMATEL questionnaire will be modified, and it will be completed by the research experts (n = 15) ,and will be prioritized by performing aforementioned technical steps on interaction effects of variables and factors influencing productivity of human resources in the Iran Insurance Company.

Multi-criteria decision-making approach can consider different criteria simultaneously and help decision-makers identify the best solution (Tizeng & Huang², 2011) .Dematel method is an analytical method for structural modeling used mainly for solving complex problems and clarifying problem essentials. (Etsu & Liu³, 2013) .The DEMATEL technique can be used as a logical approach to solve internal dependencies among a set of elements (Wu, 2008). In addition to the above, with modifications made by Dalala,⁴ et al. (2011), this technique is also capable of calculating weight of criteria.

Steps of this section are as follows (Dalala, et al., 2011):

Step One: Creating fuzzy matrix of initial direct relationship through collecting the experts' opinions

To measure relationships between the criteria, they should be put in a square matrix and ask the experts to compare them in pairs according to their effect on each other. In the survey, experts will comment on the information presented in Table 1.

Table 1. Linguistic expressions in used and corresponding fuzzy numbers

Triangular fuzzy numbers	Definitive equivalent	Linguistic expressions
--------------------------	-----------------------	------------------------

(0.0,0.0,0.25)	0	Without effect (No)
(0.0,0.25,0.50)	1	Very little effect (VL)
(0.25,0.50,0.75)	2	Little effect (L)
(0.50,0.75,1.0)	3	High effect (H)
(0.75,1.0,1.0)	4	Very high effect (VH)

Assuming we have n criteria and p experts, and also have p fuzzy matrices, then each of them is corresponded to an expert's comments with triangular fuzzy numbers as its elements. In these matrices, $\tilde{x}_{ij} = (l_{ij}, m_{ij}, u_{ij})$ are triangular fuzzy numbers and $\tilde{x}_{ii} = (i = 1, 2, 3, \dots, n)$ are taken as fuzzy numbers (0, 0, 0). To calculate all the expert's opinions according to formula (2), arithmetic mean is calculated from them.

$$\tilde{z} = \frac{\tilde{x}^1 \oplus \tilde{x}^2 \oplus \tilde{x}^3 \oplus \dots \oplus \tilde{x}^p}{p} \quad 2)$$

In this formula, p is number of experts, \tilde{x}^1, \tilde{x}^2 and \tilde{x}^p are pairwise comparison matrices of expert 1, expert 2, and expert p, respectively, and \tilde{z} is a triangular fuzzy number as follows $\tilde{z}_{ij} = (l'_{ij}, m'_{ij}, u'_{ij})$

Step Two: Normalization of direct relation of fuzzy matrix

We use formulas (3) and (4) to normalize obtained matrix.

$$\tilde{H}_{ij} = \frac{\tilde{z}_{ij}}{r} = \left(\frac{l'_{ij}}{r}, \frac{m'_{ij}}{r}, \frac{u'_{ij}}{r} \right) = (l''_{ij}, m''_{ij}, u''_{ij}) \quad 3)$$

Where, r is obtained from the following relation:

$$r = \max_{1 \leq i \leq n} \left(\sum_{j=1}^n u_{ij} \right) \quad 4)$$

Step Three: Calculating complete communication matrix

Fuzzy whole-relation matrix is obtained by formulas (5) to (8):

$$T = \lim_{k \rightarrow +\infty} (\tilde{H}^1 \oplus \tilde{H}^2 \oplus \dots \oplus \tilde{H}^k) \quad) 5($$

So that, every element of which is fuzzy number $\tilde{t}_{ij} = (l_{ij}^t, m_{ij}^t, u_{ij}^t)$ and they are calculated as follows:

$$[l_{ij}^t] = H_l \times (I - H_l)^{-1} \quad) 6($$

$$[m_{ij}^t] = H_m \times (I - H_m)^{-1} \quad) 7($$

$$[u_{ij}^t] = H_u \times (I - H_u)^{-1} \quad) 8($$

In these formulas, I is identity matrix and $H_l, H_m,$ and H_u are $n \times n$ matrices, respectively their entries of which form low number, middle number, and high number of triangular fuzzy numbers of the matrix H.

Step Four: Determining interactions of factors (effective/ impressionable)

The next step is obtaining the sum of rows and columns of the matrix T. We obtain the sum of rows and columns according to formulas (9) and (10).

$$\tilde{D} = (\tilde{D}_i)_{n \times 1} = \left[\sum_{j=1}^n \tilde{T}_{ij} \right]_{n \times 1} \quad) 9($$

$$\tilde{R} = (\tilde{R}_i)_{1 \times n} = \left[\sum_{j=1}^n \tilde{T}_{ij} \right]_{1 \times n} \quad) 10($$

Where, \tilde{D} and \tilde{R} are $n \times 1$ and $1 \times n$ matrices, respectively.

In the following, we diphas fuzzy numbers \tilde{D} and \tilde{R} according to formula (1). Then, importance (interaction) of the indices ($D_i + R_j$) and relationship between the criteria ($D_i -$

R_j) is determined. So that, if $D_i - R_j > 0$, then it is an effective relevant criterion, and if $D_i - R_j < 0$, then it is an impressionable relevant criterion.

Step Five: Determining weight of the factors

In this step, we use the following equations to determine final weight of the factors:

$$\omega_i = \frac{1}{((D_i + R_i)^2 + (D_i - R_i)^2)^{\frac{1}{2}}} \quad) 11($$

$$W_i = \frac{\omega_i}{\sum_{i=1}^n \omega_i} \quad) 12($$

D) Determination of Productivity Establishment Strategies

In-depth interviews (15 people) were used to determine productivity establishment strategies in Iran Insurance Company. Open and axial coding methods were used in analysis of information collected in the interviews. Open and axial coding can be used to analyze recorded data that can be written, for example, lectures and interviews (Burton & Milward, 2006). In this study, coding included the following steps:

- Data Summary: Selecting from obtained data, summarizing the terms or synonyms, placing this data into broader categories and the like is done at this stage.
- Data Width: Developing an organized set of data so as to come up with a conclusion at this stage. Findings obtained from each interview are set out in a separate table; there is also a general table for codes devoted to concepts.
- Conclusion: In this study, content analysis is done by the Tem method. In general, the Tem analysis process is as follows:

Stage One: Data Preparation

Before starting data analysis, the data must be in a way that, it is easy to work with. In this study, after copying, a table was prepared as the following table including answers of questions for each interviewee.

Table 2. Preparation of qualitative data

Axial coding concepts	Open coding concepts	Verbal statements	Interviewee code

- Interviewee code: Code from I₁ till I₁₅
- Verbal statements of interviewee in response to questions
- Data: Interviewee statements
- Notes: Personal notes

Stage Two: Getting to know

At this stage, the interview is repeatedly listened to, and notes are carefully arranged during the interview.

Stage Three: Coding

Coding is like raw material for data analysis. At this point, each interviewee is assigned a code from I1 to I15 whose number represents individual's number. In open coding, key concepts are expressed by the interviewees, and in axial coding, the title belongs to a set of common concepts that are expressed.

Stage Four: Creating meanings and concepts

At this point, a comprehensive table is obtained regarding what was included in tables of each interviewee. This table shows productivity establishing strategies in the Iran Insurance Company.

D) Ranking Productivity Establishment Strategies

In this section, Fuzzy VIKOR is used to rank productivity establishment strategies. VIKOR is an agreed MADM method developed on the basis of the Alpine Metrics. This method is able to provide a maximum amount of group favoritism for the majority and a minimum amount of individual influence for the opposition. This procedure includes the following steps (Aprikkvik, et al., 2011):

Step One: In this study, fuzzy arithmetic mean method is used to summarize the experts' opinions in the VIKOR questionnaire.

Step Two: Ideal positive and negative options are determined by the following rules. REICE | 582

Where $i = 1, \dots, n$ and $j = 1, \dots, m$, are:

If $\tilde{f}_j^* = (l_{ij}^*, m_{ij}^*, r_{ij}^*)$ and $\tilde{f}_j^- = (l_{ij}^-, m_{ij}^-, r_{ij}^-)$, then we have:

$$\begin{aligned} \text{For positive indicators (profit)} \quad & \tilde{f}_j^- = \min_i(\tilde{x}_{ij}) \quad \tilde{f}_j^* = \max_i(\tilde{x}_{ij}) \\ \text{For negative indicators (co)} \quad & \tilde{f}_j^- = \max_i(\tilde{x}_{ij}) \quad \tilde{f}_j^* = \min_i(\tilde{x}_{ij}) \end{aligned} \quad (13)$$

Step Three: Utility and disadvantages of options are calculated, where $i = 1, \dots, n$ and $j = 1, \dots, m$, are:

If $\tilde{S}_j = (s_j^l, s_j^m, s_j^r)$, $\tilde{R}_j = (R_j^l, R_j^m, R_j^r)$ and $\tilde{w}_j = (w_j^l, w_j^m, w_j^r)$, we will have:

If $\tilde{S}_j = (s_j^l, s_j^m, s_j^r)$, $\tilde{R}_j = (R_j^l, R_j^m, R_j^r)$ and $\tilde{w}_j = (w_j^l, w_j^m, w_j^r)$, we will have:

$$\tilde{S}_j = \sum_{i=1}^n \tilde{w}_j \otimes \left(\frac{\tilde{f}_j^* \ominus \tilde{x}_{ij}}{\tilde{f}_j^* \ominus \tilde{f}_j^-} \right) \quad (14)$$

$$\tilde{R}_j = \max_j \left[\tilde{w}_j \otimes \left(\frac{\tilde{f}_j^* \ominus \tilde{x}_{ij}}{\tilde{f}_j^* \ominus \tilde{f}_j^-} \right) \right] \quad (15)$$

Fuzzy values of S and R are determined using the following formula:

$$\text{Crisp}(N) = \frac{(l+(2m)+r)}{4} \quad (16)$$

Step Four: The VIKOR index is calculated based on the following relation:

$$Q_i = V \frac{\tilde{S}_j - \tilde{S}_j^*}{\tilde{S}_j^- - \tilde{S}_j^*} + (1 - V) \frac{\tilde{R}_j - \tilde{R}_j^*}{\tilde{R}_j^- - \tilde{R}_j^*}$$

$$\begin{aligned} \tilde{S}_j^* &= \min_i(\tilde{S}_j) \\ \tilde{S}_j^- &= \max_i(\tilde{S}_j) \\ \tilde{R}_j^* &= \min_i(\tilde{R}_j) \\ \tilde{R}_j^- &= \max_i(\tilde{R}_j) \end{aligned} \tag{17}$$

When the value of V is greater than 0.5, the Q_i index results in agreement of majority, and when the value of Q_i is less than 0.5, indicator reflects negative attitude of the majority. Generally, when the value of V is equal with 0.5, it indicates agreed attitude of valuation experts.

Step Five: Ranking of options is done by Vicar Index. In final step, the options are arranged in groups of small to large based on the values of Q, S, and R. The best option is the one with the smallest Q, provided that the following two conditions are met:

First condition: It refers to acceptable advantage. If the options A'_1 and A'_2 have the first and second ranks among m, then the following relation must exist:

$$Q(A'_2) - Q(A'_1) \geq \frac{1}{m-1} \tag{18}$$

Second condition: It refers to acceptable stability. Option A1 should be recognized as a top ranking in at least one of the S and R groups.

Thus, the following situations are likely to happen:

Mode 1: When the first condition is not met, a set of options (19) are chosen as top options:

$$(19) \quad \dots, A_M, A_2, A_1 = \text{top options}$$

Maximum value of M is calculated according to the relation (20):

$$(20) \quad 1/m-1 < Q(A_1) - Q(A_M)$$

Mode 2: When only the second condition is not met, two options of A1 and A2 are selected as top option.

Mode 3: If both conditions are met, ranking would be Q-based. (In descending order: lower Q is a better option).

Analysis and Results

Step One: Identifying the factors

Library method is used in all scientific research, and in some of them, research topic relies on findings of library research from the beginning to the end. In the present study, all the research methods for collecting information in library method, all printed documents such as books, encyclopedias, dictionaries, journals, newspapers, magazines, dictionaries, calendars, printed interviews, research papers, scientific conference books, printed texts, databases, the Internet, the intranet, and any sources that could be identified in print were used to identify the factors influencing on human resources productivity.

Based on a library study and content analysis of the research literature, factors influencing on human resources productivity were identified. For this purpose, non-repetitive criteria were first compiled for a list of factors, and then a list was provided among the factors that were replicated or conceptually identical in the following table:

Table 1. Factors influencing human resources productivity and its indicators in research

Researches	Indicators	Factors
------------	------------	---------

Haghighatian and Ezzati (2015), Abedini, et al (2017)	In-service training	Occupational factors
Aqdasi (1996), Abedini, et al. (2017)	Using workflow techniques	
Taheri (2011), Wisuki and Copner (2006), Sivate, et al. (2015)	Quality of working life	
Bahramzadeh (2004), Azam Waziri (2009), Haghighatian and Ezzati (2015)	A sense of job security	
Bahramzadeh (2004), Azam Waziri (2009)	Challenging jobs	
Wisuki and Copner (2006), Azam Waziri (2009)	Adaptation and appropriateness of job to worker	
Kramer (1998), Wisuki and Copner (2006)	Job satisfaction	
Ghahremani & Habibi (2016), Aydin & Triaki (2018)	Performance evaluation and feedback	
Saatchi (2007), Alvani and Ahmadi (2001) Ashouri (2013), Haghighatian and Ezzati (2015), George (2016),	Work experience	
Ashouri (2013), Azam Waziri (2009)	Being decisive and serious while performing tasks	
Janali Nejad (2001), Haghighatian and Ezzati (2015), Anastasia, et al (2015), Kato and Bodar (2016)	Required expertise and skills	
Agha Golzadeh (2006), Ashouri (2013)	Adherence to work ethics and conscience	
Zarei, et al. (2000), Wisuki and Copner (2006), Arjmedi Nezhad et al. (2016)	Employees' mental and physical health	

Azam Vziri (2009), Bordbar (2013)	Proportion of employees' age to their job	Organizational factors
Saatchi (2007), Bordbar (2013)	Level of Education	
Saatchi (2007), Gholipour (2009), Hogh (2007), Haghigatian and Ezzati (2015)	Positive attitude to organization and work	
Steiner (1995), Wisuki and Copner (2006), Taheri (2011), Shekarchi and Rajabi (2011)	Organizational commitment	
Horali and Naghashian(2012), Sivatate, et al (2015), Rahman, et al (2019)	Organizational culture	
Zhang and Liu (2013), Aghaie, et al. (2015), Haghigatian and Ezzati (2015), Kato and Bodar (2016)	Salary and benefits	
Ashouri (2013), Haghigatian and Ezzati (2015)	Constructive communication between managers and employees	
George (2016), Sedighei Boukani, et al (2018), Rahman, et al (2019)	Leadership Approach	
Azam Waziri (2009), Wisuki & Copner (2006), Haghigatian & Ezzati (2015), Abedini, et al (2017)	Employees' participation	
Chapman and Alkhawada (2002), Putri, et al. (2017)	Total Quality Management (TQM)	
Zare (2000), Janali Nejad (2001), Ellis & Dick (2003), Abedini, et al (2017)	Teamwork ability	
Zamanloo (2012), Haghigatian and Ezzati (2015)	Discipline and encouragement	

Chapman (2002), Estonius (2006), Sunnyquin and Saracen (2014)	Convenient and up-to-date facilities and equipment at work	Environmental factors
Bahramzadeh (2004), Ashouri (2013)	Feeling safe and comfortable in the workplace	
Ashouri (2013), Arjomandi Nejad, et al. (2016)	Quality of work environment (amount of light, noise, humidity and ventilation, etc.)	
Nasiri Pour, et al (2009), Azam Waziri (2009)	Interesting and attractive physical environment	
Zare (2000), Chen, et al (2003), Azam Waziri (2009)	Providing social services	
Chen et al (2003), Azam Waziri (2009)	Mental health of the workplace	
Zare (2000), Chen, et al (2003), Azam Waziri (2009)	Providing welfare services	
Azam Waziri (2009), Kazemi, et al (2011)	Supportive atmosphere among employees in the organization	
Chen, et al (2003), Azam Waziri (2009)	Being respected in the workplace	
Steiner (1995), Azam Waziri (2009)	Close and intimate relationships between staff	

Stage Two: Screening of the factors

In the following, identified factors presented in Table (1) are screened using the Fuzzy Delphi method at IranInsurance Company.

For this purpose, as mentioned earlier, using two methods of Impossible Targeting (Judgment) and snowball sampling, 15 experts of the Iran Insurance Company as the largest insurance supply network in the country were asked to screen effective factors on human resources productivity gathered in form of a questionnaire. After evaluating the questionnaires, 20 indices were identified and eliminated as inappropriate indices, meaning that analysts' views do not converge. Therefore, by adjusting the second Delphi Questionnaire, remaining indices were re-evaluated. To speed up process of convergence of opinions and increase agreed opinions, analyzed results of the first questionnaire were distributed to all experts. Results obtained from evaluation of the second Delphi Questionnaire showed that, mean of expert opinions in all remaining criteria was greater than 0.7, meaning convergence of analysts' views. As a result, remaining criteria were appropriate for the research project and were selected as appropriate criteria and were maintained for subsequent evaluation process.

According to the experts' opinion and based on the Fuzzy Delphi method, 15 of 35 factors identified in previous step were identified as factors influencing productivity of human resources in the Iran Insurance Company. So that, to express the results, only factors confirmed after two stages of Delphi process are listed in Table (2):

Table 2. Screening of factors and their equivalent names in research

Symbol	Condition	D-fuzzy value	Fuzzy value			Index	Factors
			U	M	L		
C1	Accepted	0/804	1	0/857	0/5	In-service training	Occupational factors
C2	Accepted	0/769	1	0/787	0/5	A sense of job security	
C3	Accepted	0/788	1	0/827	0/5	Adaptation and appropriateness of job to the employee	

C4	Accepted	0/729	1	0/808	0/3	Job satisfaction	
C5	Accepted	0/803	1	0/856	0/5	Required expertise and skills	Individual factors
C6	Accepted	0/766	1	0/881	0/3	Adherence to work ethics and conscience	
C7	Accepted	0/760	1	0/871	0/3	Employees' mental and physical health	
C8	Accepted	0/813	1	0/876	0/5	Positive attitude to organization and work	Organizational factors
C9	Accepted	0/803	1	0/856	0/5	Organizational commitment	
C10	Accepted	0/725	1	0/800	0/3	Organizational culture	
C11	Accepted	0/722	1	0/794	0/3	salary and benefits	
C12	Accepted	0/758	1	0/865	0/3	Constructive communication between managers and employees	
C13	Accepted	0/818	1	0/885	0/5	Teamwork ability	
C14	Accepted	0/716	1	0/782	0/3	Appropriate facilities and equipment at work	Environmental factors
C15	Accepted	0/782	1	0/814	0/5	Feeling safe and comfortable in the workplace	

Step Three: Determining interaction effects and weight of the indices

As stated, at this stage, the FDEMATEL questionnaire was completed by the research experts (n = 15) with respect to the fuzzy spectrum, and then the fuzzy \tilde{D} and \tilde{R} values were calculated by performing above steps.

Then, the fuzzy numbers \tilde{D} and \tilde{R} are diphased according to formula (1), and then significance (interaction) of the indices ($D_i + R_j$) and relation between the criteria ($D_i - R_j$) is determined. As stated above, relevant criterion is effective for determining interactions of indices if $D_i - R_j > 0$, and relevant criterion is impressionable if $D_i - R_j < 0$:

Table 3. Interaction effects of research indicators (effectiveness / impressionable)

factors	Index	Acro nym	D			R			D(def)	R(def)	D+ R	D- R	
			0/	1/	5/	0/	1/	5/					
job factors	In- service training	C1	0/ 49 9	1/ 43 3	5/ 96 1	0/ 46 5	1/ 37 9	5/ 69 5	2/3 32	2/2 29	4/ 56 1	0/ 10 2	effectiv eness
	A sense of job security	C2	0/ 54 7	1/ 51 1	6/ 19 6	0/ 52 4	1/ 47 2	6/ 08 0	2/4 42	2/3 87	4/ 82 8	0/ 05 5	Effectiv eness
	Adaptati on and appropri ateness of job to employe e	C3	0/ 57 3	1/ 55 1	6/ 31 2	0/ 46 6	1/ 38 0	5/ 81 7	2/4 97	2/2 61	4/ 75 8	0/ 23 6	Effectiv eness
	Job satisfact ion	C4	0/ 73 1	1/ 80 4	7/ 02 2	0/ 57 8	1/ 55 9	6/ 32 8	2/8 40	2/5 06	5/ 34 6	0/ 33 4	Effectiv eness

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Individual factors	Required expertise and skills	C6	0/497	1/429	5/960	0/516	1/461	6/044	2/329	2/370	4/699	-0/042	impress ionable
	Adherence to conscience and work ethics	C7	0/437	1/334	5/690	0/443	1/344	5/719	2/199	2/213	4/412	-0/014	impress ionable
	Employees' mental and physical health	C8	0/441	1/340	5/707	0/546	1/507	6/182	2/207	2/436	4/643	-0/228	impress ionable
Organizational factors	Positive attitude to work organization	C9	0/555	1/523	6/219	0/653	1/678	6/669	2/455	2/670	5/125	-0/215	impress ionable
	Organizational commitment	C10	0/499	1/432	5/957	0/578	1/59	6/329	2/330	2/506	4/836	-0/176	Impress ionable
	Organizational culture	C11	0/751	1/836	6/409	0/523	1/471	6/076	2/708	2/385	5/093	0/323	effectiv eness

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	Salary and benefits	C12	0/466	1/380	5/822	0/492	1/422	5/818	2/262	2/288	4/550	-0/026	Impress ionable
	Constru ctive commu nication between manage rs and employe es	C13	0/522	1/514	6/205	0/659	1/737	6/711	2/439	2/711	5/150	-0/272	Impress ionable
	Teamw ork Ability	C14	0/524	1/472	97/2	0/574	1/552	6/189	2/385	2/467	4/852	-0/082	Impress ionable
Environ mental factors	Appropri ate and updated facilities and equipm ent at work	C15	0/386	1/253	5/456	0/357	1/206	5/205	2/087	1/993	4/080	0/094	effectiv eness
	Feeling safe and secure in the	C16	0/522	1/470	6/078	0/577	1/58	6/205	2/389	2/474	4/859	-0/089	impress ionable

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	workpla ce														
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In the following, weight and priority of indicators is calculated based on the relations (11) and (12):

Table 4. Final weight of research indicators

Ind ex	C1	C2	C3	C4	C5	C6	C7	C8	C9	C1 0	C1 1	C1 2	C1 3	C1 4	C1 5
Qi	4/5 62	4/8 29	4/7 64	5/3 56	4/6 99	4/4 12	4/6 48	5/1 29	4/8 39	5/1 03	4/5 50	5/1 57	4/8 52	4/0 81	4/8 60
Wi	0/0 64	0/0 67	0/0 66	0/0 75	0/0 65	0/0 61	0/0 65	0/0 71	0/0 67	0/0 71	0/0 63	0/0 72	0/0 68	0/0 57	0/0 68
Prio rity	12	8	9	1	10	14	11	3	7	4	13	2	6	15	5

Step Four: Determining productivity establishment strategies

As stated above, to determine productivity establishment strategies in the IranInsurance Company, using two methods of Impossible Targeting (Judgment) and snowball sampling, 15 experts of the Iran Insurance Company as the largest insurance supply network in Iran were selected for in-depth interviews. Concepts were identified by analyzing content of the interviews.

In this study, in order to express the results, we only refer to derived axial codes with a frequency of 0.7 or higher.

Table 5. Productivity establishment strategies

Frequency	Interviewee	Concepts	Symbol	Axial code
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11	I1, I3, I4, I5, I7, I8, I9, I10, I11, I13, I15	Appropriate scientific structures must be designed and implemented to establish productivity alongside cultural efforts.	A1	Institutionalize productivity in the organization
15	I1 till I15	Lean management is among approaches used to establish productivity. Lean management is a systematic, and continuous improvement approach emphasizing on creation of more value for customers. It refers to elimination of any activity or process consuming resources and increasing cost or time without creating value.	A2	Lean Management
15	I1 till I15	To establish productivity, it is necessary to continuously study on subjectivity and factors involved in productivity and apply scientific strategies.	A3	Establishing a productivity research system
13	I1, I2, I3, I4, I6, I7, I9, I10, I11, I12, I13, I14, I15	Organizational productivity is established and improved when employees have required development. Organizational development creates a systematic, logical,	A4	Development of organizational growth

		interlinked, integrated, and planned approach used to improve organizational effectiveness. Organizational development is designed to address the difficulties diminishing organizational performance across all disciplines.		
12	I ₁ , I ₂ , I ₃ , I ₄ , I ₆ , I ₇ , I ₈ , I ₉ , I ₁₀ , I ₁₁ , I ₁₄ , I ₁₅	Performance management with a holistic view of organization's productivity performance always gives a clear picture of the organization's productivity.	A5	Establish a performance management system
14	I ₁ , I ₂ , I ₃ , I ₄ , I ₅ , I ₆ , I ₇ , I ₉ , I ₁₀ , I ₁₁ , I ₁₂ , I ₁₃ , I ₁₄ , I ₁₅	Creating work patterns, operating procedures, hardware, and software related to purpose of managing organizational processes deploys and improves productivity in the organization.	A6	Improving quality of organizational management process
15	I ₁ till I ₂₅	It is essential to organize payroll system in such a way that, payrolls of employees are commensurate with their efficiency and productivity	A7	Establishing a productivity-based payment system

		(creating a productivity-based incentive system.(
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According to above table, institutionalization factors of organizational productivity, lean management, establishment of productivity research system, development of organizational maturity, establishment of performance management system, quality improvement of organizational management processes, and efficiency-based payment system were determined as seven deployment strategies at Iran Insurance Company. REICE | 596

Step Five: Ranking of productivity deployment strategies

In this section, Fuzzy Victor was used to rank productivity deployment strategies in Iran Insurance Company. Accordingly, after obtaining experts' opinions (n = 15) using questionnaire and summarizing opinions; to rank productivity deployment strategies and select the best strategy; values \tilde{f}_j^* , \tilde{f}_j^- , S_j , R_j and Q were calculated by means of Equations (17-13), results of which are shown in Tables 6 and 7.

Table 6. Ideal positive and negative indicators

ind ex	\tilde{f}_j^*			\tilde{f}_j^-			ind ex	\tilde{f}_j^*			\tilde{f}_j^-		
	L	M	U	L	M	U		L	M	U	L	M	U
C1	5/5 71	7/5 71	9/1 43	3/1 43	5/0 00	7/0 00	C9	5/2 86	7/2 86	8/8 57	3/2 86	5/2 86	7/2 86
C2	5/0 00	7/0 00	8/7 14	4/1 43	6/1 43	8/1 43	C1 0	4/4 29	6/4 29	8/4 29	3/0 00	5/0 00	7/0 00
C3	5/2 86	7/2 86	8/8 57	4/1 43	6/1 43	8/0 00	C1 1	5/5 71	7/5 71	9/2 86	4/7 14	6/7 14	8/4 29
C4	5/5 71	7/5 71	9/1 43	3/8 57	5/8 57	7/5 71	C1 2	6/1 43	8/1 43	9/5 71	4/4 29	6/4 29	8/2 86
C5	4/4 29	6/4 29	8/1 43	2/7 14	4/7 14	6/5 71	C1 3	6/1 43	8/1 43	9/4 29	4/7 14	6/7 14	8/4 29

C6	5/0 00	7/0 00	8/5 71	1/4 29	3/0 00	5/0 00	C1	6/1 4	8/1 43	9/4 29	4/7 14	6/7 14	8/5 71
C7	6/1 43	8/1 43	9/4 29	2/2 86	4/1 43	6/1 43	C1	5/8 5	7/8 57	9/1 43	5/0 00	7/0 00	8/7 14
C8	5/2 86	7/2 86	9/0 00	3/2 86	5/2 86	7/2 86							

Table 7. S_j, R_j, and Q values for all seven strategies

Options	S _j			S _j (def)	S*	S-	R _j			R _j (def)	R*	R-	Q
	L	M	U				L	M	U				
A1	0/8 72	0/8 79	0/8 73	0/87 6	0/1 42	0/8 76	0/0 72	0/0 75	0/0 75	0/07 3	0/0 38	0/0 74	1
A2	0/3 48	0/3 44	0/3 23	0/34 0			0/0 67	0/0 67	0/0 67	0/06 7			0/5 41
A3	0/1 39	0/1 37	0/1 53	0/14 2			0/0 37	0/0 35	0/0 45	0/03 8			0
A4	0/4 77	0/4 73	0/4 71	0/47 3			0/0 67	0/0 67	0/0 67	0/06 7			0/6 33
A5	0/3 67	0/3 64	0/3 71	0/36 7			0/0 65	0/0 65	0/0 68	0/06 6			0/5 42
A6	0/7 41	0/7 38	0/7 18	0/73 4			0/0 75	0/0 75	0/0 72	0/07 4			0/9 04
A7	0/3 52	0/3 49	0/3 72	0/35 6			0/0 50	0/0 50	0/0 68	0/05 4			0/3 70

The ranking of productivity establishment strategies in the Iranian Joint Stock Company, based on S_j, R_j and Q values, is shown in descending order in Table (8). As it shown in this table, the establishment of the Productivity Research System (A3) has the best rank with respect to Q. On the other hand, the first and second conditions apply to this option:

First condition: $1 - (1 - 7) \geq (0 - 370/0) Q(A7) - Q(A3) \geq 1 / m - 1$

Condition 2: Option A3 also has the best rating based on the values of $S_j \cdot R_j$

Therefore rankings based on Q values (Tier 3) and are as follows: establishment of Productivity Research System (A3), establishment of Productivity Based Payment System (A7), Lean Management (A2), establishment of Performance Management System (A5), Development of organizational maturity (A4), and quality improvement of organizational process management (A6), institutionalization of productivity in the organization (A1).

Table 8. Ranking of productivity establishment strategies based on $S_j \cdot R_j$, and Q values

Options	S		Options	R		Options	Q
A3	0/142		A3	0/038		A3	0
A2	0/340		A7	0/054		A7	0/370
A7	0/356		A5	0/066		A2	0/541
A5	0/367		A2	0/067		A5	0/542
A4	0/473		A4	0/067		A4	0/633
A6	0/734		A1	0/073		A6	0/904
A1	0/876		A6	0/074		A1	1

Conclusions

Effective productivity improvement, as other organizational components and software processes among requirements of organizational work grounded in the essence of productivity improvement, and legitimacy of productivity depends on its improvement and modification. Many studies related to this concept have attempted to identify and improve the factors influencing productivity. Establishing management of productivity improvement enables productivity to be promoted as a permanent process, determining productivity path, and providing necessary contexts. Productivity improvement is essential for growth and development of the organization and will lead to institutionalization of improvement in different organizational systems. In this study, some practical approaches were mentioned regarding establishing management of productivity improvement.

In the present study, first by studying related literature, the factors influencing human resources productivity were identified and then, identified factors were screened using experts' opinions of Iran Insurance Company using fuzzy Delphi technique, in order to determine the factors influencing human resources productivity.

Considering the items obtained from comparison of screened factors influencing human resources productivity in Iran Insurance Company, the following previous researches can be mentioned:

In terms of job factors, 4 factors of in-service training, job security, job compliance, and proportionality to the employee, and job satisfaction were confirmed by the experts. These results are in agreement with the researches conducted by Kramer (1998), Wisuki and Copner (2006), Estonius (2006), Bahramzadeh (2004), Azam Waziri (2009), Abedini, et al (2016), and Haghghatian and Ezzati (2015).

In terms of individual factors, 3 factors of having necessary expertise and skills, adherence to ethical principles and work conscience, and mental and physical health of the staff were confirmed by the experts. These results are also in agreement with the researches conducted by Zare (2000), Janali Nejad (2001), Peak (2001), Estonius (2006), Wisuki and Copner (2006), Aghagolzadeh (2006), Ashouri (2013), Anastasia, et al (2015), Haghghatian and Ezzati (2015), Kato & Bodhar (2016), and Arjmadi Najad, et al (2014). In terms of organizational factors, 6 factors of positive attitude toward organization and work, organizational commitment, organizational culture, rights and benefits, making constructive communication between managers and employees, and teamwork ability were confirmed by the experts. These results are consistent with the researches conducted by Steiner (1995), Zare (1379), Janalinejad (2001), Saatchi (2007), Gholipour (2009), Ellis & Dick (2003), Wisuki & Copner (2006), Hugh (2007), Taheri (2011), Shekarchi and Rajabi (2011), Horal and Naghashian (2012), Zhang and Liu (2013), Ashouri (2013), Aghaie, et al. (2015), Sivate, et al. (2015), Haghghatian and Ezzati (2015), Kato and Bodhar (2016), Abedini, et al (2017), and Rahman, et al (2019). In terms of environmental factors, 2 factors of appropriate and up-to-date equipment at work, and security and comfort in the workplace were confirmed by the experts. These results are

consistent with the researches conducted by Chapman (2002), Estonius (2006), Sanikuyin and Sarakane (2014), Bahramzadeh (2004), Ashouri (2013).

Also, by relying on modified DEMATEL decision-making approach in investigating relationship between factors, the higher the D-R column, the greater the effect and whenever this amount is positive, it indicates full effect of studied variable. On the other hand, the D+R column also indicates amount of interaction of this type of relationship. Results obtained from modified DEMATEL decision-making approach showed that, job satisfaction has the most effect and also the highest priority over other factors.

In addition, by analyzing content of in-depth interviews conducted to determine productivity establishment strategies, institutionalization factors of productivity in the organization, lean management, establishment of a productivity research system, expansion of organizational development, establishment of performance management system, quality improvement of organizational management processes, and productivity-based payment system were identified as 7 strategies in establishing productivity improvement in Iran Insurance Company.

At the end, Fuzzy VIKOR was used to rank productivity management strategies in Iran Insurance Company. Accordingly, establishment of a productivity research system was ranked the best according to the Q value. According to findings of the present study, it can be stated that, research is required for each step of productivity improvement cycle; at productivity measurement step, indicators and measuring instruments need to be developed, which in this regard, considering conditions, environment, customer demand, and developments, new indicators must be designed, and this will be achieved through research. Analysis of productivity status and research are inseparable. Any analysis and investigation requires comprehensive research works, that can be conducted based on results of rational decision-making. Development of a productivity improvement plan requires identifying and utilizing effective and key components, which can also be achieved through research. Experiences and results obtained in future improvement process can then be used after implementation of improvement plans through research

work. Therefore, productivity improvement will be a difficult task without conduction of research.

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