IT Capability Impacts on Quality of Customer Service Process Using Fuzzy AHP

Evidence from Iranian Insurance Companies

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***Abstract*-Nowadays, providing high quality customer services is a critical strategy of almost all leading and excellent organizations and this quality is increasingly associated with organizational IT capabilities. In competitive environment, organizations pay increasing attention to IT application for enhancing their business performance. This article is to present results of the application of Fuzzy Hierarchal Analysis Process (FAHP) to the evaluation of the effects of IT capabilities on the quality of customer service process in Iranian insurance companies. Lack of literature regarding IT impacts on customer service process and existing ambiguity in human judgments motivated the authors to use FAHP. The objective of this paper is to apply FAHP for IT impact analysis on customer service process and demonstrate practical application in insurance companies. Identifying these impacts aids managers to make appropriate decisions on how to use resources in customer service and enhancing organizational market position with regard to competitors. The results indicate that IT human resource, IT business experience and shared tacit knowledge are important organizational motives toward competitive advantage in Iranian insurance companies.**

Keywords- IT Capabilities; IT Human Resource; IT Business Experience; Fuzzy Analytical Hierarchal Process; Iranian Insurance Company

I. INTRODUCTION

In the past two decades, customer services of high quality have become a strategic issue of most organizations [1, 2 and 3]. Nowadays, there is common agreement that customer service quality by itself isn't the most important factor of achieving organizational goals, but it is an index that formally evaluates customer satisfaction as the primary competitive measurement in customer service [4, 5]. Even though enterprise performance enhance with IT capabilities, information system (IS) researchers propose that IT capabilities impacts must be analysed in sections where interfering activities impacts are clearly comprehended. It means IT impacts must be analysed in sections where expected functions are firstly comprehended [6, 7, and 8].

Today, IT enables organizations to connect to their customers, and synchronize their activities in order to enhance organization performance. Such variations might enable organization to better understand its customer's preferences and enhance their satisfaction level, and finally obtain better financial records [9]. However, there is no sufficient proof on how customer service systematic analysis is performed through organization performance and how IT capabilities are applied for simplifying organizational tasks. Resource Based View (RBV) is adopted and it is accepted in the paper that IT capability impacts enable organization in better customer responsiveness, and by itself this enhances organizational performance [10]. From RBV perspective, organizational IT capabilities are defined as stimuli that aggregate IT based resources with other resources or capabilities [11, 12]. According RBV theory; resources are applied by many competitive organizations. It means that the resources that are going to explain performance gap in a similar process between competitive organizations must be rare and expensive. Just when resources are valuable, rare and expensive, emulation is able to explain performance difference in all competitive organizations [10].

IT impacts analysis needs assuming multiple indexes along with the involvement of decision makers. As IT impact analyses are multi-dimensional issues, it needs a new approach from multi-criteria decision making (MCDM). In this research, aggregation of Analytical Hierarchal Process (AHP) and fuzzy analysis (Fuzzy AHP or FAHP) is suggested [13, 14]. FAHP methodology is designed for selecting one option from various options and problems verifying by conceptual aggregation between fuzzy set theory and AHP. FAHP is able to deal with uncertainty and relativity in human judgments in IT capability impact analysis on customer service process. The objective of this paper is to apply FAHP for IT impact analysis on customer service process and demonstrate practical application in insurance companies. Identifying these impacts aids managers to make appropriate decisions on how to use resources in customer service and enhancing organizational market position with regard to competitors.

Following sections of the paper are divided into four parts. The next section demonstrates the theoretical backgrounds. Section III explains the paper research objective and methodology. Section IV presents the application of FAHP to evaluate IT impacts on customer service process. Final section states the conclusions.

II. THEORETICAL BACKGROUNDS

A. Theoretical Foundations for Criteria Selection

Some researchers indicate the importance of customer service delivery as a strategic issue [15, 2, and 16]. Additionally, customer service delivery quality is mentioned as a formal index that expresses customer satisfaction as a primary index [4, 17]. IT impacts on customer service process are not well structured and analysed, and have its specific characteristics. Firstly, all IT impacts are not naturally objective and comprehensive. Secondly, different organizational managements sense IT impacts on customer service process differently. Therefore, IT impacts analysis is only mentally achieved. So, appropriate analysis index and methodology must be identified.

B. IT Capabilities and Hierarchical Decisions Tree

Using RBV, several primary attempts are done for categorizing IT/IS capabilities and resources [18, 11]. Some researchers believe that without convergence and coverage between these taxonomies, a multi-dimensional categorization based on theoretical foundation must be adopted [19]. Table 1 demonstrates different resource categories and IT/IS capabilities.

TABLE 1 IS/IT CAPABILITIES AND RESOURCES CATEGORIZATION

<table>
<tr><td colspan="60">IS resources categorization[20]</td></tr>
<tr><td colspan="20">Technology resources</td><td colspan="20">Business resources</td><td colspan="20">Human resources</td></tr>
<tr><td colspan="60">IS resources categorization [20]</td></tr>
<tr><td colspan="30">IS capabilities (based on systems)</td><td colspan="30">IS resources (based on technology)</td></tr>
<tr><td colspan="60">IS resources categorization [21]</td></tr>
<tr><td colspan="20">Inside-out resources</td><td colspan="20">Spanning resources</td><td colspan="20">Outside-in resources</td></tr>
<tr><td colspan="20">IS infrastructure, IS technical skills, IS development, cost effective IS operations</td><td colspan="20">IS-business partnerships, IS planning and change management</td><td colspan="20">External relationship management, market responsiveness</td></tr>
<tr><td colspan="60">IS capabilities categorization [18]</td></tr>
<tr><td colspan="15">IS operation capabilities</td><td colspan="15">IS support maturity</td><td colspan="15">Systems development</td><td colspan="15">IS planning sophistication</td></tr>
<tr><td colspan="60">IS resources categorization [18]</td></tr>
<tr><td colspan="20">Partnership quality</td><td colspan="20">IT infrastructure flexibility</td><td colspan="20">IS human resource</td></tr>
<tr><td colspan="20">Internal partnership quality, External partnership quality</td><td colspan="20">Platform and network sophistication, data and core application sophistication</td><td colspan="20">IS personal skill, IS human resource specificity</td></tr>
<tr><td colspan="60">IT resources and capabilities categorization [22]</td></tr>
<tr><td colspan="12">Flexible IT infrastructure</td><td colspan="12">IT spending</td><td colspan="12">Generic technologies</td><td colspan="12">Technical IT skills</td><td colspan="12">Shared knowledge</td></tr>
<tr><td colspan="60">IT capabilities categorization [23]</td></tr>
<tr><td colspan="15">IT human resources</td><td colspan="15">IT relationship infrastructure</td><td colspan="15">IT business experience</td><td colspan="15">IT infrastructure</td></tr>
<tr><td colspan="60">IT capabilities categorization [23]</td></tr>
<tr><td colspan="30">External oriented IT capabilities</td><td colspan="30">Internal oriented IT capabilities</td></tr>
<tr><td colspan="30">IT resources, IT expertise</td><td colspan="30">Operational support, process realization</td></tr>
</table>

Upon IT studies, IS literature and interview with IT and customer service managers, four essential dimensions of IT capabilities are extracted related with Planning, Concepts, implementation and IT capabilities application [24]. Extending IT capabilities findings, four critical dimensions are demonstrated as: (1) IT infrastructure, (2) IT business experience, (3) IT relationship infrastructure, (4) IT human resources.

1) IT Infrastructure

IT infrastructures are fundamental basis of organizational business service and application [25]. Byrd and Turner believe that IT infrastructure essential foundations are: (1) computing platform (2) communication network, (3) critical shared data, and (4) core data central processing applications [26]. In every IT flexible infrastructure foundations, information sharing changes according to the organizational business strategy.

2) IT Business Experience

Rockart states that the business IT experience enables organizations to merge IT strategy with business strategy. On the other hand, Henderson believes that the element issuing strategic application of business and IT is shared knowledge among operational and IT managers [27]. Nelson and Cooprider discover that increasing shared knowledge among IS and operational groups is related with IS service and operational performance [28]. Shared knowledge among IT and business managers are divided in tacit and explicit shared knowledge [29]. Armstrong and Sambamurthy find out shared knowledge affects homogeneity of IT [30]. Therefore, shared knowledge is a critical function, which enables organization in pondering, applying and effective use of IT in customer service process enhancement.

3) IT Relationship Infrastructure

Related infrastructures include organizations capability in application of IT resources that are a function of IT infrastructure interactions with business units [31]. Such a common relationship between IT and business will lead to an information or knowledge dimension in all over the organization [32]. One of the communication infrastructures is a general IT technology that includes a batch of well-known software and hardware technologies, which can enhance customer service with regard to technology-less processes.

4) IT Human Resource

Critical dimensions of IT human resources include IT technical skills and IT managerial skills [13]. Mata et al. believe that when such skills are correspondingly distributed, imitation won't be hard for competitors [33]. With IT human resources, organizations are capable of organizational change and will reach to more organizational effectiveness.

The first step in AHP application model is to present the problem in a hierarchical structure. In this research, decision hierarchical tree is formulated as shown in Fig. 1. The model's objective is to analyse IT impacts on customer service process. Level two demonstrates indexes that facilitate the realization of general objectives. This level includes IT infrastructures, IT business experiences, IT relationship technologies, and IT human resources. Each of such criteria is breaking up in several sub-criterions that are demonstrated in the third level.

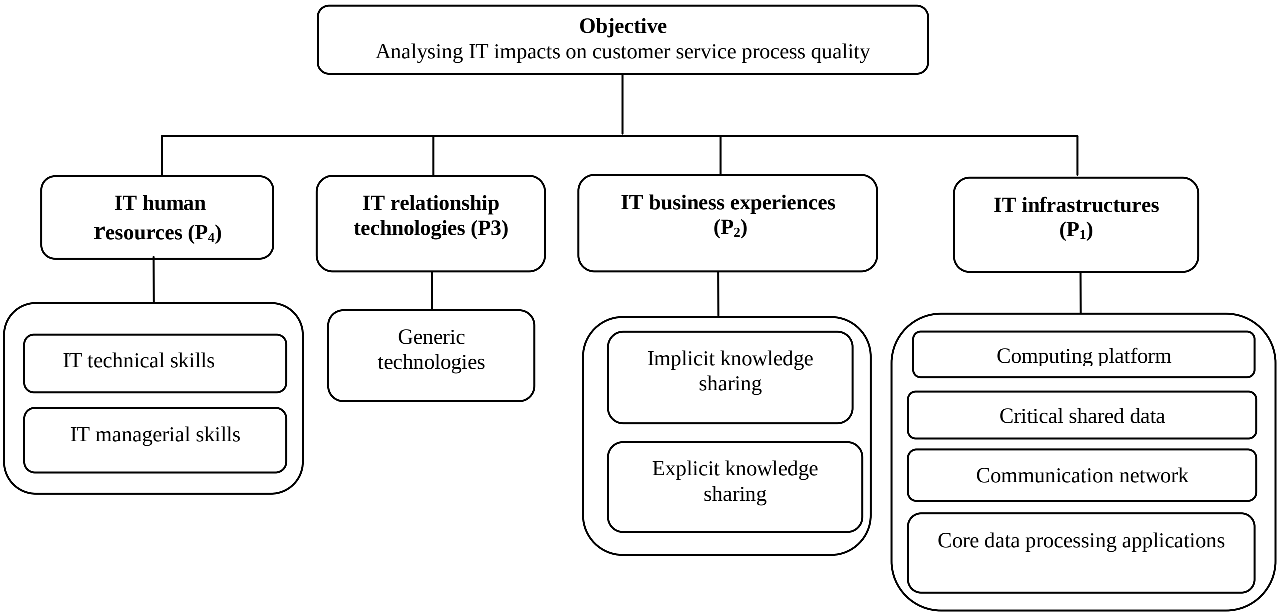

Fig. 1 Hierarchical decision tree for analysing IT impacts on customer service

III. RESEARCH OBJECTIVE AND METHODOLOGY

The objective of research is to analyse IT impacts on customer service process in competitive organizations. For three reasons insurance companies are opted. First of all, insurance companies that deal with extreme competition approach customer service from a strategic point of view [34, 35]. Second, reports are indicating that insurance companies' capabilities in customer satisfaction are higher than other companies [36]. Finally, according to statistics and digits, insurance companies are from the biggest IT application investors and their transactions are closely jointed with investments in IT [37].

In reality, traditional AHP naturally cannot incorporate human cognition especially when phenomena are not clearly exacted or there is ambiguity in data gathering. Then, in this research, FAHP methodology was applied. In fact, FAHP is a methodology that is introduced with Laarhoven, and Pedrycz, which extended AHP to situations of uncertainty and fuzzy environments [38]. FAHP application enables decision makers to assimilate qualitative and quantitative data in one decision model. They are more willing to trust in offering spatial judgments to fixed value judgment offering.

In this research, FAHP methodology is offered for the evaluation of IT impacts on customer service process. Chang introduced a new approach for adoption of FAHP using Triangular Fuzzy Numbers (TFNs) and application of extended analysis for syntactic values in pair comparison that applies extended analysis method in syntactic extended value of pair comparisons. In the following section, extended analysis on the application of FAHP is introduced for analysis of IT impacts on customer service process [13].

In this article, general outline of "Fuzzy AHP Extent Analysis Method" is used [39]:

Assume X= $\{x_1, x_2, \ldots x_n\}$, be an object set, and {u1, u2, u3… un} be a goal set. In accord with the Chang's extent analysis method, each object is taken and extent analysis for each goal *gi* is executed, correspondingly. Therefore, *m* extent analysis values for each object can be achieved as follows:

$$M^1_{gi}, M^2_{gi}, \ldots, M^m_{gi}, \ i = 1,2,\ldots, n \tag{1}$$

Where all *j Mgi* (*j* = 1, 2 ...*m*) are TFNs whose parameters are *l*, *m*, and *u*. The steps of the extent analysis method are given in the following:

Step 1: The fuzzy synthetic extent value with respect to its object is defined as:

$$S_i = \sum_{j=1}^{m} M^j_{gi} \otimes \left(\sum_{i=1}^{n} \sum_{j=1}^{m} M_{gi}{}^{j} \right)^{-1} \tag{2}$$

To achieve $\sum_{j=1}^{m} M\mathrm{gi}$ we execute the fuzzy accumulation operation of m extent analysis values for a particular matrix such that:

$$\sum_{j=1}^{m} M^j_{gi} = \left(\sum_{j=1}^{m} \mathrm{lij}, \sum_{j=1}^{m} m\mathrm{ij}, \sum_{j=1}^{m} uij \right) \left(\sum_{i=1}^{n} \sum_{j=1}^{m} M_{gi}{}^{j} \right)^{-1} \tag{3}$$

Obtaining the above, we perform the fuzzy addition operation of N^i_{gi}(j=1, 2... m) such that:

$$\sum_{i=1}^{n} \sum_{j=1}^{m} M^j_{gi} = \left(\sum_{j=1}^{m} \mathrm{lij}, \sum_{j=1}^{m} m\mathrm{ij}, \sum_{j=1}^{m} uij \right)$$

Where

$$l_i = \sum_{j=1}^{m} \mathrm{lij}, mi = \sum_{j=1}^{m} m\mathrm{ij}, ui = \sum_{j=1}^{m} uij \tag{4}$$

Then, the inverse of the vector in Eq. (5) is computed as:

$$\left(\sum_{i=1}^{n} \sum_{j=1}^{m} M_{gi}{}^{j} \right)^{-1} = \left(\frac{1}{\sum_{i=1}^{n} ui}, \frac{1}{\sum_{i=1}^{n} mi}, \frac{1}{\sum_{i=1}^{n} li} \right) \tag{5}$$

Where: $\forall\ u_i, m_i, l_i > 0$

Finally, to achieve the *Si* in Eq. (2), we perform the following multiplication:

$$S_i = \sum_{j=1}^{m} M^j_{gi} \otimes \left(\sum_{i=1}^{n} \sum_{j=1}^{m} M_{gi}{}^{j} \right)^{-1} = \left(\sum_{j=1}^{m} lij \times \frac{1}{\sum_{i=1}^{n} mi}, \sum_{j=1}^{m} uij \times \frac{1}{\sum_{i=1}^{n} li} \right) \tag{6}$$

Step 2: The degree of possibility of $M^2 = (l_2, m2, u2) \geq M_1 = (l_1, m1, u1)$ is defined as:

$$V(M_2 \geq M_1) = sup\ [min\ (\mu_{M2}(y))] \tag{7}$$

This can be expressed equivalently as follows:

$$V(M_2 \geq M_1) = hgt(M_1 \cap M_2) = \mu_{m2}(d) \begin{cases} 1 & if\ m_2 \geq m_1 \\ 0 & if\ l_1 \geq l_2 \\ \dfrac{l1-u1}{(m2=u2)-(m1=m1)} & otherwise \end{cases} \tag{8}$$

Step 3: The degree possibility for a convex fuzzy number to be greatest in *k* convex fuzzy numbers M_i *(i=1, 2… k)* can be defined by:

$$V(M \geq M_1, M_2, ..., M_k) = V[(M \geq M_1) \text{ and } (M \geq M_2) \dots (M \geq M_k)] = Min\ V(M \geq M_i),\ i = 1, 2, \dots \tag{9}$$

Assume that:

$$D'(S_{i)} = \min V(S_i \geq S_k) \tag{10}$$

For $k \neq I$, $k = 1, 2...n$. Then the weight vector is given by:

$$W' = D'(S_{1)}, D'(S_{2)} ... D'(S_{n)})^T \tag{11}$$

Where *Si* (i = 1, 2...n) are n elements.

Step 4: After normalization (the elements of each column is divided by the sum of that column and the elements in each resulting row are added and this sum is divided by the number of elements in the row), the normalized weight vectors are obtained as follows:

$$W = (D(S_1), D(S_2) \dots D(S_n))^T \tag{12}$$

The consistency in FAHP is another subject that needs to be examined. The consistency index (CI) and consistency ratio (CR) are calculated as follows:

$$CI = \frac{\lambda \max - n}{(n-1)} \text{ and } CR = \frac{CI}{RI} \tag{13}$$

where $\lambda \max$ is the largest eigenvalue of the comparison matrix, n is the number of items being compared in the matrix, and *RI* is a random index. If $CR \geq 0.1$, the decision maker has to repeat the pair wise judgments again [40].

IV. THE APPLICATION OF FAHP TO EVALUATE IT IMPACTS ON CUSTOMER SERVICE PROCESS

In this research, decision maker's comparisons are described with linguistic terms that are represented by TFNs. In order to compare criteria and sub-criteria pair wisely, a questionnaire was developed. The questionnaire consists of questions dealing with IT effects on customer service process and IT capability selection criteria. We used the outputs of questionnaire as input for FAHP model. To implement pair comparisons, FTNs linguistic scale is depicted (See Fig. 2) and fuzzy transform scale is proposed in Table 2 [40].

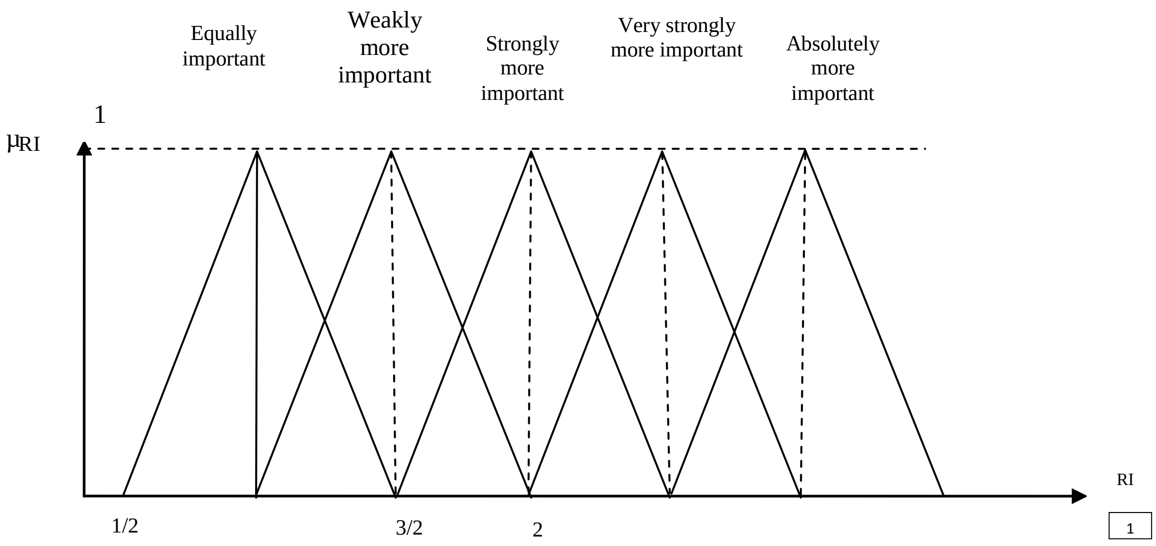

Fig. 2 Relative importance (RI) triangular number linguistic scale [40]

TABLE 2 TRIANGULAR FUZZY CONVERSION SCALE

Linguistic measures criticality	Triangular fuzzy numbers amount	Reversed triangular fuzzy numbers amount
Equally important	(1/2,1,3/2)	(2/3,1,2)
Weakly more important	(1,3/2,2)	(1/2,2/3,1)
Strongly more important	(3/2,2,5/2)	(2/5,1/2,2/3)
Very strongly more important	(2,5/2,3)	(1/3,2/5,1/2)
Absolutely less important	(5/2,3,7/2)	(2/7,1/3,2/5)

The averages of responses were calculated and the nearest linguistic measures to resulted numbers shaped FAHP input data. Because of time shortness and surplus of questions made asking upper diagonal questions of matrix, we calculated lower diagonal answers by reversing process [40]. For example, if one considers that i element is more important than j element in assuming criteria, *aij*= (3/2, 2, 5/2) may be put in upper diagonal space; and if j element is considered to be more important, pair comparison will be *aij*= (*1/u1*, *1/m1*, *1/L1*) = (2/5, 1/2, 2/3).

We used five general linguistic terms to analysis IT impacts on customer service process. The linguistic terms were opted because of expected ease of use in expert's side. As shown in Table 3, these measures are demonstrated with abbreviation signs as: AMI stands for "absolutely more important", VSMI "very strongly more important", SMI "strongly more important", WMI "weakly more important", EI "equally important", WLI "weakly less important", SLI "strongly less important", VSLI "very strongly less important" and ALI "absolutely less important". A sample question is presented in Table 3. For example, when the effects of two sub-criteria of IT human resources (IT technical skills and IT managerial skills) on customer service process are compared with each other, putting number 1 in column WLI reveals that IT technical skills are weakly less important than IT managerial skills.

TABLE 3 ANSWER TO A SAMPLE QUESTION OF QUESTIONNAIRE

ALI	VSLI	SLI	WLI	EI	WMI	SMI	VSMI	AMI	responses
			✓						1

In this research, the questionnaire was distributed among 23 information systems experts of Iranian insurance companies. Next, averaging responses fuzzy analysis matrix was calculated (Table 4). Furthermore, pair matrixes consistencies were calculated.

TABLE 4 THE FUZZY EVALUATION MATRIX WITH RESPECT TO THE GOAL

Goal	IT infrastructures (P_1)	IT Business experience (P_2)	IT relationship technologies (P_3)	IT human resources (P_4)
IT infrastructures (P_1)	(1, 1, 1)	(2/3, 1, 2)	(2/5, 1/2, 2/3)	(1, 3/2, 2)
IT Business experience (P_2)	(1/2, 1, 3/2)	(1, 1, 1)	(3/2, 2, 5/2)	(1/3, 2/5, 1/2)
IT relationship technologies (P_3)	(3/2, 2, 5/2)	(2/5, 1/2, 2/3)	(1, 1, 1)	(1/2, 2/3, 1)
IT human resources (P_4)	(1/2, 2/3, 1)	(2, 5/2, 3)	(1, 3/2, 2)	(1, 1, 1)

Using Eq. (2) presented in step 1, we have:

$$S_{P1} = (3.066, 4, 5.666) \times (0.043, 0.062, 0.070) = (0.132 , 0.248, 0. 4)$$

$$S_{P2} = (3.333, 4.4, 5.5) \times (0.043, 0.062, 0.070) = (0.143, 0.273, 0.385)$$

Using these vectors and Eq. (7) and (8), the values are calculated as:

$$V (S_{P1} \geq S_{P2}) = \frac{u1-L2}{(u1-L2)+(m2-m1)} = \frac{0.257}{0.282} = 0.911, \ V (S_{P2} \geq S_{P1}) =1$$

Finally using Eq. (9) we have:

$$V (S_{P1} \geq S_{P2,} S_{P3,} S_{P4}) = \text{Min} (0.911, 0.962, 0.668) = 0.668$$

Applying mentioned steps for other indexes, non-normalized weight vector is calculated as $W' = (0.668, 0.71, 0.644, 1)^t$. After normalization (every non-normalized weights ratio on sum of non-normalized weights), normalized weight vector of goal with regard to P1, P2, P3, P4 indexes in Table 4 are W goal= (0.221, 0.235, 0.213, 0.331).

According to results, it can be concluded that IT human resource and IT business experience are more important than other indexes. Furthermore, it can be noticed that IT infrastructure is more critical than IT relationship technologies. As a conclusion, IT human resource and IT business experience will lead to more functionality of insurance companies. Similarly, sub-criteria calculations were done as follows. Now, managers compare sub-criteria with regard to criticality of them. First sub-criteria of IT infrastructure are compared. Table 5 presents the relative importance of sub-criteria of IT infrastructures.

TABLE 5 RELATIVE IMPORTANCE OF IT INFRASTRUCTURE'S SUB-CRITERIA

P1	Computing platform (P11)	Communication network (P12)	Critical shared data (P13)	Core data processing applications (P14)
Computing platform(P11)	(1, 1, 1)	(2/3, 1, 2)	(1/2, 2/3, 1)	(1, 3/2, 2)
Communication network (P12)	(1/2, 1, 3/2)	(1, 1, 1)	(2/5, 1/2, 2/3)	(3/2, 2, 5/2)
Critical shared data (P13)	(1, 3/2, 2)	(3/2, 2, 5/2)	(1, 1, 1)	(1, 3/2, 2)
Core data processing applications (P14)	(1/2, 2/3, 1)	(2/5, 1/2, 2/3)	(1/2, 2/3, 1)	(1, 1, 1)

According to Table 5:

$$S_{P11} = (3.166, 4.166, 6) \times (0.044, 0.057, 0.074) = (0.139, 0.237, 0.444)$$

$$S_{P12} = (3.4, 4.5, 5.666) \times (0.044, 0.057, 0.074) = (0.15, 0.256, 0.419)$$

$$S_{P13} = (4.5, 6, 7.5) \times (0.044, 0.057, 0.074) = (0.198, 0.342, 0.555)$$

$$S_{P14} = (2.4, 2.833, 3.666) \times (0.044, 0.057, 0.074) = (0.106, 0.161, 0.271)$$

$V(S_{P11} \geq S_{P12}) = 0.94$, $V(S_{P11} \geq S_{P13}) = 0.7$, $V(S_{P11} \geq S_{P14}) = 1$, $V(S_{P12} \geq S_{P11}) = 1$, $V(S_{P12} \geq S_{P14}) = 1$, $V(S_{P12} \geq S_{P13}) = 0.72$, $V(S_{P13} \geq S_{P11}) = 1$, $V(S_{P13} \geq S_{P12}) = 1$, $V(S_{P13} \geq S_{P14}) = 1$, $V(S_{P14} \geq S_{P11}) = 0.635$, $V(S_{P14} \geq S_{P12}) = 0.56$, $V(S_{P14} \geq S_{P13}) = 0.287$.

$$V (S_{P11} \geq S_{P12}, S_{P13}, S_{P14}) = \text{Min} (0.94, 0.7, 1) = 0.7$$

$$V (S_{P12} \geq S_{P11}, S_{P13}, S_{P14}) = \text{Min} (1, 0.72, 1) = 0.72$$

$$V (S_{P13} \geq S_{P11}, S_{P12}, S_{P14}) = \text{Min} (1, 1, 1) = 1$$

$$V (S_{P14} \geq S_{P11}, S_{P12}, S_{P13}) = \text{Min} (0.635, 0.56, 0.287) = 0.287$$

$$W' = (0.7, 0.72, 1, 0.287)^t$$

Then, normalized vector for Table 5 is W = (0.259, 0.266, 0.369, 0.106). Based on the result, in order to enhance IT infrastructures, it can be concluded that critical shared data and communication network are more important than computing platform and core data processing application. This result indicates that critical shared data are an important function in enhancing competitive advantage of organizations in the market.

Similarly, using fuzzy extent analysis procedure, sub-criteria are compared with regard to the rest of criteria meaning IT business experience, IT relationship technologies and IT human resource. Now, with regard to all sub-criteria obtained results, a complex of priority of criteria that have an effect on customer service are presented in Table 6. As a criterion of IT relationship, technologies has only one sub-criterion meaning generic technologies, this sub-criterion’s weight is assumed 1. Integrated weight of every sub-criterion is calculated from multiplication of each sub-criterion's relative weight with weight of its main criteria.

TABLE 6 CRITERIA ANALYSIS INTEGRATED WEIGHTS PRIORITY

Main criteria	Main criteria weights	Sub-criteria	Sub-criteria relative weights	Sub-criteria integrated weights
IT infrastructures	0.221	Computing platform	0.259	0.057
		Communication network	0.266	0.059
		Critical shared data	0.369	0.082
		Core data processing applications	0.106	0.023
IT Business experience	0.235	Implicit knowledge sharing	0.5	0.11
		Explicit knowledge sharing	0.5	0.11
IT relationship technologies	0.213	Generic technologies	1	0.213
IT human resources	0.331	IT technical skills	0.316	0.105
		IT managerial skills	0.684	0.226

V. CONCLUSIONS

In a competitive environment, organizations pay increasing attention to IT application for enhancing their business performance. As customer services shape to a strategic issue of most organizations, managers are uncertain on how to apply IT resources and capabilities to have maximum performance in the competitive environment and to offer better service to customers. Then, describing a research process that help organizations on how IT influences performance is an important challenge for current mangers and organizations.

FAHP enables managers to respond to questions like how resources affect customer service and which resources must be applied to obtain better outcomes for organization and enhance competitive statues of organization. Although FAHP is a complicated methodology and implicates more quantitative calculations, its application has three advantages: 1) in unknown human judgments that data are vague, it is more structured and well-defined than other MCDM methods, 2) it brings better performance when managers deal with ambiguous data in their strategic decisions, and 3) it is a precise device which can help managers face qualitative analysis with information technology. Therefore, FAHP is utilized in this paper to evaluate IT effects on customer service process in Iranian insurance companies.

The findings demonstrate that IT human resource and IT business experience are the most important criteria that have impacts on customer service process in Iranian insurance companies. It is also concluded that implicit and explicit knowledge sharing data are of equal importance and that IT managerial skills are more important than IT technical skills.

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