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HYBRID IPA F-DEMATEL MODEL FOR ANALYSIS OF COMMITMENT, ORGANIZATIONAL LEARNING AND JOB SATISFACTION

Abstract: *When a society is in crisis, there is an increase in commitment, for only employees that are committed to their work can provide help for their company, whether that company is having serious business problems or not. It is necessary for an organization to learn how to get educated, and the key for strategic success of a company becomes the capacity for organizational education.*

Keywords: *organizational commitment, organizational learning, job satisfaction, IPA, f-DEMATEL*

1. INTRODUCTION

The degree to which an individual identifies themselves with a company and how much they is involved with realization of the company's goals represent organizational commitment [8]. Organizational commitment [17] can be defined as an inclination of an employee to identify themselves with their company and the goals it is striving to achieve, so that the employee would remain a part of the company. Managers should aim to achieve a greater job satisfaction, for doing so they can contribute to development of a higher level of commitment both personally and for their employees. Organizational commitment is in fact an additional form of job satisfaction, or even a job satisfaction to a greater extent [6].

Commitment enables better conditions for development of an employee's career, and the greater the career the bigger is the reward and proceeds, which leads to a greater level of job satisfaction [6].

Organizational learning is the capacity of a company to be competitive [15, 1]. Organizational learning has a great impact on achieving a competitive, so it is clear that organizational learning is of strategic importance for a company. Bearing that in mind, organizational learning is of great value when it comes to achieving competitiveness, and consequentially better business results. Organizational learning is becoming necessary for maintaining position in the market and survival of a company. Organizations simply don't have a choice: they are under an immense pressure to keep changing, advancing and learning. Knowledge becomes the main resource, far more important than natural, technological and financial capacities.

Job satisfaction is a general or a global concept, which includes different aspects or dimensions [7], so there is an opinion that the employees can be productive only when satisfied and that the company cannot be successful if the employees are dissatisfied. This is the reason why job satisfaction is the most researched subject in the organizational behavior field.

2. ORGANIZATIONAL COMMITMENT

The term commitment is losing its meaning nowadays [19, 18, 7]. Globalization of the society and the way of life and work of an individual, constantly implies that an employee won't be working in a single company for entire time, instead they will change companies. Commitment isn't as important as it used to be. The term commitment to an occupation is an adequate substitute for the term organizational commitment. When it comes to work environment, in today's dynamic time and space, this term is more relevant [19].

Continuous and active relationship between manager and his employees in fact represents their commitment. The willingness of an employee to make a sacrifice for the benefit of the company is organizational commitment [14]. Moreover a greater level of loyalty to the company can be considered organizational commitment. If the employee has positive attitudes, not only for their work but also for the company or some of its members [6] that too is considered to be organizational commitment. When an employee is committed to their company, makes sacrifices for it, expresses emotion and deep attachment to their company and colleagues, such an employee is committed.

There is more than one factor [6], that establish the level of organizational commitment in a company, and they are as follows:

- The nature of the job,
- The ability to do the same job for a different company,
- The nature of rewards,
- Personal characteristics of the employees,
- The attitude of the company towards the newly employed people.

Organizational commitment of the employees can have a great impact on the performance of the company. According to [6] greater organizational commitment as a consequence has an increase of employees' motivation, in fact, that is actually the key to achieving better productivity of the employees in their workplaces in the company. Productivity and organizational commitment are directly linked [16]. If there is a higher level of emotional commitment it can significantly impact the work performance of the employee and the increase in performance, whereas if the emotional commitment is continuous and constant then it has a weaker impact on work performance. Loyalty and emotional commitment are two separate things. Normative and continual commitment as a consequence have not finding the other choice but for the employee to work in the current company.

3. ORGANIZATIONAL LEARNING

Organizational Learning (OL) and Learning Organization (LO), are two separate terms. Organizational learning is a process, whereas the learning organization is at the same time both the condition and the consequence of that process [6]. Learning organization occurs in the process of the organizational learning. Companies develop the capability of organizational learning, encourage and instruct the employees to learn, and they change and upgrade their business processes quickly and easily.

When compared to the organizational learning, the learning organization uses organizational knowledge for boosting innovation and organizational effectiveness. Learning organization is a company that proactively creates, acquires and passes on the knowledge, all the while adapting the behavior of the company with regards to the new knowledge and understandings [8]. The following definition points out the characteristics of the learning organization according to [2]:

- New ideas are a necessary condition for learning. New knowledge must be shared throughout the company.
- New knowledge leads to changes in behavior.
- In contemporary business conditions constant change is inevitable, and the only stability lies in continual movement, which is based on knowledge as the most important resource.
- Successful companies:
- Acquire new knowledge,
- Share their findings throughout the entire organizational structure
- Turn this knowledge into business innovations that ensure development and contribute to the increase in efficiency of business processes.

Informational technologies provide a strong support in the process of acquiring and transferring knowledge in companies. It's the informational technologies that create the necessary conditions for creative and beneficial use of knowledge [13].

4. JOB SATISFACTION

Considering the significance of the job satisfaction, the following questions must always be asked:

- What are the things that make employees satisfied with their job?

- How to make sure the employees are satisfied with their job?

Job satisfaction is represented by the degree to which the employees are satisfied with the results of the job and the type of the reward they get [6]. That means that it is important what each individual employee values. There are some who work for a relatively small salary but as long as the job is creative, and the employee has a chance to learn and further develop their career, and has such conditions at work, then such an employee will be satisfied regardless of the small salary. Individuals assess their job based on the factors they personally find important [20].

Employees are satisfied with their job when they feel good about it. According to [12] this feeling is often connected to the sense of a job well done, the fact that they are getting better in their field or have good performance. High level of job satisfaction [3] influences:

- Increase in performance,
- Commitment to the company,
- Decrease in the absence and resignations

It has been established that job satisfaction can contribute to the psychological stability of the employees at and outside of work [18]. Job satisfaction represents the attitude of the employees more than it represents their behavior. However the consequences of that attitude have an effect on the employees' behavior:

- Satisfied workers come to work regularly,
- They work better,
- They have better work results
- They are loyal to the company.

In reality, a satisfied employee isn't necessarily more productive. Similarly, there's no strong affirmation of the assumption that the highly productive worker is at the same time satisfied.

Third point of view claims that the job satisfaction and work performance are related under certain conditions. All the while the focus is on moderate effect of the reward. According to this good work performance lead to reward of the employees, who then become more satisfied. At the same time, Fairness in the rewarding system is of great importance for the employee. The worker who achieves satisfaction in this way performs better.

The role of job satisfaction in achieving better organizational performances still hasn't been researched in its entirety [5], even though job satisfaction inevitably contributes to numerous performances in a company. The increase of work performances and productivity of employees will remain one of the most important researching subjects in the field of organizational behavior and management.

5. THEORETICAL FOUNDATIONS OF IMPORTANCE-PERFORMANCE ANALYSIS (IPA)

IPA matrix [10] hows average value of importance and performance elements of the model compared with the entire model, where the y-axes shows the value of importance, and the x-axes shows the value of performance (Figure 1).

Matrix of importance and performance is consisted of four quadrants: 1. Quadrant – elements that have great importance, but offer a low level of satisfaction. Elements that belong to this quadrant are categorized as: "Concentrate Here". 2. Quadrant – elements that have great importance and provide high level of satisfaction. Elements that belong to this quadrant are categorized as "Keep up the Good Work". 3. Quadrant – elements that have low level of importance and give low level of satisfaction. Elements that belong to this quadrant are categorized as "Low Priority". 4. Quadrant – elements that have low importance but give high satisfaction. Elements that belong to this quadrant are categorized as "Possible Overkill".

By using the IPA matrix, managers can establish the effects of using limited resources and give priorities to the elements of the model for betterment and surge in performances.

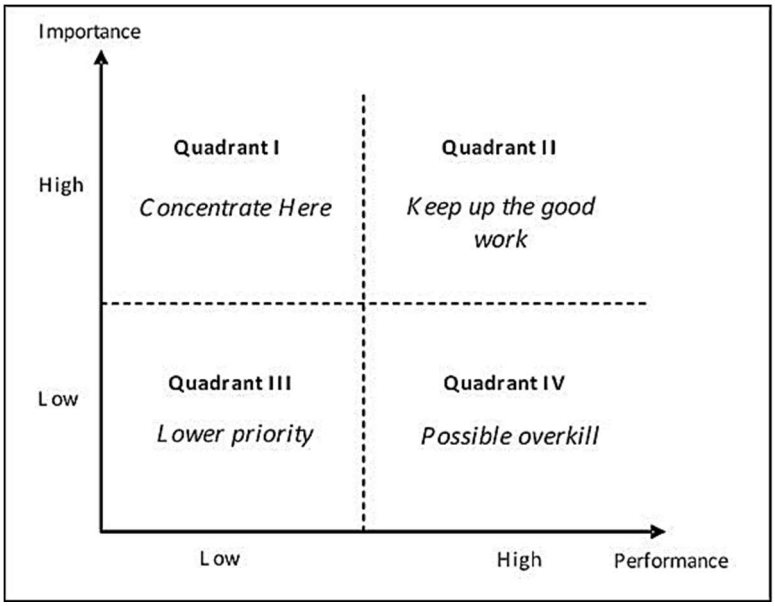

Figure 1 – Analysis of importance and performance
Source: Martilla J. A., James, J. C. (1977). Importance-Performance Analysis. Journal of Marketing. 41(1): p.78

6. THEORETICAL FOUNDATIONS OF THE METHODE FUZZY DECISION-MAKING TRIAL AND EVALUATION LABORATORY

Intuitionistic f-DEMATEL method for determining priorities of the criteria in typical decision-making problem, consists of the following steps [22, 21, 4]:

1. Step: In order to achieve the goals of decision making, there needs to be established a team of experts. The team of experts must have good experience and knowledge of the certain field of research in order to make correct managerial decisions. Once made, the team needs to compare the supposed criteria, in this case criteria for: (OC, OL, JS).

2. Step: The assessment of the alternatives is achieved by contemplating a number of criteria. Only efficient set of criteria can give a better assessment for decision-making. That's why it is important that the team of experts identifies the criteria, in this case: (OC, OL, JS) for problem evaluation, using fuzzy matrix of direct assessments. The team that determines the relationship between the criteria, in this case: (OC, OL, JS) by grading their opinions in the scale of five comparisons that are defined in the following way: 0 (Without effect), 1 (Very low impact), 2 (Low impact), 3 (Great impact) and 4 (Very high impact) (Table 1.). Using this scale the experts give their assessment for interrelationship between the criteria, in this case: (OC, OL, JS). For evaluation in this case trapezoidal fuzzy numbers are being used.

3. Step: Because trapezoidal fuzzy numbers aren't suited for matrix operations, the process of defuzzification is used in order to produce crisp numbers. Intuitionistic Fuzzy direct relation matrix (M) is expressed with formula (formula 1.):

$$\mathrm{M} = \frac{1}{4}(a_1 + a_2 + a_3 + a_4) \quad (1)$$

Table 1 – Intuitionistic Fuzzy verbal scale

verbal term	Result of the impact	Intuitionistic trapezoidal Fuzzy number	Expected crisp value
Without effect	0	(0; 0; 0; 0)	0
Very low impact	1	(0; 0,1; 0,2; 0,3)	0,15
Low impact	2	(0,3; 0,4; 0,5; 0,6)	0,45
Great impact	3	(0,7; 0,8; 0,9; 1)	0,85
Very high impact	4	(1; 1; 1; 1)	1

4. Step: Normalizing direct relation matrix (N) is derived using (formulas 2. and 3.) (Lin, 2013):

$$L = Min\left[\frac{1}{Max\sum_{j=1}^{n} a_{ij}}, \frac{1}{Max\sum_{i=1}^{n} a_{ij}}\right] \quad (2)$$

$$N = L \text{ x } M \quad (3)$$

5. Step: By transforming the normalizing direct relation matrix (N) we get a total relationship matrix (T), using (formula 4.):

$$T = N \text{ x } (I - N)^{-1} \quad (4)$$

6. Step: We calculate the causal parameters using (formula 5. and 6.), R represents the sum of rows, and D the sum of columns:

$$R = \left[\sum_{i=1}^{n} a_{ij}\right]_{n\ x\ 1} \quad (5)$$

$$D = \left[\sum_{j=1}^{n} a_{ij}\right]_{1\ x\ n} \quad (6)$$

7. Step: In the end the cause and effect diagram which consists of the (D+R) and (D-R) values is drawn.

7. EMPIRIC RESEARCH

IPA results are shown in the (Table 2.) and in the (Figure 2.) for a sample of ten experts. Average value of importance is 4,33 and average value of performance is 3,76, and they are used as a basis for determining: the importance of each criteria as "high" or "low", and performances of each criteria as "good" or "bad".

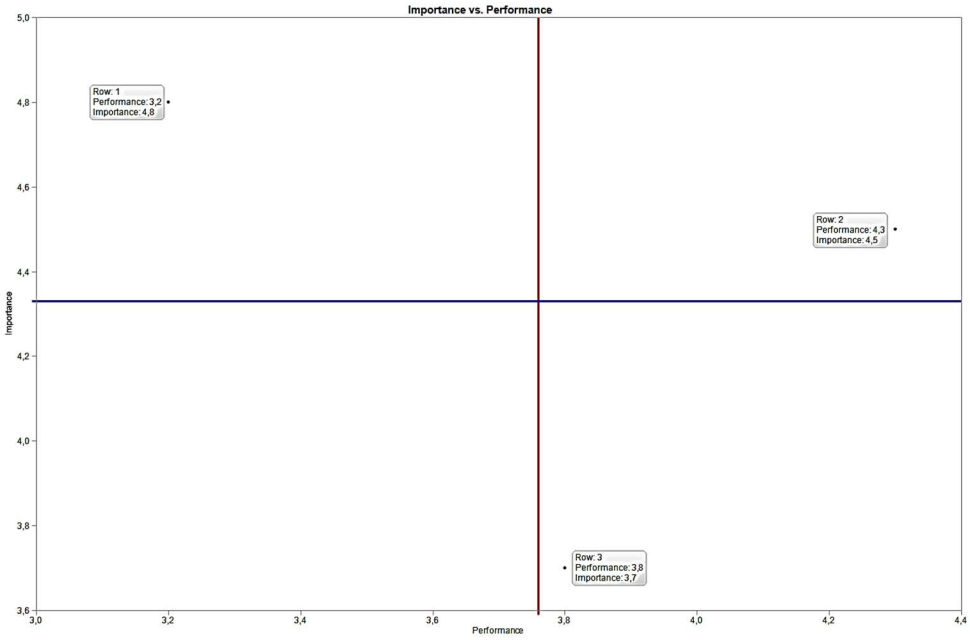

Figure 2 – IPA matrix for OC, OL and JS criteria

OC criteria has high importance but offers low level of performance. It belongs to the 1. quadrant "Concentrate Here". Criteria OL has high importance and high performance. It belongs to the 2. quadrant" Keep up the Good Work". Criteria JS has low importance, but high performance. It belongs to the 4. quadrant "Possible Overkill".

It can be concluded that the experts assign high value to the importance and performance for the OL criteria, they also assign high value for the OC criteria, but they are displeased with performance for this criteria, and finally they assign low level of importance for the JS criteria, but are pleased with performance for said criteria.

Shown below are the calculations for the f-DEMATEL method. In (Table 3.) are listed the

values of impact given by ten experts for OC, OL and JS criteria.

Table 2 – Analysis of importance and performance for OC, OL, JS criteria

No	criteria	importance	performance	Management of strategies
a1	OC	4,8	3,2	"Concentrate Here"
a2	OL	4,5	4,3	" Keep up the Good Work"
a3	JS	3,7	3,8	"Possible Overkill"
average		4,33	3,76	

Table 3 – Opinions of 10 experts on following criteria

	OC	OL	JS
OC	0	3,2,3,3,2,1,3, 3,4,2	2,3,3,2,3,2,4, 2,4,3
OL	3,2,3,4,3,3,1, 2,3,3	0	2,3,1,2,3,3,4, 3,4,2
JS	2,2,3,4,3,1,2, 3,3,2	2,2,4,3,2,2,3, 2,3,3	0

Table 4. shows average values of opinions of ten experts for OC, OL and JS criteria, and are calculated as average values for the criteria in crisp numbers.

In (Table 5.) you can see normalizing matrix (N) of impact on a sample of ten experts for OC, OL and JS criteria.

Complete method of calculating the total relationship matrix for OC, OL and JS criteria, is shown in (formulas 7 – 10):

Table 4 – Average opinions of 10 experts on following criteria

	OC	OL	JS	Σ
OC	0	0,675	0,72	1,395
OL	0,715	0	0,69	1,405
JS	0,635	0,662	0	1,297
Σ	1,35	1,337	1,41	4,097

Table 5 – Normalizing matrix of impact of 10 on experts on following criteria

	OC	OL	JS
OC	0,000	0,479	0,511
OL	0,507	0,000	0,489
JS	0,450	0,470	0,000

In (Table 6.) you can see total relationship matrix values for (OC, OL, JS).

$$T = N \text{ x } (I - N)^{-1} \quad (7)$$

Where:

Identity matrix I:

$$\begin{pmatrix} 1.00 & 0.00 & 0.00 & 0.00 \\ 0.00 & 1.00 & 0.00 & 0.00 \\ 0.00 & 0.00 & 1.00 & 0.00 \\ 0.00 & 0.00 & 0.00 & 1.00 \end{pmatrix}$$

(N) Normalizing matrix N:

$$\begin{pmatrix} 0.00 & \frac{479.00}{1000.00} & \frac{511.00}{1000.00} \\ \frac{507.00}{1000.00} & 0.00 & \frac{489.00}{1000.00} \\ \frac{9.00}{20.00} & \frac{47.00}{100.00} & 0.00 \end{pmatrix}$$

(I-N) (8)

$$\begin{pmatrix} 1.00 & 0.00 & 0.00 \\ 0.00 & 1.00 & 0.00 \\ 0.00 & 0.00 & 1.00 \end{pmatrix} - \begin{pmatrix} 0.00 & \frac{479.00}{1000.00} & \frac{511.00}{1000.00} \\ \frac{507.00}{1000.00} & 0.00 & \frac{489.00}{1000.00} \\ \frac{9.00}{20.00} & \frac{47.00}{100.00} & 0.00 \end{pmatrix} = \begin{pmatrix} 1.00 & -0.48 & -0.51 \\ -0.51 & 1.00 & -0.49 \\ -0.45 & -0.47 & 1.00 \end{pmatrix}$$

Table 6 – Total relationship matrix for (OC, OL, JS) criteria

	OC	OL	JS	D	R	D+R	D+R	D-R	D-R
OC	9,972	10,245	10,616	30,833	30,134	60,967	1	0,699	2
OL	10,357	9,970	10,657	30,984	29,981	60,965	2	1,003	1
JS	9,805	9,766	9,786	29,357	31,059	60,416	3	-1,702	3

$$(I - N)^{-1} \tag{9}$$

$$\begin{pmatrix} 1.00 & -0.48 & -0.51 \\ -0.51 & 1.00 & -0.49 \\ -0.45 & -0.47 & 1.00 \end{pmatrix}^{(-1.00)} = ?$$

$$\equiv$$

$$\left(\begin{array}{ccc|ccc} \textcircled{1.00} & -0.48 & -0.51 & 1.00 & 0.00 & 0.00 \\ -0.51 & 1.00 & -0.49 & 0.00 & 1.00 & 0.00 \\ -0.45 & -0.47 & 1.00 & 0.00 & 0.00 & 1.00 \end{array}\right) \sim$$

Pivot element: $p_1 = a_{11} = 1.00$

$$\frac{a_{1,1} \times a_{i,j} - a_{i,1} \times a_{1,j}}{p_0} \rightarrow a_{i,j}$$

$$\equiv$$

$$\left(\begin{array}{ccc|ccc} 1.00 & -0.48 & -0.51 & 1.00 & 0.00 & 0.00 \\ 0.00 & \textcircled{0.76} & -0.75 & 0.51 & 1.00 & 0.00 \\ 0.00 & -0.69 & 0.77 & 0.45 & 0.00 & 1.00 \end{array}\right) \sim$$

Pivot element: $p_2 = a_{22} = 0.76$

$$\frac{a_{2,2} \times a_{i,j} - a_{i,2} \times a_{2,j}}{p_1} \rightarrow a_{i,j}$$

$$\equiv$$

$$\left(\begin{array}{ccc|ccc} 0.76 & 0.00 & -0.75 & 1.00 & 0.48 & 0.00 \\ 0.00 & 0.76 & -0.75 & 0.51 & 1.00 & 0.00 \\ 0.00 & 0.00 & \textcircled{0.07} & 0.69 & 0.69 & 0.76 \end{array}\right) \sim$$

Pivot element: $p_3 = a_{33} = 0.07$

$$\frac{a_{3,3} \times a_{i,j} - a_{i,3} \times a_{3,j}}{p_2} \rightarrow a_{i,j}$$

$$\equiv$$

$$\left(\begin{array}{ccc|ccc} 0.07 & 0.00 & 0.00 & 0.77 & 0.72 & 0.75 \\ 0.00 & 0.07 & 0.00 & 0.73 & 0.77 & 0.75 \\ 0.00 & 0.00 & 0.07 & 0.69 & 0.69 & 0.76 \end{array}\right)$$

$$\equiv$$

$$\begin{pmatrix} 1.00 & -0.48 & -0.51 \\ -0.51 & 1.00 & -0.49 \\ -0.45 & -0.47 & 1.00 \end{pmatrix}^{(-1.00)} = 14.25 \times \begin{pmatrix} 0.77 & 0.72 & 0.75 \\ 0.73 & 0.77 & 0.75 \\ 0.69 & 0.69 & 0.76 \end{pmatrix} = \begin{pmatrix} 10.97 & 10.25 & 10.62 \\ 10.36 & 10.97 & 10.66 \\ 9.81 & 9.77 & 10.79 \end{pmatrix}$$

$$\equiv \qquad \equiv \qquad \equiv$$

$$T = N \text{ x } (I - N)^{-1} \tag{10}$$

$$\begin{pmatrix} 10.97 & 10.25 & 10.62 \\ 10.36 & 10.97 & 10.66 \\ 9.81 & 9.77 & 10.79 \end{pmatrix} \times \begin{pmatrix} 0.00 & 0.48 & 0.51 \\ 0.51 & 0.00 & 0.49 \\ 0.45 & 0.47 & 0.00 \end{pmatrix} =$$

$$\equiv \qquad \equiv$$

$$\begin{pmatrix} 10.97 \times 0.00 + 10.25 \times (0.51) + 10.62 \times (0.45) & 10.97 \times (0.48) + 10.25 \times 0.00 + 10.62 \times (0.47) & 10.97 \times (0.51) + 10.25 \times (0.49) + 10.62 \times 0.00 \\ 10.36 \times 0.00 + 10.97 \times (0.51) + 10.66 \times (0.45) & 10.36 \times (0.48) + 10.97 \times 0.00 + 10.66 \times (0.47) & 10.36 \times (0.51) + 10.97 \times (0.49) + 10.66 \times 0.00 \\ 9.81 \times 0.00 + 9.77 \times (0.51) + 10.79 \times (0.45) & 9.81 \times (0.48) + 9.77 \times 0.00 + 10.79 \times (0.47) & 9.81 \times (0.51) + 9.77 \times (0.49) + 10.79 \times 0.00 \end{pmatrix} = \begin{pmatrix} 9.97 & 10.25 & 10.62 \\ 10.36 & 9.97 & 10.66 \\ 9.81 & 9.77 & 9.79 \end{pmatrix}$$

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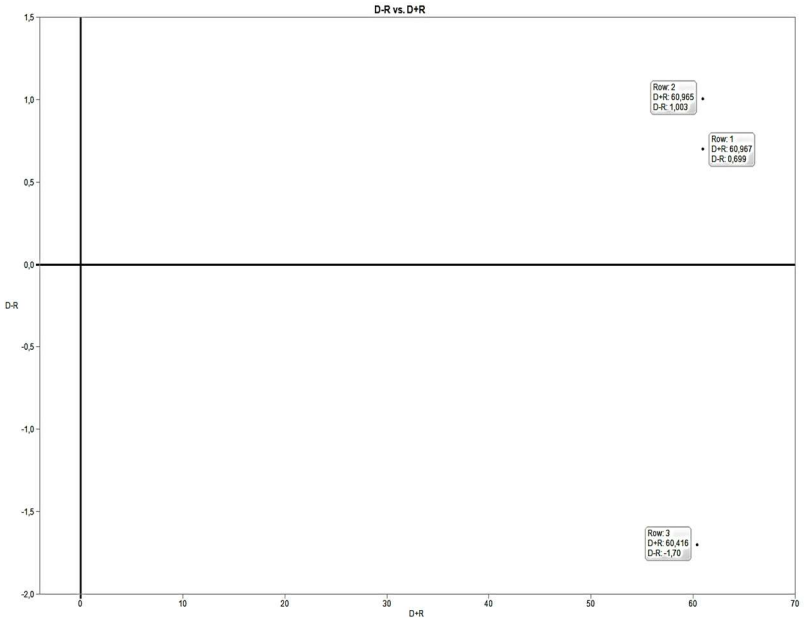

Figure 3 – Causal diagram of the proposed criteria

Figure 3 represents a Causal diagram of the criteria, arranged according to the (OC, OL, JS) criteria [21].

In the Causal diagram, (Figure 3.), the axes (D+R) represents the importance of OC, OL and JS criteria – factor of success which is ranked in the following way: highest impact on the company has the organizational commitment OC, then organizational learning OL and finally job satisfaction JS, whereas the (D-R) axes which shows the cause of impact for OC, OL, JS – and the critical factors are defined in the following way: highest impact has organizational learning OL, then organizational commitment OC and finally once again job satisfaction JS.

8. CONCLUSION

Hybrid model of decision-making using IPA and f-DEMATEL methods has proven that the two methods, when combined, complement each other and both are suitable for solving problems by group decision-making in a sensitive environment. Both methods are excellent and important for decision-makers, for they give the possibility to research each complex problem in decision-making. Results of experts' opinion on proposed criteria OC, OL, and JS can neatly be represented by combining IPA matrix and Causal diagram.

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