INTERPERSONAL NETWORKS AND LEADERSHIP IN MULTILINGUAL GROUPS, CASE STUDY

RELATII INTERPERSONALE SI MANIFESTAREA LIDERILOR IN GRUPE MULTILINGVE, STUDIU DE CAZ

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Abstract. *Managementul unui grup de lucrători aflaţi în colaborare intensă necesită o înaltă înţelegere a relaţiilor interpersonale stabilite în colectiv. Aceste relaţii pot fi interpretate greşit datorită lipsei informaţiei sau subiectivităţii managerului. În această lucrare se vor explora metode noi de interpretare a relaţiilor interpersonale prin utilizarea chestionarelor, tehnicilor statistice şi algoritmilor de stabilire a gradelor de relevanţă, pentru a reduce erorile umane si a uşura sarcinile manageriale.*

Cuvinte cheie : *Lider, relaţii interpersonale, informatică, alegeri, PageRank, management social*

JEL CLASSIFICATION: C80, C99, M50, M54

INTRODUCTION

Managers have the hard task of observing the behavior of their employees and assuming what they are thinking. One of the hardest tasks of this type is finding what relationships have been established in a certain group and which are the people that need to be encouraged and helped in order to integrate themselves better in a group.

Purpose and methodology

To work around incomplete information and reduce subjectivity, the author and coordinators have organized a study having applied the empirical scientific approach and the scientific tools as follows: Data collection based on a survey and data analysis by the use of the matrixial way to run a basic PageRank algorithm, representing a relative scientific novelty in the way it is implemented by this study .

As such the objectives of the study are:

- To create and test a confident mathematically based management tool that could help visualize a group's interpersonal network, improve effectiveness of teambuilding strategies, by finding individuals with high potential and manage risks by identifying weak links.
- To analyze differences between one's personal beliefs and perceptions and that of the groupof people in which they manifested their behavior.

The methodology has been tested upon an academic group of first year bachelor students, International Economic Relations Faculty from the Academy of Economic Studies of Moldova. The study language of the group is English (third language), while having different native languages split between them. To note that casual interactions between them are usually done in their respective native languages.

BASE CONTENT

The research was done in two steps: first, data collection through a questionnare and secondly, interpreting the collected data through quotinents and ranking algorithms.

The questionnare was composed of three different categories of questions: Relations, Outward Perceptions and Inward Perceptions. To note respondents could only offer points to others and that responses regarding one's own score were not included. The first section is made up of three questions regarding frequency of interaction with others, confidence level of others and leading capabilities of others. For each member, you had to choose between 0 (or 1) and 5, depending on the question. The first question, regarding how much you interacted, is affected by individual perceptions of what frequency of interaction represents, it may have the scale of interaction with the group, or it could have the scale of interaction of all of your relations, inside and outside the group. Absences increase the difference in reciprocality significantly. To rescale the values to mean group interactions we can use the quotinent of each raw value out of the sum of values distributed by each person. Table 1 shows the sum of the absolute value of the differences between points given and received. As such it demonstrates the „agreement" of the level of interaction that person has with the group as a whole.

Score inflators represent scale modifiers such as connections with a high number of low frequency members, extra interactions with some members (in your free time), and high activity in the community. The exact opposide has the same effect. A low score means you share scales with many members. That, in turn means that you have confident relationships. Individual scores can vary between sum given (1) + sum recieved (<18, ussualy below 2). Group sum score could be used to analyze unity/ evenness within a group and also frequency of students coming to university.

Table 1. Interaction Agreement (Reciprocality) Table

THE INTERACTION AGREEMENT TABLE, RAW AND QUOTINENT FORM								
St number	**St 1**	**St 2**	**St 3**	**St 4**	**St 5**	**St 6**	**St 7**	**St 8**	**St 9**
Normal	16	23	21	29	22	20	23	15	17
Quotinent	0,215	0,356	0,455	0,673	0,467	0,486	0,582	0,355	0,319
St number	**St 10**	**St 11**	**St 12**	**St 13**	**St 14**	**St 15**	**St 16**	**St 17**	**St 18**
Normal	15	19	22	38	17	36	27	13	11
Quotinent	0,388	0,383	0,401	0,427	0,530	0,572	0,494	0,285	0,294

Source: Elaborated by the author based on survey results

The further use of the first question is calculating networking capacity of each individual. Using the algorithm based on Markov chains (Markov, 2006) described in Table 2 we can find the ability of a person to connect to members of the group, according to their relevance for each member. Since you could give scores from 0-5 we should represent the data in quotients, (Paul, 1916) so the scores sum 1 for each member.

Table 2. PageRank Matrixial Model

MATRIX OF WIEGHED CHOICES				SCORE MATRIX	EIGENVECTOR MATRIX
N => (3)	**POINT GIVERS**		**SUM MAX= N**		
	0	1	0,5	**EQUAL PART OF 1 GIVEN TO ALL 1/N**	**SCORE ACCORDING TO GEN**
	0,5	**0**	0,5	**SUM OF POINTS RECEIVED**	
POINT TAKERS	0,5	0	**0**		
SUM= 1	**SUM OF POINTS GIVEN**			**SUM =1**	**SUM =1**
FOR M GOES TO INFINITY, (MATRIX OF WIEGHED CHOICES)^M*SCORE MATRIX =E MATRIX					

Source: Elaborated by the author based on survey results

A perfect group would have all scores around the average, which in the case of Table 3 should be 5,5. When we compare Table 1 to Table 3, we observe that a person's networking score is strongly related to their understanding of relationships. Outliers in this comparisson can be explained through

relations with low frequency students. It would be expected that at least one or a couple of high rankers in Table 3 would have high scores in Table 1. (ex. St 11).

Table 3. Interaction Network Scores

Networking score, based on interaction itteration								
St Number	**St 1**	**St 2**	**St 3**	**St 4**	**St 5**	**St 6**	**St 7**	**St 8**	**St 9**
GEN 1	6,2%	7,5%	6,4%	4,6%	4,5%	4,8%	6,5%	7,1%	5,7%
GEN 8	6,4%	7,3%	6,3%	4,1%	4,7%	5,0%	6,5%	7,1%	5,9%
St Number	**St 10**	**St 11**	**St 12**	**St 13**	**St 14**	**St 15**	**St 16**	**St 17**	**St 18**
GEN 1	4,4%	7,2%	6,0%	4,9%	3,1%	3,1%	4,5%	6,6%	6,8%
GEN 8	4,0%	7,3%	6,2%	4,3%	2,9%	2,8%	4,8%	7,0%	7,1%

Source: Elaborated by the author based on survey results

To calculate the confidence score, we would use first, a quotient of points given, then a sum of horizontal values, lastly, another quotient of the horizontal sums sum. This is the same as a first itteration of the PageRank algorithm.

To calculate pure leadership, we use the Table 2 method again. These scores would represent the leader that would assure the best chain of command, based on links of „authority". This makes the assumption of authority being trasferable in a top to bottom direction. For this to function, members of the group would need to engage in prolonged discussion. As a result, the first itteration (Rank 1), is the current situation, with everyone rataining their own opinion, while further itterations of the PageRank algorithm would be predictions beased on T=Generation (GEN) amount of time debating the question.

Table 4. Pure Leadership Score

Pure, Optimized Leadership								
St Number	**St 1**	**St 2**	**St 3**	**St 4**	**St 5**	**St 6**	**St 7**	**St 8**	**St 9**
1 GEN	4,37%	8,74%	4,31%	4,25%	3,96%	5,04%	10,06%	6,00%	7,92%
10 GEN	4,80%	8,97%	4,29%	3,89%	4,05%	4,78%	10,57%	6,42%	7,43%
St Number	**St 10**	**St 11**	**St 12**	**St 13**	**St 14**	**St 15**	**St 16**	**St 17**	**St 18**
1 GEN	4,10%	9,14%	9,53%	1,92%	0,97%	5,26%	2,68%	8,04%	3,69%
10 GEN	4,35%	9,80%	9,12%	1,40%	0,96%	4,64%	2,52%	8,21%	3,81%

Source: Elaborated by the author based on survey results

Notice that leader scores do not correspont perfectly with the relationship scores. The Optimum Leader is not someone with a lot of relations, but someone that has the respect of others. In the case of a multilingual group, a person capable of communicationg with the majority of the group, while also showing leader qualities is naturally preferred. (Bruce J. Avolio, 2009)

To calculate the chance of winning an election, we must first find a way to compose all these different indicators. From the relationship and leader questions, we will take only the highest values given out by each member, giving the equal weight. Lastly we will take the confidence score. In order to combine this we will use a weighted sum of the three indicators, based on the assumption that 35% of weight is be attributed to leadership, 40% to relations and 15% to confidence. Table 5 shows the results.

Table 5. Election Winning Chance

ELECTION WINNING CHANCE								
Student no.	**St 1**	**St 2**	**St 3**	**St 4**	**St 5**	**St 6**	**St 7**	**St 8**	**St 9**
Election %	0%	6%	4%	4%	2%	1%	23%	2%	5%
Student no.	St 10	St 11	St 12	St 13	St 14	St 15	St 16	St 17	St 18
Election %	1%	25%	13%	1%	0%	6%	0%	5%	1%

Source: Elaborated by the author based on survey results

From this conclusions can be made upon the importance of relationships in small group elections. It would seem as though even while showing high levels of leadership capabilities, one's ability to win the vote of others is more dependant on one's relationships with the voters. To note that, even whilst being very close, the group would not necessarily choose the „best" leader. In fact, probably any of the first 3-5 rankers would be fine leaders. A good manager would have to consider other factors when choosing between them.

CONCLUSION

Upon analysis of the survey data, it becomes possible to deduce some characteristics of the group, these being even more valuable in the hands of people in direct contact with the group. In the case of this paper, no names were made public, as agreed with the survey takers. Managers, on the other hand, would have access to them when doing this for themselves. This allows the observer to make very specific, highly accurate assumptions over the situation of each individual in the group, and, in turn, take valuable measures to improve the wellbeing of the group. This kind of study, may only be used amongs groups of peers and requires the survey maker to be in a position of social distance from the group. Normally, such a study should not involve the person making it. One of the biggest problems that could appear in a group could be gender related. If the group subdivides in gender related subgroups, that could harm unity, especially long-term. As a countermeasure, this study would facilitate the identification of candidates that could bridge the subgroups and reunite the group. A specific characteristic of the group studied is its polynuclear leadership. This could be partly caused by the different native languages of the members, that inhibits their ability to leave their confort zone in pursuing new relations. English seems to be just the academic language. Some of the other reasons seem to be gender related, as stated above.

A notable result of the implementation of the PageRank algorithm is that the group does not naturaly tend toward inclusion of all members. This may be due to the nature of the algorithm, but more likely is either a specific characteristic of the group surveyed, or it could demonstrate the importance of collaboration incentives in bringing groups together.

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