The Role Of Leadership Inside Organizations In The Context Of Globalization

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Abstract: *Any organization, irrespective of the field, needs skilled leaders who have a vision and confidence in action.The leader plays various roles and the key issue is to determine how they influence the performance of the team they coordinate. The research method used was the mathematical modeling applied to the example of a team. The aim of the research is to identify the cooperation method in order to improve workers' performance but also to minimize the possible conflicts which can affect the level of performance. The results of this research led us to conclusions regarding the characteristics of the team leader.*

Key words: leader, organization, performance, models

JEL Classification: D23, F15,

Introduction

In order to ensure its success on the new market and society structure, an organization should take into account various factors, such as human resources, product quality and offered services, competition. But it must not overlook the fact that one of the most important factors is the way of organizing the employee teams and their managers. Their performance depends not only on the workers' and managers' individual skills, but also on dynamic, that is both the team members and their leaders can change.(Bennis 2009)

Among the new obtained perspectives there is the fact that having a qualified leader can be more important for the team's performance than the control on the team members. Furthermore, another result is related to the fact that a qualified leader, when attaining cooperation, can overcome or at least minimize the interacti on issues among the team members, issues which can damage the team's performance level.(Draghici, Nistor, Popescu, Macarie , 2008)

Related to improving a team's performance, specialized publications mainly focused on forming methods and feedback. Despite all this, managers can intentionally replace the members of a team when other methods do not allow the reach of the wanted results. The impact of hiring new members can be substantial: hiring the wrong person can lead to wasting the firm's resources.

Research methodology

The main challenge of this initiative is given by including on the team a leader who controls, motivates and leads the team towards a common goal. The key problem is to determine how the leader influences the performance of the team they coordinate.

For the mathematic modeling there are the following notations:

- N = number of jobs or workplaces on a team.
- K = number of workers that affect the contribution of each team member.
- x = (x_1,..., X_n) represents the team, where each xi ≡ {0, 1}.
- $x_i^k = (x_{i-[k/2]}, ..., x_{i-1}, x_i, x_{i+1}, ..., x_{i+[k/2]})$, evolving cyclic if necessary.
- z = team leader.
- pi(xi ^{k},z) = a number between 0 and 1 that represents the contribution of worker $x_{i,}$ who depends on the team x , the leader z and K- other workers.

The closer to 1 pi(xi ^{k,}z) is, the more worker xi contributes to the performance of team x.

- p(x, z) = performance of team x with the leader z.
- (x*, z) = a local maximum of team x* with the leader z whose level of performance is higher or the same in all the situations of replacing team members.
- E (p (x*, z)) = expected performance by the local maximum of team x* with the leader z.

Results

In the simplest case, a team is made up of at least two workers, aspect noted with A = 2. Each of the 2 N teams is represented by a binary N-vector, x = (x1,..., xn), where xi = 0 means that one of the two available workers is chosen for the position i and xi = 1 means that another worker is chosen for this position.

By introducing a leader z, the contribution of the worker i depends not only on worker xi but also on the contribution of other members of team K, but also on the leader z, aspect reflected mathematically on the following ratio:

$$p(\mathbf{x}, z) = \frac{\sum_{i=1}^{N} pi(\mathbf{x}_i^K, z)}{N}$$

(1)

Next, we associated the following two new parameters with the leader:

- μ = a non-negative number which represents the level of qualification of the leader when achieving cooperation among workers. If μ is 0, the leader has no qualification, and as the value of μ is higher, the leader has more abilities/qualifications.

- σ = a non-negative number which represents the leader's variation, which practically refers to the variation of the leader's ability to achieve cooperation among different subordinates. If the value of this parameter is closer to 0, we can talk about the fact that the leader elicits the most of each real team member performance. Since this parameter increases, the influence of the leader concerning performance varies from one team member to another.

Each constant choice of people for the N positions inside the team x, whose performance can be modeled as a real number, p(x), with values between 0 and 1.

Thus, when A is close to the value of 1, it indicates a team with relatively good performance, and when A has a value close to 0 it indicates a team with a relatively weak performance.

It is assumed that each position i contributes with an amount pi (x_i^k) to the team's performance. In the case when p_i (x_i^k) depends on the worker in position i and the workers in other positions K on the team (0 ≤ K ≤ N - 1), we can assert that positions K/2 on each side of position i, require the repetition of evaluation cycle. (Fitzsimmons J.., Fitzsimmons Mona, 1998)

Therefore, if K = 0 it means that the contribution to the team performance depends only on the worker in position i, and for K = N - 1 it means that the contribution to the team performance in position i depends on the worker in position i and on the workers on all the other N – 1 team positions.

Generally, there can be 2 k+1 possible combinations for the workers from K +1 positions to affect position i, so that we can define the value of pi (xiK) for one of 2 k+1 , consistent random value between 0 -1 – that corresponds to the combinations of workers in position i and K- team positions. The performance p(x), of team x is then considered as being the average of these contributions:

$$p(x) = \frac{\sum_{i=1}^{N} p_i(x_i^K)}{N} \quad (2)$$

Given the values for N, K and N – charts for 2N+1 consistent random value from the interval 0-1, we will aim to find the global maximum, that is a team whose performance is better than that of all the other teams.

Starting with an initial team - x, by replacing the worker in position i with another worker available for that position we create a new team - x′, obtaining what it is called in this case" a replacing neighbor for x". The new team is only kept if x′ has better performance than x. This replacing process implies a sequence of teams, each with a better performance than the one of its predecessor, so that the sequence continues until it reaches a local maximum, that is a team whose performance is better or the same for all the versions of team member replacement. Therefore, using computer simulations with the help of SPSS program, we obtain chart no.1 with the values associated to expected performance for a team when N = 20 and K = 10.

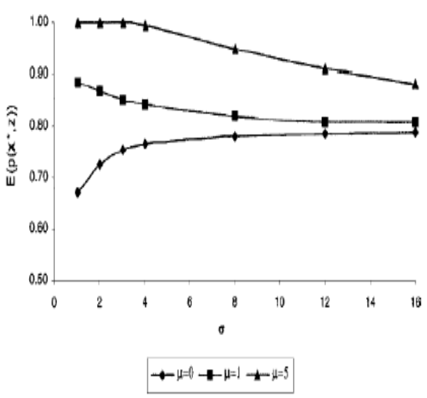
Table 1. Performance of the team according to the leader's level of qualification and the degree of cooperation among the team members

σ	$\mu = 1$	$\mu = 2$	$\mu = 5$
1	0.67000	0.88516	1.00000
2	0.72655	0.86783	0.99996
3	0.75301	0.85182	0.99931
4	0.76623	0.84334	0.99535
8	0.77877	0.81976	0.94874
12	0.78575	0.80903	0.91006
16	0.78967	0.80748	0.88390

Source: Buiga, A., (2009), Statistică inferențială. Aplicații în Spss, Todesco, Cluj Napoca

Graphically, the situation is presented in diagram no.1:

Diagram no.1 – Variation of team performance according to the leader's level of qualification and the degree of cooperation among the team members



We can notice that the team performance is the highest when the maximum number of workers that need to be coordinated is 4 and the leader has a high number of qualifications (in our case μ is 5).

The following approach incorporates the leader's ability to achieve a good relationship among workers for a fixed sum of interactions among them. This relationship can be limited to offering advice or the attempt to solve interpersonal conflicts among team members so that they work better together and, so, closer to the maximum individual abilities.(Abrudan 2009)

In this case it is necessary to add a set of notations:

- $a_i\ (x_i)$ = a worker's least possible contribution - xi ($0 \le a_i\ (x_i) \le 1$).
- b_i (xi) = a worker's biggest possible contribution - x_i ($0 \le b_i\ (x_i) \le 1$).
- $r_i\ (x_i^{\ k}, z)$ = a - a number between 0 and 1, which represents the relationship achieved by leader z between worker xi and K ≥ 1 the other workers who affect the performance of worker xi.

If $r_i\ (x_i^{\ k},z)$ is closer to 1, leader z achieves a better collaboration between worker xi and the other workers K.

In the case when the work group leader does not have any specialization, it can be assumed that each worker contributes to team performance in the interval [ai (xi), bi (xi)], where:

$a_i\ (x_i)$ = min $\{u_1,u_2\}$, $b_i\ (x_i)$ = max $\{u_1,u_2\}$, u_1,u_2 U [0,1] (3)

The relationship ri ($x_i^{\ k}$,z) U [0,1] achieved by leader z between worker xi and other workers K is then used to determine the time when worker xi contributes effectively in the interval [ai(Xi), bi (xi)]. That is, the contribution to performance of a worker xi is computed as a convex combination of the following elements ai (xi) and bi (xi):

$p_i\ (x_i^k,z) = (1\text{-}r_i(x_i^k,z))a_i(x_i)+r_i(x_i^k,z)(b_i(x_i)$ (4)

and the team performance p (x, z), is the average of all the worker's contributions.

We can notice from the formula (4) that when the relationship ri (xi k ,z) is close to 1, the leader reaches a high level of cooperation between worker xi and K- other workers, therefore the performance of worker xi is closer to the maximum individual potential, noted $b_i(x_i)$.

As well, when the relationship $r_i(x_i^k, z)$ is closer to 0, the leader determines that the performance of worker xi is closer to the minimum individual potential, noted $a_i(x_i)$.

Since the relationship's variable is generated in the interval U [0, 1], the leader is declared to be without any specialization.

In conclusion, in the case when the team leader does not have a specialization in this way, the team can obtain a series of advantages when there is a low quantity of interaction among workers. When the team is coordinated by a specialized leader, this characteristic is included in the following approach by generating values for the relationship's variables from a normal distribution with parameters μ and σ. The approach is carried out in two steps, as follows:

- a random number will be generated - y from a normal distribution N (μ, σ) and then
- there will be computerized attempts for the relationship $r_i(x_i^k, z)$ in the area of normal distribution N (μ, σ) for number y.

Notational, relationship $r^i(x_i^k, z) = \Phi(y)$, where y ~ N (μ, σ).

The computer simulations with the help of SPSS programs are presented in the table no.2 and they compare the expected performance at the level of the team for the various levels of qualifications of the leader.

Table.2. Expected performance at team level according to K and N

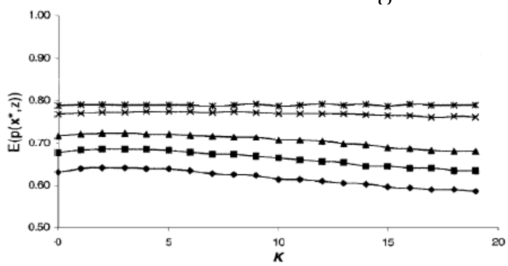
N(μ,σ) / K	N(0,0)	N(0.5,1)	N(1,1)	N(2,1)	N(3,1)
0	0,63215	0,67708	0,71746	0,76881	0,7891
1	0,63916	0,68455	0,72133	0,77164	0,79016
2	0,64179	0,68725	0,72374	0,77314	0,79144
3	0,64318	0,68766	0,72431	0,77338	0,79092
4	0,6411	0,6856	0,72261	0,77504	0,79041
5	0,63896	0,68354	0,72145	0,77446	0,79154
6	0,63507	0,67965	0,71968	0,77435	0,79217
7	0,62943	0,67591	0,71792	0,77464	0,78866
8	0,6264	0,6753	0,71618	0,77345	0,79086
9	0,62386	0,67191	0,71462	0,77202	0,79261
10	0,62568	0,66598	0,70825	0,77156	0,79152
11	0,61552	0,66154	0,70788	0,77097	0,79262
12	0,61029	0,65687	0,70715	0,77013	0,78898
13	0,60561	0,65449	0,69931	0,76956	0,79273
14	0,60377	0,64744	0,69703	0,76755	0,79194
15	0,5969	0,64769	0,69116	0,76723	0,7916
16	0,59463	0,64312	0,68978	0,76321	0,79158

17	0,59142	0,64192	0,68547	0,76363	0,78256
18	0,59093	0,63586	0,68154	0,76173	0,78489
19	0,58768	0,63556	0,68119	0,76098	0,78899

Source: Constantin Draghici, Gheorghe Nistor, Marin Nicolae Popescu, Marius Macarie , (2008), Modelarea matematica in economie, Editura Tiparg, Bucuresti

These aspects can be shown graphically in diagram no.2.

Diagram no.2. Interpretation of expected performance at team level according to K and N



Taking into account that the range of contributions is in the interval [ai (xi), bi (xi)], the model allows different workers to have different contribution levels. The simulation results presented in chart no. and diagram no. emphasize the way in which the leader's qualification variation affects the team performance for the fixed values of μ.

In the case when the leader has the capacity to achieve cooperation when there is a fixed amount of interaction among the team members, we must take into account the leader's capacity to cooperate in the conditions of the increase of the number of worker interactions.

For this purpose we take into account what happens when K increases by 1, then the contribution of a worker, who, in turn, depends on the contribution of a supplementary worker.

Initially, value $p_i(x_i^{k+1})$ is generated by a uniform distribution 0 - 1, independent of the value of pi(xik). As a result, $p_i(x_i^{k+1})$ could be different from $p_i(x_i^k)$.

For example, if $p_i(x_i^k)$= 1, then it is possible that $p_i(x_i^{k+1})$ = 0,9. So, the distance from $p_i(x_i^{k+1})$ to $p_i(x_i^k)$ depends on the cooperational leader's abilities.

At the other extreme, in the case when the interaction with the supplementary worker is beneficial, a skilled leader should be able to improve this benefit.

For this we will have:

- α = a number between 0 and 1 representing the leader's level of cooperational qualification. When α is 0, the leader has no qualification.

When the value of α is higher, we can talk about leader qualification.

- $[l_i^{k+1},(p_i(x_i^k),\alpha),u_i^{k+1}\ (p_i(x_i^k),\ \alpha]$= the range of possible worker xi contributions, when the interaction sum is K + 1, as function $p_i(x_i^k)$ and α.

To determine the new low l_i^{k+1} , $(p_i(x_i^k), \alpha)$ depends on the leader's skill.

When the value of the interaction with a new worker increases, the contribution to performance of worker xi can be decreased theoretically from $(p_i(x_i^k)$ to 0.

To the other extreme, a highly qualified leader, that corresponds to α = 1, could prevent the contribution of worker xi to decrease under the current value $p_i(x_i^k)$.

Therefore, the new bottom limit increases as much as the level of the leader's qualification, according to the following formula:

l_i^{k+1} , $(p_i(x_i^k), \alpha) = \alpha(p_i(x_i^k)$ (5)

The high limit u_i^{k+1} $(p_i(x_i^k), \alpha)$ also depends on the leader's ability.

As well, a skilled leader will more than likely get a higher contribution of worker xi if the conclusion is that the interaction with the new worker is beneficial for worker xi. In conclusion, after generating pi(xi0) ~ U[0,1], each consecutive contribution will be based on the following relation:

$p_i(x_i^{k+1}) \sim U[l_i^{k+1}(p_i(x_i^k), \alpha), u_i^{k+1}(p_i(x_i^k), \alpha)$ (6)

Conclusions

In conclusion, in this paper we have presented a few simple approaches of mathematical models in order to study the effects of the cooperational leadership on a team's performance in which the quality of members changes in time. These models include controllable parameters which allude to: the leader's qualification and the degree of interaction among the team members. Therefore, when we talk about the collaborative leader's advantages, we talk about a better performance of the team, as well as about the capacity of the qualified leader to place emphasis on worker interaction. (Abrudan 2009)

In the case when the qualification of the collaborative leader is included, workers are differentiated according to the extent in which they can contribute to the team performance. Their work relationship with other workers K depends on two parameters: μ - collaborative leader's skill and σ - leader's variation. The more trained the leader, the bigger the probability that each worker contribution to the team performance is closer to their maximum capacity.

If we notice a certain capacity of the collaborative leader to increase the value of worker interaction, the main result of modeling is the fact that the more trained the leader, the bigger the probability that the effects of supplementary interactions among workers improve.

Starting from the results of computer simulation we can make a series of recommendations for the management of the organizations:

- a team leader's performance will be higher if the team does not have more than 4 members and the leader has a large number of abilities (for example being a good organizer, promoting open communication with the team members, capacity to motivate the team members, acknowledging workers' qualities, being a good mediator, etc.).
- organizations must invest continuously in the training of those holding management positions in order to give teams a chance to improve their performance.

Collaboration means primarily people involvement in creating their own solutions for the problems they face and giving up or adopting existing solutions (Collins 2007). Also, this implies the identification of common interests and giving up adopting rigid positions. When we assume a position we are ready to defend that position and we adopt a defensive attitude.

Identifying common interests implies finding those areas which manage to bring us closer to the ones who have different views. Many times collaboration means working with those individuals or groups that we normally perceive as being our opponents. In collaboration process people have the opportunity to find out the others' point of view and perspective and to consider together the common future of the community they belong to. Shortly, collaboration means conscientious effort to involve all the community sectors – nongovernmental organizations, decentralized governmental agencies, businesses and individuals –that can significantly contribute to such a community effort.

Cooperation is a relationship in a certain way, when all parts involved choose from a strategic point of view to cooperate in order to reach a common goal. The success of collaboration, due to its voluntary nature, greatly depends on the ability of one or more leaders to maintain the relationships among parties. In this context, organizations must better monitor the activity of human resource department concerning the team members hiring procedure, in order to initiate or improve the system of establishing project teams, assessing individual performance, the system of replacements in the project teams.

Collaborative leaders will try to involve all people in the leading and decision-making process. Decisions are made after a collaborative process of talks and by applying the majority rule or, ideally, by reaching consensus. Finally a collaborative leader will encourage team work and trust among the members of the organization/institution. As well, collaborative leaders show some specific abilities. They know how to analyze and understand leadership challenges, how to develop strategies that can overcome the inaction or opposition moments, how to gather individuals around them, how to instill a feeling of trust among them and to transmit the necessary abilities to make collaborative actions possible. These mathematical approaches of leadership offer a new perspective on team management, that is a talented and trained leader can be more important for the team performance than the control of the interaction level among team workers.(Draghici, Nistor, Popescu, Macarie , 2008)

Besides, the leader's ability can overcome or diminish the problems that might appear as a consequence of the team's interaction and which might generate a decrease in performance.

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