

THE IMPACT OF CLUSTER SETTING ON THE PERCEIVED IMPORTANCE OF FORMAL VERSUS INFORMAL REWARDS

Paul-Mugurel POLEANSCHI
Bucharest University of Economic Studies
Bucharest, Romania
E-mail: mpoleanschi@gmail.com

ABSTRACT

Motivation is, per se, a key ingredient in every organization and, like beauty is in the eyes of those who are looking, the latent, maybe unconscious subjectivity of managers as decision makers in perceiving the importance of both formal and informal rewards might bias their effective allocation, altering further their efficiency for each and every employee. As an organization disconnected from any business environment, with very few monetary incentives above the fixed wage, military developed a rewarding system with clear formal rewards, sorted in an ascending order by official regulations and limited in options. As this is the most important motivational tool to keep both the morale and the discipline very high, the rewards' effectiveness is crucial for the commanders as decision makers, in order to obtain the desired motivational level. The main aim of this paper is to determine to what extent the perception of the decision makers' over the formal rewards' efficiency is reinforced by the existence of the informal rewards. To assess the influence of different perceptions on the importance of both formal and informal rewards, the cluster method is adapted. Thus, the results derived from the experiment described in this paper represent an indicator of the sensitivity of the cluster method, in which intangible categories are grouped according to their perceived importance, instead of the physical comparison of entities.

Keywords: motivation, clusters, AHP, consistency, perception, military, formal rewards.

Granting rewards through the eyes of a Decision Maker - why difference in the perception matters?

Rewards in an organization are granted by managers, in accordance with the available pools, both formal and informal, and their desired outcome. According to Poleanschi [4], there is a degree of subjectivity when granting rewards, especially due to the individual perception of the presumable outcome. In order to understand the influence of the informal over the formal awards, the research was based on Saaty's cluster method [3]. Formal rewards were treated as random variables with attached priority vectors, using decisional matrices with consistency indexes, to which a parallel computation of consistency index was performed, according to Benitez [1].

Formal versus informal rewards: Clusters setting

Informal rewards augment formal ones in unperceived ways, depending on the formal versus informal interchange. While some agreement can be achieved on the way formal and informal rewards are grouped in clusters, yet the order of importance inside clusters, clusters' sequence and the choice of the pivots, are definitely a result of the differences in the perceived importance of formal versus informal rewards among the decision makers.

In Table 2.1 is shown the split of the formal rewards (F1, F2) into two clusters, according to their importance, following both Poleanschi (2013) and the official recognized ascending importance. While in Poleanschi (2013), the comparative order on the importance of each of the overall eight formal rewards was asserted through the consideration of a hierarchy, the numerical estimation of their perceived importance derived in that specific context partly matches the order of importance as set by law. In this paper the order of the items within every cluster of formal rewards is kept fixed, following the recognized importance assigned in the official law.

Table 2.1

F1				F2			
F1-1	F1-2	F1-3	F1-4	F2-5	F2-6	F2-7	F2-8
F1-1 Appreciations				F2-5 Money or personal items			
F1-2 Felicitations				F2-6 Special ribbons			
F1-3 Diploma of excellence				F2-7 Small arms			
F1-4 Citation in the official log				F2-8 Medals			

The list of the most important eight informal rewards, as well as their position in clusters (I1, I2) was agreed among a number of twenty experts with significant experience as decision makers and it is shown in Table 2.2.

Table 2.2

I1				I2			
I1-▲	I1-►	I1-▼	I1-◄	I2-♣	I2-♠	I2-♥	I2-♦
I1-▲ Complex task assignment				I2-♣ Appeal for promotion			
I1-► Project management				I2-♠ Leadership education			
I1-▼ Development courses				I2-♥ Function promotion			
I1-◄ Share of personal experience				I2-♦ Rank promotion			

Unlike formal rewards, the weight of importance in terms of effectiveness in rewarding and increasing motivation among subordinates is prone to significant subjective variations. This justifies why arbitrarily symbols, instead of numbers from 1 to 8 were assigned to distinguish among each informal reward. Items' order in clusters, succession formal and informal clusters and pivot's selection were decided by the twenty experts, divided in four teams, in accordance with their common opinions over the placement of informal rewards in the context of their reinforcement effect over the formal ones. The succession of the informal and formal rewards' clusters and the pivots, as teams perceived the effect of the informal over the formal rewards is depicted in Table 2.3.

Table 2.3

	A1		A2		A3		A4			
F1	F1-1	0.21	I1	I1-▲	I1	I1-▲	F1	F1-1		
	F1-2	0.05		I1-►		I1-►		F1-2		
	F1-3	0.57		I1-▼		I1-▼		F1-3	0.55	
	F1-4	0.03		I1-◄		I1-◄		F1-4		
	I1-▲ (pivot)			F1-1(pivot)		F1-1(pivot)		I1-▲ (pivot)		
I1	I1-▲	0.12	F1	F1-1	F1	F1-1	I1	I1-▲		
	I1-►	0.25		F1-2		F1-2		I1-►		
	I1-▼	1.23		F1-3		0.14		F1-3	0.17	I1-▼
	I1-◄	0.52		F1-4		F1-4		I1-◄		
	F2-5 (pivot)			F2-5 (pivot)		I2-♣(pivot)		I2-♣ (pivot)		
F2	F2-5	3.07	F2	F2-5	I2	I2-♣	I2	I2-♣		
	F2-6	3.29		F2-6		I2-♣		I2-♣		
	F2-7	3.07		F2-7		I2-♥		I2-♥		
	F2-8	3.41		F2-8		I2-♦		I2-♦		
	I2-♣ (pivot)			I2-♣ (pivot)		F2-5(pivot)		F2-5(pivot)		
I2	I2-♣	16.97	I2	I2-♣	F2	F2-5	F2	F2-5	3.66	
	I2-♠	16.97		I2-♠		F2-6		F2-6		
	I2-♥	109.61		I2-♥		F2-7		F2-7		
	I2-♦	309.66		I2-♦		F2-8		F2-8		

At this point, it is worthwhile to notice that the cluster method as in Saaty (2011) is adapted to the versatile value of the pivot in the cluster of informal rewards. When considering intangible sets like informal rewards, the weight of importance of a certain pivot is not necessarily the highest or the smallest. Yet, the inference of the

assigned importance of the pivots from one cluster to the next one was done after the weights of importance within a cluster were normalized by their division to the correspondent minimum weight. The weighted importance of the items within A1 is depicted with two decimals on the second column in Table 2.3.while selective values for two of the formal and informal rewards are respectively reported in the next columns of this table. For quantifying the sensitivity in the weights of importance asserted to a certain formal reward along the four alternatives considered, as a result of different informal rewards' reinforced effect over the formal ones, every formal reward was thought to be modeled by a random variable whose four realizations are the four correspondent values in the priority vectors derived for each of the four columns in the previous table. For simplicity, the random variable will be referred with the same notation as the one used for the formal reward. So that if for a formal reward F there are available four values ($f_{A1}, f_{A2}, f_{A3}, f_{A4}$) corresponding to the four alternatives A1 to A4, the correspondent random variable is

$$F: \begin{pmatrix} f_{A1} & f_{A2} & f_{A3} & f_{A4} \\ p_1 & p_2 & p_3 & p_4 \end{pmatrix} \quad (2.3.)$$

The probabilities in the second row are derived as follows. For every alternative (A_i) _{$i=1, \dots, 4$} it is counted the percentage of times p_i preferred in which the formal reward F was preferred against other formal or informal rewards. The probabilities in the second row represent the normalized counterparts of the vector formed by the percentages above calculated. Mean of the random variable F is interpreted as an average value expressing the importance of the formal reward F against the alternatives considered. The variance of the random variable F is interpreted as an indicator for the sensitivity of the mean to the grouping in different clusters and in broader as, how large is the influence of the informal rewards over the formal ones, as a result of different perceptions on their importance and location in the succession formal, informal.

The impact of cluster setting on the perceived importance of rewards in a military organization: An experiment.

For every decision matrix within a cluster the consistency index (CI) was computed together with the associated priority vector (PV). Since over collaborative discussions a satisfactory consensus did not yield a small enough CI, the closest consistent decision matrix as in Benitez (2011) was derived and the corresponding priority vector recalculated. This kind of achieving consistency is further referred as “bold consistency”. The consistency index for the original decision matrices, F1 to I2 in alternative A1 are shown on the first column in the Table 3.1.

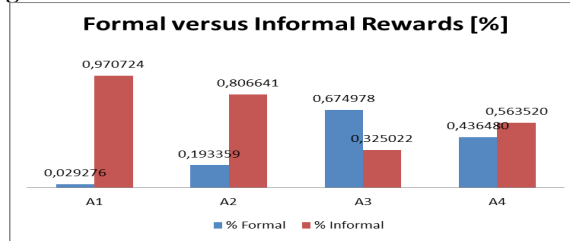
Table 3.1

A1 ^{BC}		A1		
F1 ^{BC}	F1-1	0.21	F1-1	0.21
	F1-2	0.05	F1-2	0.05
	F1-3	0.57	F1-3	0.57
	F1-4	0.03	F1-4	0.03
CI = 0	I1-▲ (pivot)		CI = 0.28	I1-▲ (pivot)
I1 ^{BC}	I1-▲	0.12	I1-▲	0.12
	I1-►	0.24	I1-►	0.25
	I1-▼	1.20	I1-▼	1.23
	I1-◄	0.51	I1-◄	0.52
CI = 0	F2-5 (pivot)		CI = 0.42	F2-5 (pivot)
F2 ^{BC}	F2-5	3.00	F2-5	3.07
	F2-6	3.25	F2-6	3.29
	F2-7	3.00	F2-7	3.07
	F2-8	3.38	F2-8	3.41
CI = 0	I2-♣ (pivot)		CI = 0.98	I2-♣ (pivot)
I2 ^{BC}	I2-♣	18.92	I2-♣	16.97
	I2-♠	18.92	I2-♠	16.97
	I2-♥	118.86	I2-♥	109.61
	I2-♦	335.77	I2-♦	309.66
CI = 0			CI = 0.40	

The corresponding components of the extended priority vector after the cluster method was inferred are indicated in the second column of the Table 3.1. The fourth column reports the priority vector for the bold consistency (BC) versions of each priority decision matrices.

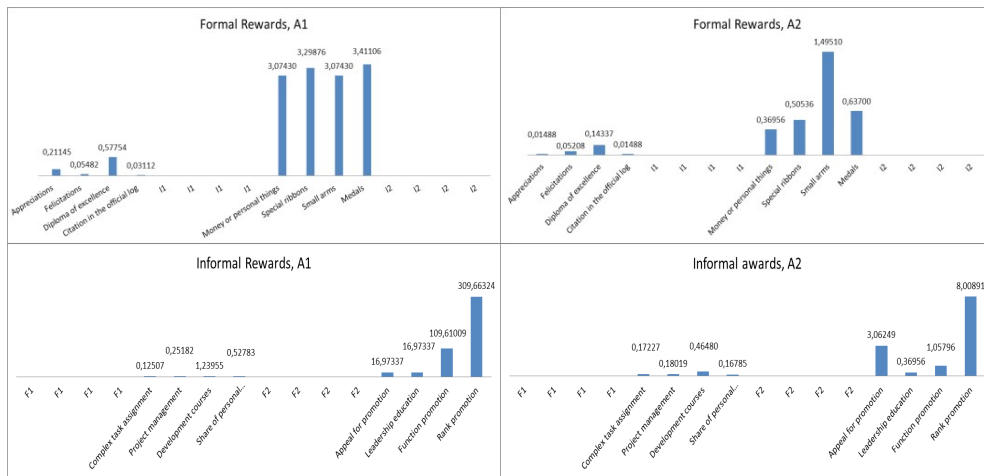
It is interesting to observe in figure 3.1 that the cumulated weight of importance for the informal rewards highly overpass the one for the formal ones in three out of the four alternatives considered.

Figure 3-1



In order to further detail the importance of cluster setting, we analyze the clusters which had the closest values of the informal rewards, namely alternatives A1 and A2. Figure 3.2 compares the values of formal and informal clusters of alternatives A1 and A2, which shows variations of cluster F2: in A1 “medals” has the highest value, while all the other three have small differences; in A2 “small arms” has the highest value, with significant variations of the others. The surprise comes from the “rank promotion”, which exceeds all other formal and informal rewards with an unexpected value of 309.66 in A1 and with 8.00 in A2.

Figure 3-2



The above numerical findings point in two directions: first, that the use of informal rewards does influence the perception over the formal rewards and, second, that the cluster setting inside each alternative influence the perception over both formal and informal rewards. Figure 3.3 indicates, through the associated mean and variance values, that with the higher importance associated with the formal rewards comes a higher level of subjectivity in granting that reward, depending on how the commander, as decision maker is making use of the available informal rewards.

Figure 3-3

Formal Rewards	Mean	Variance
Appreciations	0,11160	0,00766
Felicitations	0,06220	0,00012
Diploma of excellence	0,38907	0,04075
Citation in the official log	0,00000	0,00000
Money or personal things	1,99200	1,75609
Special ribbons	3,96805	2,72041
Small arms	6,16791	24,49765
Medals	23,65129	461,33808

Conclusions

This paper shows an experiment for measuring the influence of the informal rewards over the formal ones in a military organization. The analysis was performed by adapting cluster method as in Saaty (2011) for intangible items, when size is not obvious. Whenever the decision matrices displayed an unsatisfactory consistency index, these were replaced by the closest consistent matrix as in Benitez (2011). Surprisingly, the priority vectors corresponding to the improved decision matrices in terms of consistency were very close to the priority vectors corresponding to the initial decision matrices. Whether this finding holds true for the particular decision matrices in this experiment or the result is more general, is a topic to be addressed in a future research. Informal rewards reinforce the formal ones in numerous ways and in that perspective, twenty experts divided in four teams identified four different sequences. The values along these four sequences, for one item as a particular formal reward, were assumed to be realizations from a random variable modelling that formal reward. The associated probabilities were derived from preference percentages of the considered item beside the four alternatives. The comparative variances for the random variables modelling the formal rewards were interpreted as measures of sensitivity to the cluster grouping of the informal rewards among the formal ones. The numerical results show a correspondence between the size of the mean and the size of the corresponding variance, in the sense that for small mean values correspond incremental variances while for larger means correspond almost quadratic values of the associated variances. The interpretation associated with these findings is that when stakes are high, so is the degree of subjectivity embodied in decision makers 'perception over the importance of the rewards. Secondary, these findings show that the cluster method adapted for intangible items is highly dependent on the perceptions associated to the content, the pivots and the succession of the considered clusters.

Key References

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