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## SOCIO-COMMUNICATIONAL INFORMAL INTERACTIONS WITHIN THE SOCIAL REINTEGRATION STAFF IN A ROMANIAN DETENTION UNIT. SOCIAL HUB CASE STUDY

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### Abstract

The article aims to study socio-communicational interactions on informal topics among social reintegration staff in a detention unit in Romania, using sociometry and Organizational Network Analysis (ONA) research methods. The research has two main objectives: the first one is to investigate the association between the highest values of the "social hub" indicator obtained by group members and "the accumulated work experience within the target group" indicator. The second objective refers to investigating the association between the highest values of the "social hub" indicator obtained by group members and the "employees' influence power" indicator.

This research is useful for decision-makers in prisons because it shows the way to discover employees who benefit from increased social capital, which in fact represents sustainable human resources for organizational leadership. Such employees can contribute to the knowledge transfer or information flow within the network, including promoting the adoption of new management policies and increasing the cohesion degree within the group. The sources of the research are books and articles that develop the subject of social network analysis, some of which are written by well-known authors.

To achieve the proposed objectives, it was necessary to represent the employees' informal socio-communicational networks, both the social support network and the trust network, within the social reintegration sector, which constitutes the target group.

The networks were identified through a questionnaire answered by members of the social reintegration sector. The questionnaire aimed to obtain and represent the relational choices (connections) expressed by each employee in the context of informal social interactions on topics outside the professional environment. The questionnaire was administered digitally through the Google Forms platform with the agreement of the participants, after obtaining approval from the institution's management.

After representing the employees' informal networks, specific centrality measurements were applied using sociometry and ONA research methods to identify the values of the "social hub" and "power of influence" (Eigenvector-Authority In) indicators. The quantifiable values of the indicators were obtained by applying statistical calculation procedures specific to sociometry and ONA, using both Microsoft Excel and IBM i2 Analyst's Notebook software.

After testing hypotheses in the context of discussions about leisure activities, the following conclusions were drawn regarding individuals who benefit from increased social capital, respectively those who occupy the most important positions on the "social hub" status value scale:

a) they have accumulated considerable work experience within the collective's activity sector, respectively over 6 years (with one exception).

b) they are not necessarily the ones who have the highest values of the "employees' influence power" indicator, with the exception of the person who has both the most social connections and is the most influential in the work collective, which reinforces their informal leadership position within the employees' group in the context of discussions about leisure activities.

**Keywords:** Organizational Network Analysis, social hub, influencer, informal social interactions, social support network, trust network

## INTRODUCTION

Since the beginning of the 20th century, studying communities through the application of "social network analysis" method and from the perspective of the integrated component, "network communication", has become a promoted approach in scientific literature, during the process of societal adaptation to the new dynamics of social interactions facilitated by major innovations of civilization, such as industrialization and electricity.

In this context, predecessors of the field such as Georg Simmel, Emile Durkheim, and Ferdinand Tönnies analyzed macro-social changes using concepts such as "social differentiation" and "social stratification".

Subsequently, in 1934, Jacob L. Moreno used the sociometric technique to analyze socio-communicational interactions at the small groups level. Currently, the "organizational network analysis" (ONA) method has been developed for studying interactions between members of an organization.

Through the application of the sociometric method and ONA, this paper identifies the informal networks of the social reintegration group in a detention unit in Romania and, subsidiarily, informal leaders, also known as "influencers," revealed by the work collective' members' statuses indicators: "social hub" (popularity) and "Eigenvector-Authority In" (influence).

Considering that these two indicators, respectively popularity and influence, can be considered as employees' social capital valences (Ciupercă & Vlăduțescu, 2014), their value is identified among the target group members through the application of centrality measures on informal networks that represent employees' relational preferences.

According to the literature, the informal networks resulting from the study can also be described as an expression of social support and trust relations within the employees' target group (Krackhardt & Hanson, 1993).

The theoretical and methodological frameworks offered by network science are specifically designed to address the interconnectedness and inherent interdependency among humans (Nordlund & Fierăscu, 2018). Thus, communication within a work collective, including informal socio-communicational interactions among employees as customized in this article, is conceptualized as "collaboration, consultation, friendship, informal relations, confidential gossip, friendship groups, or alliances".

The main advantages of identifying employees' informal networks refer to the discovery of useful resources, both for employees' individual professional development and for contributing to improving or facilitating organizational performance, such as: optimizing and facilitating employees' learning process of operational work procedures (Hunter & Wolf, 2016; Boud & Middleton, 2003), assessing the meaning of lucrative activities carried out in the organization in order to raise awareness of their significance for oneself, organization and community (Fan & Dawson, 2022), optimizing leadership style and human resource management policies (Liu & Moskvina, 2016).

In particular, Krackhardt argues that social network analysis, through the argument of the importance of social capital, also finds its usefulness in explaining career success, providing a complementary perspective to the one centered on the role of human capital (Hâncean, 2014).

Once the informal networks are known, it is also possible to identify individuals who benefit from preferential values of the "social hub" and "Eigenvector-Authority In" status indicators, which can also be considered vectors of professional performance through their significant contribution to facilitating the information flow and knowledge transfer within the work collective.

In the literature, it is presented that at the organizational level, knowledge transfer (including professional knowledge) is facilitated by individuals who occupy important positions on the "social hub" status value scale, represented by the well-connected employees within the group, who may also have considerable experience in the profession, thus contributing to the accumulation and facilitation of knowledge transfer or information flow within the network (Demir & Ozkan, 2015; R.S. Burt, 2007).

According to ONA methodology, "a social hub is person who has social ties to many other people compared to most people. In popular culture, this type of person is also called a popular person. In organizations, there are popular employees who are in fact a "social hub" (Demir & Ozkan, 2015).

Based on definition and description of the concept, employees who have important positions on the "social hub" status value scale are recognized as "influencers" or group leaders, formal if they hold management positions, and informal if they do not (Demir & Ozkan, 2015; R.S. Burt, 2007; Gibson & Barron, 2003; Murray, 2002).

One method of identifying people with informal influence used in the ONA methodology refers to the application of specific centrality measurements related to the "Eigenvector" indicator.

According to ONA methodology, "eigenvector centrality is a more sophisticated view of centrality: a person with few connections could have a very high eigenvector centrality if those few connections were to very well-

connected others" (Hansen & Shneiderman & Smith, 2010), thus being identified those employees who have the greatest influence within the group.

## METHODS, TESTING HYPOTHESES AND RESULTS

The novelty of the study lies in the application of sociometry and ONA as research methods to a Romanian prison unit for the identification of informal networks and informal leaders of a employees' group, with the aim of utilizing the research results as decision support for management policies.

The sources of the research are books and articles that develop the subject of social network analysis, some of which are written by well-known authors.

The article aims to study socio-communicational interactions on informal topics among social reintegration staff in a detention unit in Romania, using sociometry and Organizational Network Analysis (ONA) research methods.

The research has two main objectives, the first one is to investigate the association between the highest values of the "social hub" indicator obtained by group members, as an independent variable, and "the accumulated work experience within the target group" indicator, as a dependent variable. The second objective refers to investigating the association between the highest values of the "social hub" indicator obtained by group members, as an independent variable, and the "employees' influence power" indicator, as a dependent variable.

To achieve the proposed objectives, it was necessary to represent the employees' informal socio-communicational networks, both the social support network and the trust network, within the social reintegration sector, which constitutes the target group.

The networks were identified through a questionnaire answered by members of the social reintegration sector. The questionnaire aimed to obtain and represent the relational choices (connections) expressed by each employee in the context of informal social interactions on topics of mutual interest that refer to leisure activities outside the professional area. The questionnaire was administered digitally through the Google Forms platform with the agreement of the participants, after obtaining approval from the institution's management.

After representing the employees' informal networks, specific centrality measurements were applied using sociometry and ONA research methods to identify the values of the "social hub" and "power of influence" (Eigenvector-Authority In) indicators. The quantifiable values of the indicators were obtained by applying statistical calculation procedures specific to sociometry and ONA, using both Microsoft Excel and IBM i2 Analyst's Notebook software.

Based on the scientific appreciations mentioned in this study were formulated working hypotheses. In order to test these, centrality measurements were applied to the employees' informal networks within the social reintegration sector of a detention unit in Romania.

### Testing the work hypotheses of the research

#### Hypotheses 1 and 2

Considering the definition of the "social hub" concept/status/indicator, its values can be calculated by applying specific centrality measurements of the "Degree In" indicator in the ONA methodology. In concrete terms, given that the "Degree In" centrality measurement is a ONA method of accounting for the direct connections each member has with others within the group (Golbeck, 2015), it was applied to calculate the value of each person's "social hub" status (popularity).

Taking into account some characteristics presented in the literature regarding employees who have important positions on the "social hub" status value scale within the group, such as the importance of their professional role within the team and the accumulation of professional experience (Demir & Ozkan, 2015; R.S. Burt, 2007), and also starting from the idea that is desirable for seniors within the group to facilitate the knowledge transfer or information flow within the network (specific role of "social hub"), the following hypotheses was formulated:

**Hypothesis no. 1** - In the top values of the employees' „social hub” status (independent variable), individuals with "high seniority" (dependent variable), compared to those with "low seniority" (dependent variable), benefit from higher values of the "social hub" status indicator.

**Hypothesis no. 2** - In the top values of the employees' „social hub” status (independent variable), individuals with "medium seniority" (dependent variable), compared to those with "low seniority" (dependent variable), benefit from higher values of the "social hub" status indicator.

Employees seniority within the group was identified through a direct question addressed to employees in the questionnaire. After data collection, it is created three descriptive categories:

"Low seniority" = less than/equal to 5 years of service accumulated within the social reintegration sector at the penitentiary unit where the study was conducted,

"Medium seniority" - = between 6 - 10 years of service accumulated within the social reintegration sector at the penitentiary unit where the study was conducted,

"High seniority" - = more than/equal to 11 years of service accumulated within the social reintegration sector at the penitentiary unit where the study was conducted.

The value of the "social hub" status, which generally reflects the degree of employees' sympathy or even the employees' popularity (members of the target group), is calculated by identifying, centralizing, and processing responses regarding the preferred dialogue partners (connections) of each member for discussing on leisure activities.

The "social hub" status is determined in three ways, using the following centrality measures:

**The first way of determining the "social hub" indicator:**

The value of the "social hub"1 indicator or sociometric status as employee' sympathy degree (Degree In), is determined by identifying sympathy connections among group members (as indicated by each member) to rank individuals based on the number of choices they receive within the group.

After centralizing the responses and processing them using centrality measures, the following highest Degree (In) values for employees within the social reintegration sector are obtained:

a) In the first place, with 6 points (Degree In), is Croitoru Albert, who has a "medium seniority" of 8 years within the social reintegration sector;

b) In the second place, with 5 points each (Degree In), are Pop Raluca, with 21 years of "high seniority", Moldo Alina, with 15 years of "high seniority", and Galatean Madalin with 1 year of "low seniority".

Regarding to the two hypotheses, it can be observed that the person who obtained the highest score on the "social hub"1 status as employee sympathy (Degree In) has a "medium seniority", and the next three people have the same score, of whom two have a "high seniority" while one has a "low seniority".

Therefore, hypothesis number 1 is invalidated, as the score obtained by individuals with "high and low seniority" is the same. However, there is still a difference in representativeness in the ranking, with two employees with "high seniority" to one with "low seniority".

Regarding to hypothesis number 2, it is validated by the fact that the employee who obtained the highest score on the "social hub"1 scale status as employee sympathy (Degree In) has a "medium seniority", which is more than individuals with "low seniority" has.

**The second way of determining the "social hub" indicator:**

The value of the "social hub"2 status as employee' sympathy preferential degree (Degree InP) is determined by identifying preferential sympathy connections among group members (indicated by each of them) in order to rank employees based on the order in which they are chosen, as well as the number of accumulated choices within the group. Based on these two criteria, selected employees are assigned with different weights according to the following predetermined scoring system: 3 points for the most preferred option, 2 points for the second preferred option, and 1 point for the third (last) preferred option.

After centralizing responses and processing them using centrality measures, the following highest Degree (InP) values for employees within the social reintegration sector are obtained:

a) In the first place, with 12 points (Degree InP), is Croitoru Albert, who has 8 years of "medium seniority" within the social reintegration sector;

b) In the second place, with 10 points (Degree InP), is Gheorghiu Mihai, who has 21 years of "high seniority" within the social reintegration sector;

c) In the third place, with 9 points each (Degree InP), Pop Raluca has 21 years of "high seniority", Moldo Alina has 15 years of "high seniority", and Dumitru Mihai has 6 years of "medium seniority", all rank third.

Regarding to the two hypotheses statements, it can be observed that the person who obtained the highest popularity score on the "social hub"2 scale status as preferential sympathy (Degree InP) has a "medium seniority", the next person has "high seniority", and the following three employees (third ranked) have the same score, two of whom have "high seniority", while one has "medium seniority".

Therefore, both hypotheses are validated, given that no employee with "low seniority" appears among the top 5 ranked.

**The third way of determining the "social hub" indicator:**

The value of the "social hub"3 status as a "preferential degree of sympathy compared to antipathy among employees" (Degree InP - A) is determined by correlating the preferential connections of sympathy with the antipathy identified among group members (as indicated by each of them), based on which selected employees are assigned with different weights according to the following predetermined scoring system: +3 points for the most preferred option, +2 points for the second preferred option, and +1 point for the third (last) preferred option;

respectively, -3 points for the first option to be avoided, -2 points for the second option, and -1 point for the third (last) option.

After centralizing the responses and processing them by applying centrality measures, the following highest Degree (InP-A) values for employees within the social reintegration sector are obtained:

- a) In the first place, with 10 points Degree (InP-A), Croitoru Albert has 8 years of "medium seniority" within the social reintegration sector;
- b) In the second place, with 9 points Degree (InP-A), Moldo Alina has 15 years of "high seniority";
- c) In the third place, with 8 points both Degree (InP-A), Dumitru Mihai has 6 years of "medium seniority" and Galatean Madalin has 1 year of "low seniority".

Regarding to the two hypotheses statements, it can be observed that the person who obtained the highest popularity score on the "social hub"3 scale status as preferential sympathy compared to antipathy (Degree InP-A) has a "medium seniority", the next person has a "high seniority", and the following two employees (third ranked) have identical scores, one has "medium seniority", and the other has "low seniority".

Therefore, both hypotheses are validated, given that the first two places are occupied by employees with "medium seniority", respectively "high seniority".

### Hypothesis 3

Considering the definition of the "Eigenvector-Authority In" (influence) status, its values can be calculated by applying specific centrality measurements of the "Eigenvector-Authority In" indicator in the ONA methodology. In concrete terms, given that "Eigenvector" is a ONA` method for counting the direct connections that each member has with others in the group who in turn have the most numerous connections (Hansen & Shneiderman & Smith, 2010), it was applied to calculate the value of the "Eigenvector-Authority In" status (influence) of each person.

Taking into account the ideas presented in the literature that describe employees occupying important positions on the "social hub" status scale as "influencers" within the group (Demir & Ozkan, 2015; Burt, 2007), the following hypothesis was formulated:

**Hypothesis no. 3** - Employees with the highest values of the "social hub"2 status indicator (independent variable) also benefit from the highest values of the influence power indicator (dependent variable).

The value of the "social hub"2 status indicator (Degree InP) namely popularity as preferential sympathy among employees is determined in testing hypotheses 1 and 2.

The value of the influence power indicator (Eigenvector-Authority In1) of group members is determined by identifying, centralizing, and processing the responses regarding the preferred dialogue partners (connections) of each member for discussing leisure activities, in order to rank individuals based on their direct connections with those who in turn have a large number of connections with group members.

After centralizing the responses and processing them using centrality measures, the following values of the employees' influence power indicator (Eigenvector-Authority In1) within the social reintegration sector are obtained:

- a) Croitoru Albert ranks first with 0.5148 points of the Eigenvector-Authority (In) indicator, also obtaining 12 points of the Degree (InP) indicator;
- b) Galatean Madalin ranks second with 0.4785 points of the Eigenvector-Authority (In) indicator, also obtaining 8 points of the Degree (InP) indicator;
- c) Carari Costel ranks third with 0.3582 points of the Eigenvector-Authority (In) indicator, also obtaining 6 points of the Degree (InP) indicator;
- d) Pintilie Ruxanda ranks fourth with 0.2319 points of the Eigenvector-Authority (In) indicator, also obtaining 9 points of the Degree (InP) indicator.

Regarding to the hypothesis no.3 statement, except for the employee Croitoru Albert, who obtained the highest scores on both indices, the hierarchy has changed for the others, therefor hypothesis number three is not validated.

## CONCLUSIONS AND DISCUSSIONS

### For hypothesis no. 1 (view Chart no.1 and 2)

Hypothesis number 1, which states that in the top values of the employees' „social hub” indicator (popularity) reflected by the relational choices of each group member, individuals with "high seniority", as compared to those with "low seniority", benefit from higher values of the "social hub" status indicator, is validated in at least two ways (out of three) of calculating values, as follows:

a) in the case of the status indicator "social hub"1, namely popularity as sympathy (Degree In), the hypothesis was invalidated, but the scores obtained by employees with high and low seniority are equal, and representativeness is in favor of those with high seniority;

b) in the case of the status indicator "social hub"2, namely popularity as preferential sympathy (Degree InP) and the status indicator "social hub"3, namely popularity as preferential sympathy in relation to antipathy (Degree InP-A), the hypothesis was validated.

**For hypothesis no. 2 (view Chart no.1 and 2)**

Hypothesis number 2, which states that in the top values of the employees' „social hub” indicator (as popularity) reflected by the relational choices of each group member, employees with "medium seniority", as compared to those with "low seniority", benefit from higher values of the "social hub" indicator, is validated in all three ways of calculating these indicator values, namely as sympathy, preferential sympathy, and preferential sympathy compared to antipathy.

Therefore, regarding to this research and the two hypotheses, it can be concluded that among employees with maximum values of the "social hub" status indicator in the social reintegration sector of the detention unit where the study was conducted, employees with medium or long seniority in the department are better connected to group members than those with short seniority.

Thus, through this study, respectively its first two hypotheses, were identified those employees who benefit from increased social capital and high values of the "social hub" indicator, with an important contribution in facilitating the flow of information, as well as those employees who have a high level of "Eigenvector-Authority In" indicator, which reveals the employees' influence power at the level of the work collective.

**For hypothesis no. 3 (view Chart no.3)**

Hypothesis number 3, which states that employees with the highest values of the "social hub"2 indicator (Degree InP), namely popularity as preferential sympathy (Degree InP), also benefit from the highest values of the influence power indicator, is invalidated.

Considering the lack of agreement between the scores obtained by individuals with the highest values of the "social hub"2 status indicator and the influence power status indicator (Eigenvector-Authority In1), except for Croitoru Albert, the person ranked first, in other situations the hypothesis cannot be validated, considering the resulting situation: the person in second place (in the Eigenvector-Authority In1 ranking) moves up two positions compared to the Degree (In)P hierarchy, the person in third place (in the Eigenvector-Authority In1 ranking) moves up three positions compared to the Degree (In)P hierarchy, while the person in fourth place (in the Eigenvector-Authority In1 ranking) moves down one position compared to the Degree (In)P hierarchy.

The lack of agreement between the scores obtained for the two indices can be explained both by the nature/architecture of the network structure (given by the way employees are connected) as well as by the difference in variables included that are part of the calculation formula for their values. Thus, while the determination of the "social hub" (Degree InP) status indicator2 is based solely on the number of direct connections a person has with group members, in determining the influence power status indicator1 (Eigenvector-Authority In1), both the number of direct connections and the number of direct connections they have with other group members are taken into account, therefore the latter being an indicator with a higher degree of relevance in determining the level of influence.

However, specifically regarding Croitoru Albert, ranked first in the hierarchy of both indicators, it can be stated that he is a popular person and has an uncontested influence power within the group. Also, through the nature of his connections with other employees, he plays a very important role in increasing and maintaining the network's cohesion.

<b>CHART 2</b>				
<b>Nr. crt.</b>	<b>ID employee</b>	<b>Eigenvector-Authority (In)</b>	<b>Degree (InP)</b>	<b>Eigenvector-Authority (In) position related to Degree (InP)</b>
1.	Croitoru Albert	0,5148	12	– (stay)
2.	Galatean Madalin	0,4785	8	↑ up 2 levels
3.	Carari Costel	0,3582	6	↑ up 3 levels
4.	Pop Raluca	0,2319	9	↓ down 1 level
5.	Dumitru Mihai	0,2292	9	↓ down 1 level
6.	Moldo Alina	0,227	9	↓ down 1 level
7.	Muresan Daniel	0,2079	7	↓ down 2 levels
8.	Bostan Irina	0,1905	7	↓ down 3 levels
9.	Gheorghiu Mihai	0,1817	10	↓ down 7 levels

10.	Gaspar Viorel	0,1753	7	↓ down 5 levels
11.	Dobre Raluca	0,1596	7	↓ down 6 levels
12.	Cretescu Daiana	0,1243	4	↓ down 4 levels
13.	Dima Constantin	0,1171	4	↓ down 5 levels
14.	Neam Madalin	0,082	6	↓ down 8 levels
15.	Sonia Maria	0,0787	3	↓ down 6 levels
16.	Bostinaru Decebal	0,0784	5	↓ down 9 levels
17.	Maurer Felicia	0,0538	4	↓ down 9 levels
18.	Popa Mihai	0	0	↓ down 8 levels
	Biris Roxana	0	0	↓ down 8 levels
	Munte Irina	0	0	↓ down 8 levels

### Final conclusions

In a dynamic social context such as the institutionalized one, sociometry and organizational network analysis (ONA) become tools for leadership and management, particularly for participative dimension of them, for optimizing professional performance. These research methods provide leadership and management with the advantage of identifying not only informal networks within the organization, but also individuals with increased social capital, also known as "influencers" or informal leaders, involved in facilitating knowledge transfer and information flow, with positive implications for supporting organizational performance.

Therefore, the present study identifies informal organizational networks that describe social support and trust networks, as well as individuals with the highest social capital within the employees' group in the social reintegration sector of a detention unit in Romania on the topic of leisure activities, calculated under the criteria of:

- a. Social support, by highlighting the values of the "social hub" status indicator/employees' popularity,
- b. Influence, by highlighting the values of the "Eigenvector-Authority In" status indicator/employees' influence.

Following the identification and analysis of social support and trust networks, the following conclusions are relevant for the leadership interests regarding the informal leaders of the employees' group in the social reintegration sector of the detention unit where the study was conducted, specifically individuals who occupy the highest positions of the "social hub" scale status:

1. The most socially connected four individuals, in the context of discussing leisure activities, generally have more than 6 years of seniority in the group, with one exception.

2. The most socially connected four individuals, in the context of discussing leisure activities, are not necessarily the most influential, except for the first individual who has both the most social connections and is the most influential within the group, which consolidates their position as an informal leader on the chosen topic.

Given the increased social capital acquired within the group, both Croitoru Albert and the other identified informal leaders (e.g. Dumitru Mihai, Moldo Alina, Pop Raluca, Galatean Madalin) can be involved in facilitating knowledge transfer and information flow, with possible impacts on: facilitating the adoption of new management policies, increasing cohesion among the employees' group including in the hybrid work format, integrating individuals with weak connections with the rest of the group, increasing employees participation in achieving organizational objectives, optimizing and facilitating the learning of operational work procedures and evaluating the meaning given by employees to the work performed in the organization.

The novelty of the study arises from the application of sociometry and ONA as research methods to a Romanian prison unit for the identification of informal networks and informal leaders within a employees' group, with the aim of using the research results as decision support for management policies.

### Limits of the study

Given that the research design is non-experimental, determined by the impossibility of manipulating variables and controlling participant subjects, the study does not aim to identify and analyze the causal relationship between variables, but only their association.

The study does not aim to distinguish between the two qualities, formal and informal leaders, nor to identify individuals in leadership positions. However, the data collection method applied highlights those individuals recognized as informal leaders, namely social hubs, within the target group.

### New research perspectives on the study

In order to enhance the adoption of management policies through network analysis, in addition to identifying informal leaders with high popularity, also known as "social hubs," it is necessary to identify employees recognized

as "role models" within the organizational group. Future studies could consider identifying individuals recognized as "role models" within the network, whose status within the employees' group can be leveraged to develop and strengthen organizational norms, values, and habits, in order to build organizational culture and professional development opportunities for employees.

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APPENDIX

**CHART 1**  
Representation of the employees' "social hub" status values in relation to their seniority

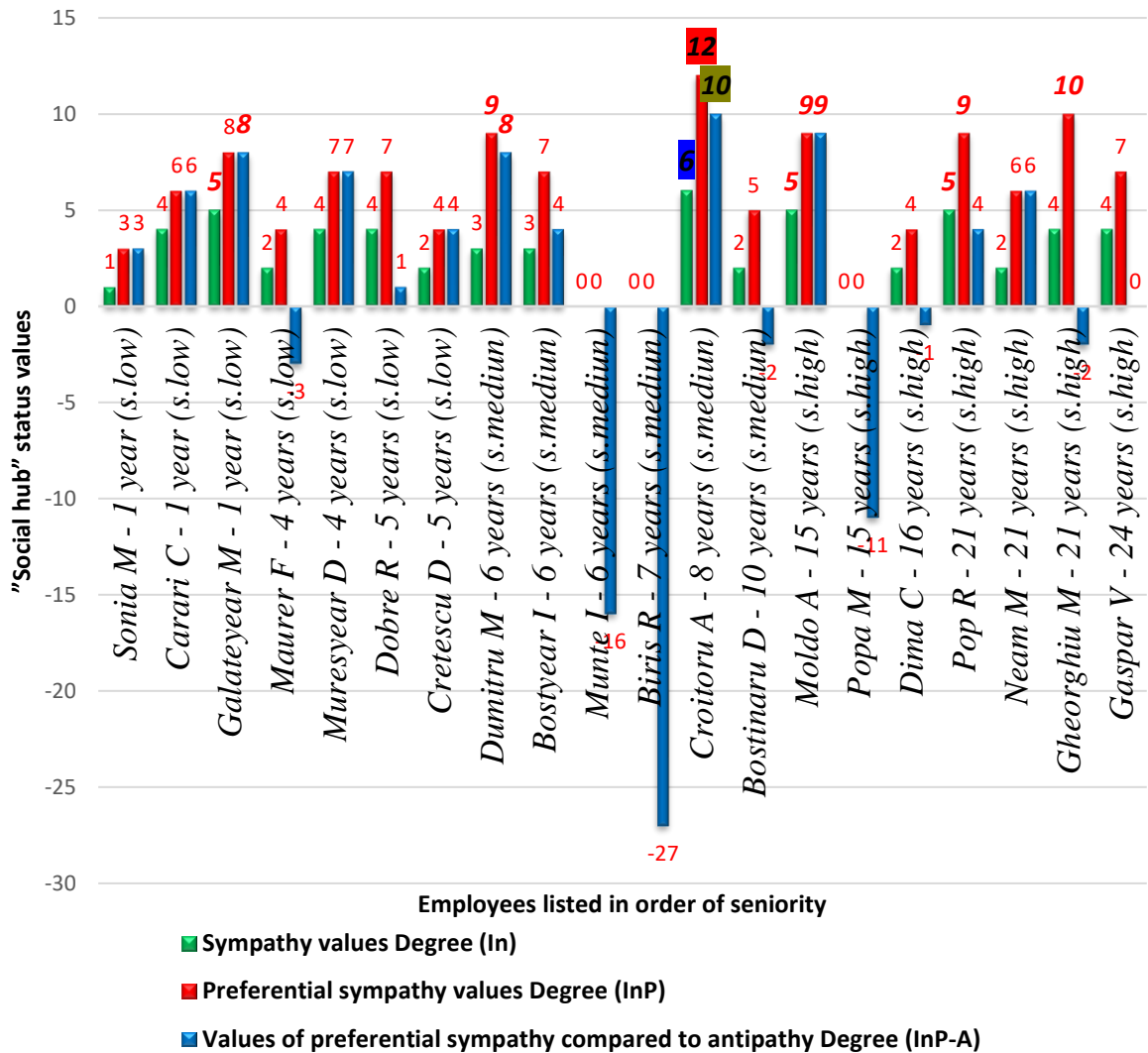


CHART 3

