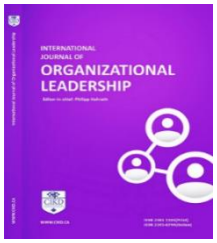

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The Impact of Leadership Networking on the Implementation of Projects within Multinational Organizations

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ABSTRACT

Managing complex teams in the implementation of projects requires collaboration and building trust between different actors, such as service and product providers, agencies or certification bodies, consultancies, financial institutions, or enterprises. The success of the project is significantly influenced by the ability of the leadership networks to form and implement a collaborative structure that ensures the achievement of expected results. This paper aims to develop and analyze a networking model to test the cooperation mechanism, the flow of information, and the capacity for collective action within a Transport Management System - Freight Audit & Payment (TMS-FAP) project in a multinational company. In this regard, the research was approached by using Social Network Analyses (SNA). The leadership network comprised 15 teams, who participated in implementing a new logistics system in a multinational company's subsidiary from Romania. The results suggest the key positions that different actors/stakeholders must hold within the project that induce a maximum effect on the achievement of the expected results and the success of the project. The added value of the study resides in the possibility of replicating the analysis model developed in similar cases, which requires the formation of the most appropriate implementation teams for various types of projects.

Globalization strongly influences companies' activities independently of their dimensions or activity domain. Firms constantly adapt their management strategies to navigate the complexities of the external environment, relying on organizational flexibility and robust leadership systems. These two characteristics are materializing by combining agile management skills with a complex organizational structure that is increasingly accepted in large

companies operating in international markets. In the case of these companies, the adoption of project management is the prerequisite for ensuring these strategies.

There are lots of studies in the literature that identify leadership impact on projects results, project teams, customer satisfaction, and organizational objectives achievement (Govender et al., 2015; Jiang, 2014; Nixon et al., 2012; Oh et al., 2019; Tran et al., 2018). In the past three decades, there has been growing interest among researchers and practitioners in studying the behavioral relationship between leaders and employees within organizations, focusing on communication, collaboration, and trust building. Various studies explore the basic mechanism through which leadership styles influence networking between project implementation teams and the development of information systems within them. Project management strategy is a topic of high interest for project management researchers due to the rapid expansion and heterogeneous nature of organizations (Casu et al., 2021). However, the understanding of project-based organizations and the mechanism by which the collaboration between different teams and their managers ensures the success of the project is still lacking. Teamwork, the characteristic of project-based organizations, refers to the interaction between the component elements of high-performance leadership that ensures the effective coordination and performance of several individuals (Ameri, 2016; Kayani et al., 2023).

The literature on project management highlights project management and PS preconditions, such as team communication, cohesion, and collaboration (Bond-Barnard et al., 2018). However, in the context of projects aimed at improving organizational performance, there is limited research addressing the impact of leadership on achieving desired outcomes and collaboration among stakeholders. Additionally, the development and analysis of a social network model provide a valuable research approach that focuses on group interactions.

This study focuses on the evaluation of the main parameters of the leadership network established following the implementation of a Transport Management System-Freight Audit & Payment (TMS-FAP) project within a multinational company in Romania.

The use of Social Networking Analyse (SNA) as the main research tool presents a high degree of novelty by bringing many benefits to practitioners and managers, who can improve their organizational performance by making the leadership network more efficient.

Theoretical Frame and Literature Review

Leadership through Projects: Opportunities and Challenges

According to several authors, including Kaufmann and Kock (2022) and Georgiades (2022), structuring activities within projects enables the resolution of complex problems that are precisely defined and have a strong innovative nature. This process involves the contribution of diverse specialists from various organizational units within the same structure, who are temporarily integrated into an autonomous organizational network parallel to the formal organizational structure.

Organizational efficiency increases by managing projects with clear objectives, precise quality requirements, well-defined budgets, and a determined completion date (Bloch et al., 2012). Instead, difficulties arise in the sphere of leadership because a project manager has to manage the client's requirements and face many challenges related to the organization and its results, risks, or inevitable changes in a turbulent and uncertain competitive environment.

From a broader perspective, leadership through projects emphasizes the importance of project management skills in achieving organizational goals (Muller & Turner, 2010). In this leadership style, leaders focus on leading and managing projects, rather than micromanaging individual team members. They work with teams to set clear project goals, establish project plans and schedules, monitor progress, and make course corrections as needed to keep the project moving forward (Turner & Müller, 2005).

According to Lch (2014), effective leadership through projects requires strong communication skills, both written and oral, to effectively communicate the project goals and progress to team members and stakeholders. Leaders in this style should also have the ability to motivate and inspire team members to perform at their best. Leadership through projects emphasizes the importance of collaboration and teamwork (DuBois et al., 2015); It requires leaders to focus on building strong relationships with their team members and stakeholders and to work collaboratively to overcome obstacles and achieve project success. Leaders who adopt the leadership through projects style need to be organized, flexible, and able to adapt to changing circumstances. They must be skilled in managing time, resources, scope, and budgets to ensure project success (Kriemadis & Kourtesopoulou, 2021). Overall, leadership through projects focuses on achieving project goals and delivering results. By emphasizing project management skills, leaders can help their teams succeed and contribute to the organization's overall success.

The Social Networks Approach to Group Interaction Research

Projects are considered unstable networks because they are limited in duration. Network resets are done with the start of a new project. Researching the interaction of groups that are part of projects receives increased attention because concepts such as communication and trust between project partners, stakeholders, and beneficiaries are important drivers in ensuring the success of the project (Bjørnson & Dingsøyr, 2008; Palangi et al., 2016).

The approach of social networks in the analysis of the behavior of groups focuses on a detailed analysis of the project team. The link between traditional social analysis and the success of the project team consists of a novel approach to studying groups, whereby the network concept is expanded to encompass performing teams, integrating project elements with social interaction factors such as communication and collaboration (Malherbe, 2022).

Studies show that, especially in industrial fields, the networks tend to have a weak cohesion because the project partners focus especially on individual plans and objectives more than collective objectives, which diminishes the collective strength, thereby jeopardizing the success of the networking. (Chinowsky et al., 2008). Cohesion, density, centrality, and structural holes are the most used indicators that have been applied in numerous researches in different fields of activity (Berenhaut et al., 2022; Moody & White, 2003; White & Harary, 2001). These indicators must be known and visualized to identify weak points of the network.

Network visualization allows analysts to isolate relationships, calculate and qualitatively interpret the structural indicators of the network, and model and optimize the network. These strong points are essential in the redesign groups that jointly participate in the fulfillment of certain tasks and activities and in achieving the expected results.

The Model of Social Networks as a Basis for Leadership Networking Research

The foundation of leadership networking research on the social network model was developed by researchers from different interdisciplinary fields (Darwin, 2017; Provan et al., 2005). A leadership network means developing and using networks to build relationships and strengthen alliances in service of the organization's work and goals.

The need and opportunity to adopt leadership networks start from the fact that, initially, the hypothesis was assumed that the project and the teams face delays and suboptimal results due to instability within the project network (Qazi et al., 2020). Instability consists of frequent changes or adjustments of activities and expected results, reorientations regarding allocated resources, changes in forecasted costs, or even changes in team personnel components (Aubry et al., 2007).

The focus on the formation of team networks within complex projects has led to a deepening of the study of social networks and their analysis as a methodology and potential tool for investigating network relationships and modeling. This approach appeared as a response to the need to ensure the success of the project through an adequate organizational structure, which can be easily and safely established using the SNA tool.

Zheng et al. (2016) sustain the applicability of SNA in the industrial domain. A variety of collaboration models were also discussed, as well as their effect on performance. Despite its limitations, Caglio and Ditillo (2008) have deemed SNA to be a valuable tool for analyzing inter-firm relationships containing collaborations on difficult projects. Liaquat et al. (2006) revealed how network centrality affects project-based coordination. A study was conducted using SNA techniques to investigate the correlation between network positions and coordination within an email dataset. The study describes how actors communicate and exchange information with each other. Regarding the social network model used to evaluate a network within multinational companies, SNA offers two key advantages:

The use of mathematical metrics offers a reliable foundation for analyzing quantitative and qualitative correlations within the network and its topology. The use of visualization and modeling technologies gives a clear technique for capturing the connections, interactions, and qualities of actors/work teams, as well as the network connecting them. With these two fundamental advantages as starting points, social network analysis offers the opportunity to visualize the relationships and contrasts between high performance and under-performance within the network.

The most representative indicators of the graphs from the SNA researchers form the core of the theoretical constructs that are directly related to the field of organizational projects. Recent research argues for the analysis of network graphs and social relations, emphasizing the distribution of connections across the network, which is reflected in centrality. People who are more central than others occupy a favorable position in the network and greatly influence the behavior of others. In highly centralized networks, a few nodes have most of the relationships with other nodes in the network. In contrast, a low centrality network distributes relationships relatively evenly across the network. Individual centrality determines status, reputation, and power within a group (Shipilov & Gawer, 2020). Some of the most important centrality measures lead to a comprehensive picture of the network and can suggest how efficient the collaboration between stakeholders of a project is (Chaoqun et al., 2011). Thus:

a) Power centrality is a concept in leadership networking that refers to the degree to which a leader is central to the network of individuals with whom they interact. In other words, it is a measure of the extent to which a leader is positioned at the center of a network rather than peripheral. Leaders with high power centrality have more influence and control over the group than those with low centrality. b) Degree centrality-is a measure used in social network analysis to identify and analyze the importance of individual nodes (vertices) within a network. Degree centrality is used to analyze different descriptive situations of networks at a general level. This measure indicates the number of node connections. c) Closeness centrality helps estimate the speed with which information flows through a particular node to other nodes (Ni et al., 2011). Central nodes with high proximity have a less restrictive influence on other nodes but also reflect the ability to receive information about other nodes. d) Betweenness centrality is a key concept in social network analysis that measures the extent to which an individual node in a network lies along the shortest path between other nodes. Betweenness centrality measures the degree to which an individual is a bridge between different parts of the network. In the leadership network, betweenness centrality is an important measure of an individual's ability to connect different groups or sub-networks within an organization.

Material and Method

The research was carried out by analyzing the impact of the collaborative processes of the leadership networks within projects aimed at increasing organizational performance by introducing new high-performance technical/technological systems within the multinational industrial companies in Romania. For the research, a project was chosen as a case study that aims to implement together with the Transport Management System (TMS) an audit and payment program of transport invoices (FAP) within a multinational company with a subsidiary in Romania.

Description of the Project

It has been recognized by most organizations the need to externalize the freight audit and pay services because of these services' complexity, and the organizations need to be in control to ensure that the price paid for transports are in line with the contracts, the transports occurred, and carriers get paid on time.

The overall objective of the Freight Audit and Pay (FAP) Project is to provide quality services regarding the consolidation of the historical database of invoices issued by suppliers in a digital database by designing, implementing, and monitoring them in an integrative system. The principles of the development of this audit and payment system are based on a program development of the Transport Management System (TMS). The usage of these services usually generates cost avoidance/ savings much higher than audit and payment services fees.

The implementation phase of the project has involved testing an audit and payment program for transport invoices within a global organization at the European level. Implementing and running this program aims to enhance the accuracy of paid transport invoices, achieve cost reductions in human resources involved in these operations, and generate reliable databases for analysis, forecasting, and strategic decision-making in the organization's logistics field.

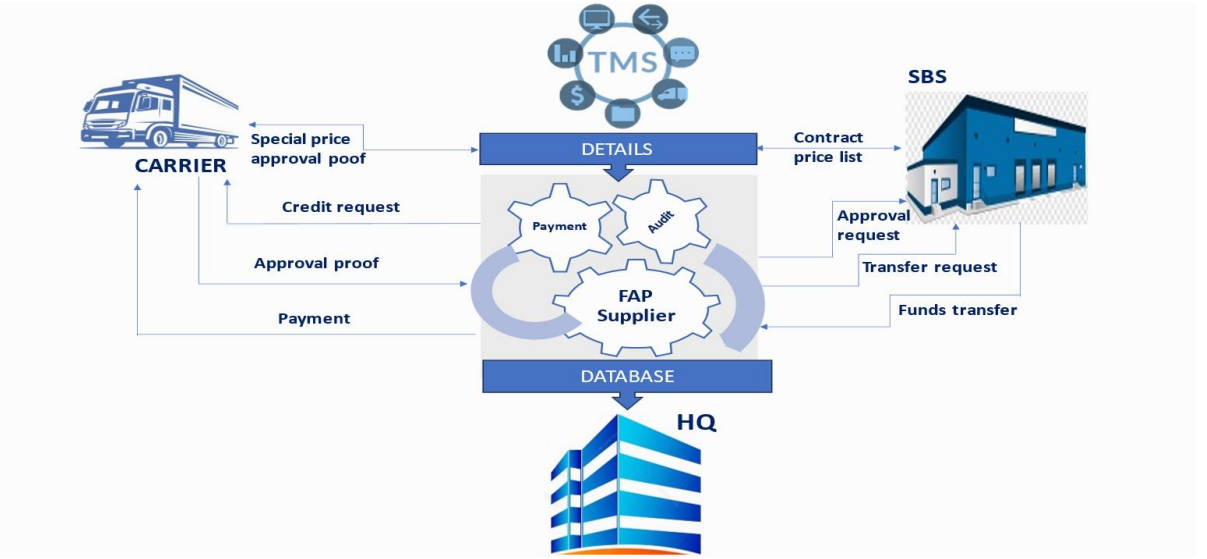
In addition to the general objective, the company also proposed the standardization of processes for all the subsidiaries from several European countries that were bought separately,

and they continued to hold to their autonomy on the logistics level. The implementation of the freight audit and pay program (FAP) was a change management strategy to centralize and control logistics activity at the global level, on top of direct audit and financial ones, as a FAP implementation is to be done in the corporation in all regions, including Europe, and represents digitizing the activities of freight invoices receipt, translation to an editable format, invoices audit and invoices payment. The software design has been carried out by a supplier contracted for these services. The scheme of the FAP System is captured in Figure 1.

There are companies specialized in freight audits and payments on behalf of their customers. The FAP supplier must receive the freight invoices from organization carriers through Electronic Data Transfer (EDI), EXCEL, or pdf, audit them, and arrange their payment on time. For this, the organization's procurement team must handle the contract prices to the FAP supplier, and in case needed, the internal audit team approves or rejects special price proofs for invoices with claims. After the invoice is completely audited and approved, before the due date, an automat request for funds is submitted to the organization’s accounts payable team, which transfers the funds for correspondent invoices to the FAP supplier, who performs the payments to carriers.

Figure 1

Freight Audit and Pay Program (FAP)



Stakeholders Identification, Responsible Parties with FAP Implementation

The responsibilities of the leadership network implementation teams of the project in the Romanian subsidiary of the multinational company are presented below. Thus:

– The Project Manager is responsible for implementation, roll out, and performance of the program **[BPM]**.
– Head Quarter is responsible for contracting the FAP Supplier **[HQ]**.
– EDI team from FAP Supplier is responsible for setting up the audit system with carrier and subsidiary organization data and getting it ready to go live **[EDIT]**.
– FAP Price keying Team is responsible for key data from paper invoices where invoicing is on paper or invoice details, and charges differ from the rate sheets [**FAPPT].**
– Auditors from FAP Supplier are responsible for reviewing system-created claims and investigating discrepancies [**FAPA]**.

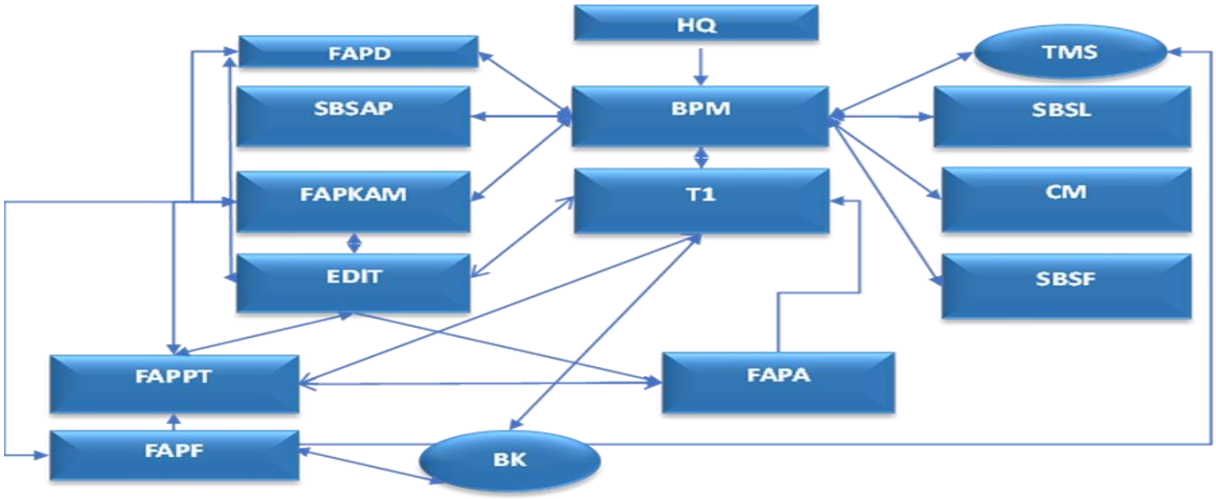
- FAP Supplier Key Account Manager is responsible for coordinating onboarding activities in their system [**FAPKAM]**.
- FAP Supplier Director is responsible for the escalation of KAM and other teams **[FAPD]**.
- The carrier is responsible for setting up his system and testing to activate the EDI connection and to send the test invoices with parameters from price lists .**T1**.
- The subsidiary AP team is responsible for booking the invoices and arranging funds transfer to FAP Supplier on time [**SBSAP].**
- The Logistics Commodity Managers are responsible for setting the prices with carriers and communicating them to FAP Supplier[**CM].**
- The subsidiary logistics operations director provides carrier contact details and facilitates communication with carriers [**SBSL]**.
- FAP Supplier Finance Team is responsible for releasing the payments to carriers on time [**SBSF].**

Information Flow Development on FAP System

Achieving the expected results of the project requires combining all the allocated resources within some activities that take place in a logical sequence. The optimal management of the implementation of the project activities requires knowledge of both the participating entities and their responsibilities, as well as the informational subsystem regarding the flow and connection between the actors. The flow in which the information (Figure 2) and the project documentation ensure the implementation of these activities is shown below:

Figure 2

Project Flow Chart TMS-FAP



Research Methodology

The research assesses the key stakeholders of the FAP project's network and thus identifies gaps in their network by employing Social Networking Analysis. Moreover, SNA can help leaders map the path to achieving their organizational goals by identifying individuals or departments that are best equipped to help them achieve their objectives; they can then work with those individuals to develop a plan that leverages their strengths and resources. With the help of leadership network analysis, leaders can identify the most suitable strategies and approaches to achieve the goals of the TMS-FAP project. Analysis can provide them with

insights into how network members communicate with each other and how these relationships can be used to better implement the project.

By using SNA, the parameters that indicate the properties of the network can be evaluated. Rădulescu et al. (2016) argue that the selection of the SNA methodology is an appropriate way of visualizing and modeling the project network. This led to the question of which project indicators should be analyzed within the network.

Target Group, Data Collection, Network Construction

The leadership network established during the implementation of the TMS-FAP project within a multinational company with a subsidiary in Cluj-Napoca consists of 15 actors/stakeholders, which forms the target group presented in Table 1.

The sampling method for determining the target group was Expert Sampling (ES). This method was chosen because of the team leaders who implemented the pilot project TMS-FAP at the Romanian subsidiary of the company. They are responsible for achieving the goals of the project and lead the specific implementation activities of the program and have expertise and knowledge in digitizing programs.

To be able to clarify the accuracy and quality of continuous information in the procedures and documents required by the FAP- TMS pilot project, data from fifteen leadership representatives' teams involved in the pilot implementation of FAP program was collected through a survey, where they were asked to appreciate and to complete an average number of weekly communications with all the other parties involved into the program implementation. To be more specific, we asked leaders about the weekly average number of emails sent, direct calls performed, and meetings they have attended with the other actors involved in the project. This average weekly number of collaborations between network actors was ranked on a scale from 0 to 3 (0... <1;2...1-5;2...5-10;3....>10). The ranking was aggregated in a matrix that identifies the collaboration links between these stakeholders, measures the intensity of these links, and enables to perform the SNA analysis.

Before defining and analyzing the indicators of the network, the network was built using SocNetV 2.8 software. The nodes of the network are the actors/stakeholders, and the arcs are the links between them formed as a result of the exchange of information, communication, joint activities, etc. carried out within the project. Table 1 contains the coded list of actors and the corresponding node.

Table 1

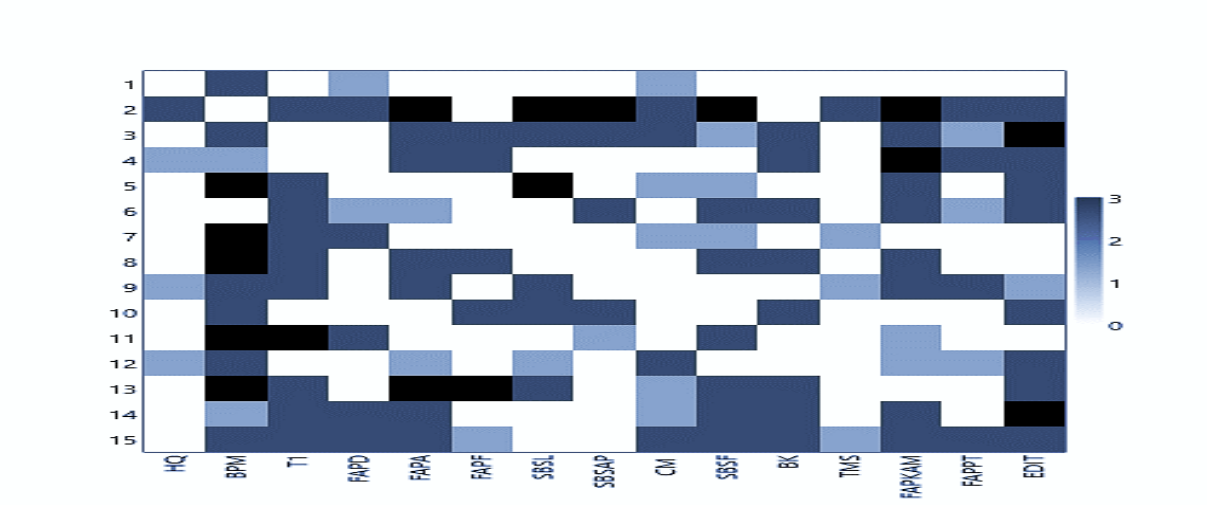
List of Nodes and Corresponding Stakeholders

Node	Label	Description
1	TMS	Transport Management System Team
2	HQ	Organization Head Quarter
3	FAPD	Freight Audit and Pay Director
4	SBSL	Subsidiary Logistics Operations Director
5	EDIT	Electronic Data Interchange Team
6	FAPA	Freight Audit and Pay Auditors
7	SBSF	Subsidiary Finance Director
8	T1	Carrier
9	FAPKAM	Freight Audit and Pay Key Account Manager
10	BK	Bank
11	BPM	Business Performance Manager
12	FAPPT	Freight Audit and Pay Price Set up Team
13	FAPF	Freight Audit and Pay Finance Team
14	CM	Commodity Managers
15	SBSAP	SBSAP Subsidiary Accounts Payable Team

By collecting and processing the questionnaire data, an adjacency matrix was obtained that shows the intensity of the links between the actors of the network**.** The adjacency matrix of a social network is an NxN matrix where each element (i,j) is the value of the edge from actor I to actor j, or 0 if no edge exists. The adjacency matrix plot (Figure 3) is a plot of the network's adjacency matrix, an NxN matrix where each element (i,j) is filled if there is an edge from actor I to actor j, or not filled if no edge exists.

Figure 3

Adjacency Matrix Plot

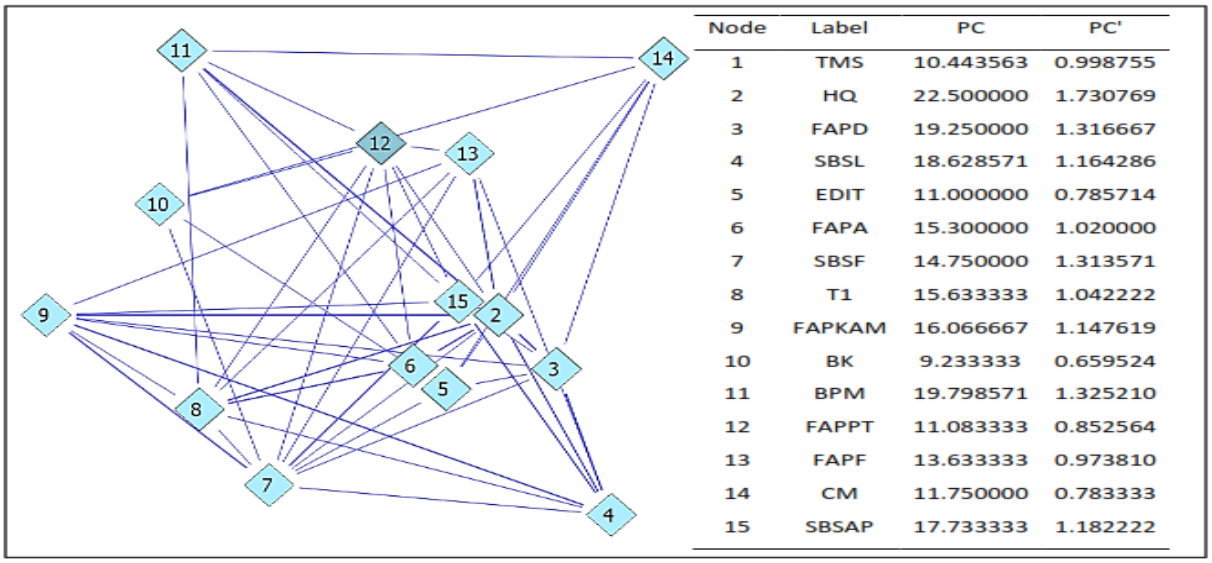


Results

The first parameter evaluated in the study is *Power Centrality (PC)*. Following the construction of the network, the PC and PC' index was calculated for the Power Centrality analysis. The PC index, introduced by Gil and Schmidt (Sinclair, 2009), of an n node is the sum of the sizes of all N th-order neighborhoods with weight 1/n PC' is the standardized index: The PC score divided by the total number of nodes in the same component minus 1 (SocNetV 2.8 Manual; Rădulescu et al., 2016). For the TMS-FAP network PC index calculus and plot are presented in Figure 4, where Max PC' = 1.730769 (node 2) and Min PC' = 0.659524 (node 10).

Figure 4

Power Centrality Network



Node	Label	PC	PC'
1	TMS	10.443563	0.998755
2	HQ	22.500000	1.730769
3	FAPD	19.250000	1.316667
4	SBSL	18.628571	1.164286
5	EDIT	11.000000	0.785714
6	FAPA	15.300000	1.020000
7	SBSF	14.750000	1.313571
8	T1	15.633333	1.042222
9	FAPKAM	16.066667	1.147619
10	BK	9.233333	0.659524
11	BPM	19.798571	1.325210
12	FAPPT	11.083333	0.852564
13	FAPF	13.633333	0.973810
14	CM	11.750000	0.783333
15	SBSAP	17.733333	1.182222

Leaders of the network have greater access to information, resources, and opportunities that can help them advance their goals. They are also more likely to be able to shape the norms and behaviors of the group. However, there are also potential downsides to high power centrality.

In this network, the highest power centrality is held by the head office HQ = 1.730769, followed by BPM Business Performance Manager = 1.325210, FAPD Freight Audit and Pay Director = 1.316667 and SBSF Subsidiary Finance Director = 1.313571, which confirms the hypothesis that the leadership of this project is evenly distributed among members with decision-making power within the project team. This is important because leaders strike a balance between power centrality and collaboration. Effective leadership networking involves building a diverse network of contacts and actively engaging with all members of the group while still maintaining a position of influence and control.

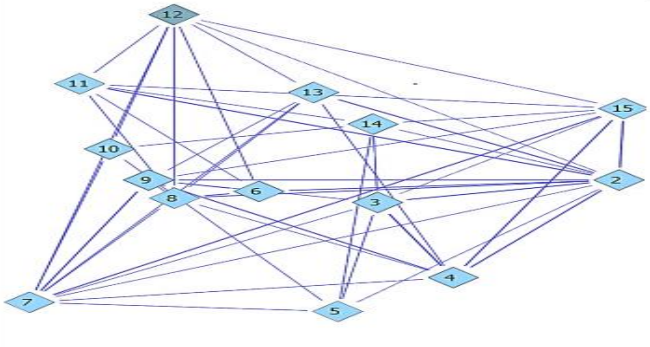
Within this network that implements the FAP project, the key person, respectively BPM, can also play the role of gatekeeper and perform different functions in the project management process. A "gatekeeper" is someone who takes information from an external source and communicates it internally. Their main task is to provide access to the outside world and facilitate the procurement of important external resources (Xue et al., 2018). In relational networks, gatekeepers connect the project's external environment to the internal network and are always more peripheral in the network. The internal network is also located at the point of greatest external connectivity, where the network has high density and high InDegree. On the contrary, leaders who are too centralized may become isolated from the rest of the group and may fail to consider diverse perspectives or ideas. They may also become vulnerable to being overthrown if their power dynamic is disrupted.

The second parameter evaluated in this study is *Degree Centrality (DC)*, which consists of InDegree is the number of connections each node has to other nodes, and OutDegree is the number of connections each node has to other nodes. The higher the value of degree centrality, the more connected that node is to other nodes (Maharani & Gonzali, 2014).

According to SocNetV 2.8 Manual and Rădulescu et al. (2016), in undirected networks, the DC index is the sum of edges attached to a node u. In directed networks, the index is the sum of outbound arcs from node u to all adjacent nodes (also called "outDegree Centrality"). If the network is weighted, the DC score is the sum of the weights of outbound edges from node u to all adjacent nodes.DC' is the standardized index [DC divided by N-1 (non-valued nets) or by sumDC (valued nets)]. For the TMS-FAP network DC index calculus and plot are presented in Figure 5, where Max DC' = 0.164179 (node 11) and Min DC' = 0.029851 (node 10).

Figure 5

Degree Centrality Network



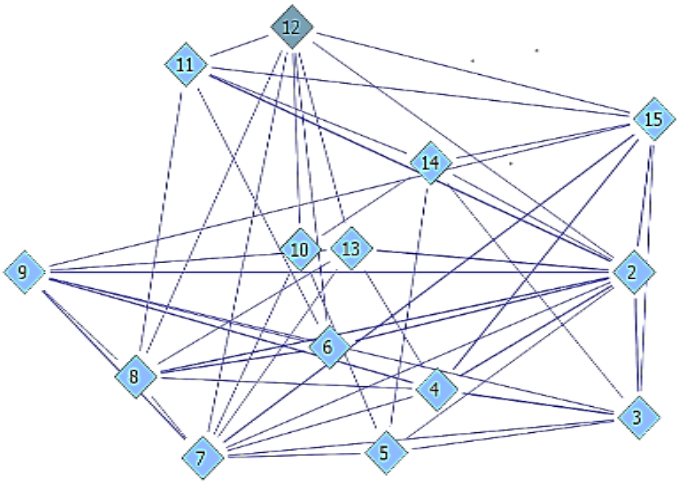
Node	Label	DC	DC'
1	TMS	8.000000	0.0571429
2	HQ	8.000000	0.059701
3	FAPD	11.000000	0.082090
4	SBSL	12.000000	0.089552
5	EDIT	5.000000	0.037313
6	FAPA	7.000000	0.052239
7	SBSF	12.000000	0.089552
8	T1	10.000000	0.074627
9	FAPKAM	11.000000	0.082090
10	BK	4.000000	0.029851
11	BPM	22.000000	0.164179
12	FAPPT	8.000000	0.059701
13	FAPF	7.000000	0.052239
14	CM	6.000000	0.044776
15	SBSAP	11.000000	0.082090

In leadership networking, degree centrality can be used to examine the degree of connections that a leader has with others in the network. Leaders with a high degree of centrality within a network have a large number of direct connections with other nodes in the network. In this network, BPM-Business Performance Manager, who is also the Project manager, has the maximum Degree of centrality. It means that a leader with a high degree of centrality will have more opportunities to exert influence, access resources, and gather information from other network members. On the other hand, leaders with a low degree of centrality may have limited opportunities to exercise influence and receive resources from others (BK-Bank = 0.029851). Degree centrality can also be used to identify subgroups within a network where certain leaders may hold high amounts of power due to their central position within the group. By analyzing degree centrality, leaders can identify influential members within the network and work to build stronger relationships with them to enhance their leadership effectiveness.

The third parameter evaluated in this study is *Closeness Centrality (CC). Closeness centrality ci*, the harmonic average of the node's geodesic distances to other nodes, also captures geodesic distance. According to SocNetV 2.8 Manual and Radulescu et al. (2016), the CC index is the inverted sum of geodesic distances from each node u to all other nodes. CC' is the standardized index (CC multiplied by (N-1 minus isolates). For the TMS-FAP network CC index calculus and plot are presented in Figure 6, where Max CC' = 0.448276 (node 2) and Min CC' = 0.206349 (node 10).

Figure *6*

Closeness Centrality Network



Node	Label	CC	CC'
1	TMS	0.073171	0.317073
2	HQ	0.070588	0.305882
3	FAPD	0.084507	0.366197
4	SBSL	0.077922	0.337662
5	EDIT	0.058252	0.252427
6	FAPA	0.070588	0.305882
7	SBSF	0.075000	0.325000
8	T1	0.0942857	0.3775144
9	FAPKAM	0.075949	0.329114
10	BK	0.047619	0.206349
11	BPM	0.078947	0.342105
12	FAPPT	0.061224	0.265306
13	FAPF	0.103448	0.448276
14	CM	0.059406	0.257426
15	SBSAP	0.082192	0.356164

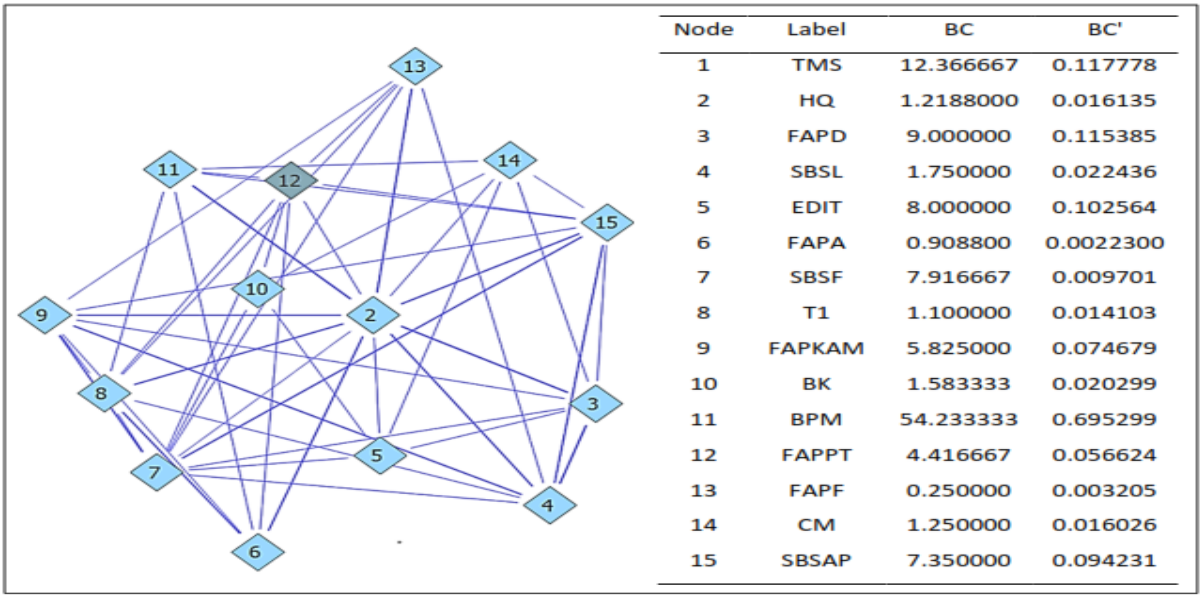
Due to the nature of the project, namely that of implementing a FAP system within the Romanian subsidiary of a multinational company, closeness centrality has the highest values around the main stakeholders that ensure the implementation of their activities, i.e., BPM, FAPD, FAPF, SBSL, FAKPAM, teams of key leadership.

The last parameter evaluated in this study is *Betweenness centrality (BC).* According to SocNetV 2.8 Manual and Rădulescu et al. (2016), the BC index of a node u is the sum of δ(s,t,u) for all s,t ∈ V where δ(s,t,u) is the ratio of all geodesics between s and t which run through u. BC' is the standardized index (BC divided by (N-1)(N-2)/2 in symmetric nets or (N-1)(N-2)

otherwise. For the TMS-FAP network, BC index calculus and plot are presented in Figure 7, where Max BC' = 0.695299 (node 11) and Min BC' = 0.000000 (node 6).

Figure 7

Betweenness Centrality Network



Node	Label	BC	BC'
1	TMS	12.366667	0.117778
2	HQ	1.2188000	0.016135
3	FAPD	9.000000	0.115385
4	SBSL	1.750000	0.022436
5	EDIT	8.000000	0.102564
6	FAPA	0.908800	0.0022300
7	SBSF	7.916667	0.009701
8	T1	1.100000	0.014103
9	FAPKAM	5.825000	0.074679
10	BK	1.583333	0.020299
11	BPM	54.233333	0.695299
12	FAPPT	4.416667	0.056624
13	FAPF	0.250000	0.003205
14	CM	1.250000	0.016026
15	SBSAP	7.350000	0.094231

Betweenness centrality measures the degree to which an individual is a bridge between different parts of the network. In the leadership network, betweenness centrality is an important measure of an individual's ability to connect different groups or sub-networks within an organization. Leaders with high are often considered to have a strategic advantage, as they can access and distribute information more effectively and influence decision-making processes across multiple groups. However, the headquarters carry out the decision-making process, as well as the formulation, elaboration, and implementation of the company's strategy, albeit playing a peripheral role in this network.

Also, this network comprises 2 actors with high betweenness centrality TMS = 0.1177 and EDIT = 0.1025, access having a decisive role in the correct diffusion of information, the speed in which it will be distributed and assimilated in the network.

Structural holes were also investigated to check the gaps between members of a network that are not connected (Burt, 2017) in this research. In the context of leadership networking, structural holes can have both positive and negative effects. On the one hand, having structural holes can be beneficial because it allows leaders to access information and resources that they might not otherwise have access to. For example, if a leader has connections to multiple groups that do not communicate with one another, he or she can act as a bridge between those groups and facilitate communication and collaboration. On the other hand, having too many structural holes can lead to isolation and a lack of support. If a leader does not have strong connections to any particular group or network, they may not have access to the resources or support needed to be effective. Therefore, leaders need to balance their networking efforts and cultivate strong connections within their existing networks and connections to new networks and groups. By doing so, leaders can access new ideas and resources, while still maintaining a base of support and strong relationships within their current networks.

By analyzing this network, the danger of structural holes appears due to the weak link between the respective HQ of the TMS team and most of the actors in the network. In the case of new projects that are implemented within multinational companies, the role of its leader is strategic, and the role of the TMS team is that of a catalyst. These aspects should not be neglected in building an efficient network.

Discussions

The research was developed based on investigating two topics of interest: 1) Leadership through Projects and 2) Leadership networking. The research brings a new fresh approach to the study of leadership, aiming at its performance by analyzing and evaluating the networks formed following the implementation of a company digitalization project. The network analysis proposed in this paper operates through an integrative approach to identifying and visualizing structural relationships within a collaborative network.

As can be seen in the previous section, by evaluating the parameters of the network, the role, position, and collaborative relationships between the stakeholders of the network can be identified, which helps the decision-makers to make important decisions regarding the efficiency of the project network, or the timely correction of some deficiencies related to the continuity of the operational flows of the project, or the merging of procedural operations in time and the balanced volume of tasks assigned to each team. The study reported in this paper emphasizes the need to use a SNA to manage collaborative networks. This point is intended to serve as a guideline for businesses who are still hesitant to use an SNA to lead teams when implementing projects of strategic importance for their organization (Easton & Rosenzweig, 2015; Lee et al., 2018; Nunes & Abreu, 2020).

By evaluating the leadership network within the TMS-FAP project, certain topological dysfunctions of this network can be found, which can lead to a decrease in the collective or individual efficiency in accomplishing tasks, achieving the expected results, and implicitly achieving the project's objectives. Table 2 depicts some of these dysfunctions found in the study and recommendations for increasing the efficiency of the network's indicators.

The expected results of the project involve improving the consumption of human resources, reducing costs, reducing time, and standardizing operations. These elements lead to organizational performance improvement, and the correct and rapid introduction of FAP within the subsidiaries requires an optimized cooperation network. Visualization of the network allows quick detection of its weak areas and taking measures to improve the situation.

Table 2

Dysfunctions and Recommendations for Improving Leadership Networking

Network measure	Actors	Dysfunction	Recommendation
Power centrality	HQ	No Client Management was introduced in the network Effects-Basic information from clients' needs is missing	Remodeling the network by introducing key stakeholders and procedures for external communication
Degree centrality	EDIT HQ	Week relationship with TMS and FAPF Effects-very poor feedback regarding the system's operation Week relationship with BPM and FAPA Effects-Low assessment of stakeholder engagement with the project, including communication, participation in project meetings, and feedback	The introduction of procedures/instructions in the relationship diagram to regulate the flow of information/communication between the actors. Ensure that all relevant stakeholders are kept informed of the project's progress

Closeness centrality	FAPD BPM	No relationship with TMS Effects-Misunderstanding of the change management processes in terms to ensure the logistics project does not negatively impact the company's operations No relationship with SBSL, TMS, CM BK Effects- poor internal and external communication with stakeholders communicate internal and external with stakeholders is inappropriate	Review how the change management process is communicated to stakeholders and how their feedback is incorporated Introduction of a communication plan within the project to regulate the nature and frequency of information communicated with stakeholders
Betweenness centrality	TMS EDIT	Week relationship BPM, FAPD, SBSF Effects-Low diffusion and feedback of information concerning upgrades, regulations, and standards, including data protection, privacy, and safety. 2 actors with high betweenness centrality TMS=0.1177 and EDIT =0.1025 high betweenness centrality can create potential vulnerabilities, as those who are heavily relied upon as connectors in the network may become overloaded or subject to excessive demands on their time and resources.	The introduction into the network of some administration and monitoring teams of the FAP system, including the continuous improvement of employees regarding the use of the system Due to the large volume of information that must be managed correctly, and for proper upgradation and maintenance, the recommendation would be to introduce a maintenance team within the network. Therefore, a balanced approach to leadership network development that takes into account considerations such as role clarity, delegation, and resource allocation is essential for maximizing the benefits of betweenness centrality while minimizing its potential drawbacks.
Structural holes	HQ	Week relationship with TMS Effects- A more difficult Identification of the performance metrics used to measure success and ensure they are clearly defined and aligned with the project goals and objectives. Structural holes tend to split networks when implemented in different subsidiaries of the same multinational company.	Evaluate how the metrics are being tracked and reported for each subsidiaries FAP project and ensure they are clearly defined and aligned with the project goals and objectives by checking with TMS teams.

Practical Implications of the Study

Social Network Analysis (SNA) is a valuable tool for leadership networking because it allows leaders to visually depict their social networks, analyze patterns of relationships, and gain insights into how those networks support or hinder organizational goals. The roles and importance of social networking analysis in leadership networking reside in:

- With SNA, leaders can identify which members of their network have the most influence and who are the key stakeholders in their network of TMS-FAP projects. This can help leaders identify gaps and dysfunctions in the project's activities and strategically build relationships with influential individuals who can significantly improve implementation procedures of similar TMS-FAP projects.
- Building and maintaining relationships: By analyzing the social network, leaders can identify relationships critical to their success and nurture those connections, thus selecting the most efficient collaborators and partners, empowering the TMS-FAP project's network.
- As a consequence, SNA can help leaders identify barriers to effective team collaboration, such as silos or power imbalances. Through SNA, leaders can identify which individuals or teams need to be brought together to enhance collaboration and create a more cohesive team. Analysis of leadership networks can highlight

communication and collaboration issues within the team. With this analysis, leaders can identify and collaborate with critical nodes in their network to facilitate communication and information sharing.

- Monitoring network changes: As social networks evolve; leaders need to be aware of any changes that may have an impact on their objectives. SNA can help leaders monitor changes in their social networks and adjust their strategies accordingly.
- Improving the decision-making process - Analysis of leadership networks can provide insights into how network members make decisions and how these processes can be improved. By identifying critical nodes and key relationships, leaders can improve decision-making by engaging in key discussions and making decisions more collectively.

Conclusions

Increasing the effectiveness of leadership is a basic desire of any organization. In conditions of fierce competition, the internationalization of markets represents a valuable strategy for large organizations. The leadership networks ensure a uniform distribution of the management and administration of multinational companies. The role of leadership networks is sharing responsibilities and tasks assigned to groups that implement common activities in the organization. The purpose of this paper was to analyze the interactions of a network formed by teams participating in a TMS-FAP project; respectively, the study focuses on internal and external communication and the information workflow among teams during the implementation of project's activities. The impact that leadership has on the project ensures its success. Social Network Analysis (SNA) was utilized to conduct the research, which is a technique with numerous practical implications that contribute to effective leadership. The development of a social network model and then its analysis led to the identification of the main actors of the network who have the most significant influence on the achievement of the expected results. `

Given that digitization projects are often executed throughout all subsidiaries of a business, this analysis will give feedback and essential information for other similar projects to be implemented. This research suggests that SNA provides valuable information for all similar subsidiaries of a multinational company that implement TMS-FAP project types due to the improvement measures of leadership networking as a result of the analyses performed in the pilot study.

In conclusion, social network analysis is a powerful tool for leaders to improve their networking effectiveness, build better relationships, and achieve organizational goals. It provides a structured approach to better understand how individuals and teams communicate, collaborate, build trust, and align their efforts to achieve a common goal.

The research of leadership networks with the help of SNA can be extended in future studies and applied to other types of organizations that implement different projects in various fields of activity. By conducting such research, a deeper understanding of the dynamics and effectiveness of leadership networks can be gained, providing valuable insights for organizations operating across various industries.

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