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COMMUNICATION STRUCTURE AND THE PERFORMANCE OF ORGANISATIONAL TEAMS

Abstract. *Relationship between communication structure of organisational teams and their performance is becoming increasingly important as more and more modern organisations move beyond their internal and external boundaries. Such a context provides room for the communication and co-operation of groups of individuals that cut across the various parts of the organisation. This article shows that the flattening of the hierarchy alone, which contributes to connectivity across the organisation, is not sufficient for successful cross-unit team collaboration. We support this discussion with the results of a study of two teams differing in their performances where a significant relationship was found between centralisation and team performance.*
Keywords: *organisational teams, communication structure, team performance, social networks*

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Introduction

The managers of modern organisations face the challenges of how to increase productivity, motivate employees and bring about the greater participation of employees. All of these organisational issues speak in favour of organising work and making decisions in small units or teams. Teamwork is the "process by which a group of people try to use, in a systematic manner, the individual team members' talents in order to achieve a set of objectives in the best possible way" (Casse in Purg et al., 2003: 15). What distinguishes the work performed by teams from that of individuals are the skills and experience the team members bring in together and which exceed that of any particular individual. In 1988, Drucker acknowledged that "although teams within organisations are hardly new, they have recently gained importance as a fundamental unit of organisational structure".

Teams are usually composed of mixed knowledge, insights and skills as well as characters, values, roles and functions (Mayo, Lank 1996: 153). Large

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projects bring people from different parts of the organisation together and hence establish a diversity of connections between project members. Individual team members are strongly interdependent, not only for information and knowledge, but also for mutual support, advice and assistance. That is why group dynamics and communication serve as a vehicle that has the potential to drive group behaviour, norms and consequently their performance.

In this article we present teams from a social network perspective. The structural approach to studying organisations, which explores communication patterns within the organisation, provides important insights into the operating principles of organisations and their structural elements. Looking at the organisation as a natural system (Scott, 1981/2003), the informal structure of relations that develops among participants provides a more informative and accurate guide to understanding organisational behaviour than the formal structure.

Today, ever more present research interest in teams has a different research focus compared to the studies conducted in the past. Team researchers used to identify classical team variables that predict the effectiveness of a team such as cohesiveness, size, leadership, motivation, group goals (Guzzo and Dickson, 1996) and the composition of a team, particularly as regards diversity. Recently the concepts of teams and social networks have begun to converge (Katz and Lazer, 2003) and research has focused on the social ties among team members and the impact that these ties have on the performance of teams. In the middle of the last century, experimental work showed that structural arrangements of ties in groups may hold consequences for their productivity (Bavelas, 1948).

Teams as communication networks

From the social network perspective, the key building block of a team is a tie which is often based on communication, such as task-related communication, advice-related communication and social communication. Interpersonal connections in networks form a structure which is a complex set of ties between actors in a network. The structure of relations, represented by communication flows, reveals the possibilities of actors to communicate with a certain number of actors in a network and with actors holding specific positions in a network. In the team management theory communication among team members is captured at the team or individual level, more in terms of formal relationships than informal interaction patterns (Guzzo and Shea in Kantz and Lazer, 2003). But informal communication networks hold important implications for the diffusion of innovations (Rogers, 1995) and transmit work-related resources (task advice and strategic information),

and social identity (norms). With teamwork, interpersonal ties connect team members and, through these ties, information, knowledge, ideas and decisions are spread more rapidly than via most other kinds of communication channels.

According to Katz and Lazer (2003), very little data is available on how social ties are relevant in the team context since the literature on social networks has primarily focused on organisations or the national level, and less on the group level. Nevertheless, small group research dates back to the beginning of the 20th century and has produced the most prominent research findings for today's network research.

Social network analysis is grounded on the work of psychologists (Bavelas, 1948; Leavitt, 1951; Shaw, 1964) and their observations which showed that social actors are interdependent and their links have important consequences for every individual and a group. The network of relations was first mentioned already in the 1940s by the anthropologist Radcliffe-Brown to mean the interaction patterns describing a social structure. The central idea of network analysis is that people's beliefs, feelings and behaviours are driven by the patterns of relationships among individuals. Social networks are important for understanding the context of teams because, when individuals participate in a team, they bring with them ties that they have with other people in their lives. The pattern of those ties creates a network of interdependent social exchanges wherein certain people become trusted exchange partners (Oh, Chung and Labianca, 2004: 862).

In contrast to groups where a strong leader is typically the one who directs activities, assigns tasks, establishes schedules, and performs in a traditional management role, teams share leadership among individual members, or may rotate leadership among members. Due to the lack of stable formal rules of engagement, team members rely more on the communication ties with others in the team so as to provide the information and knowledge required for performing tasks and making decisions within the team.

Communication structure and performance

Communication networks vary according to different network characteristics. One of these features is structure. Each communication network has its own structure of ties representing patterned communication flows. Each team has its own communication structure which reveals the possibilities of team members to communicate with other members in a network. The first observations of network structures of small groups and of their implications on group performance were made by Bavelas (1948) and his colleagues (Leavitt, 1951; Shaw, 1964) while studying communication in small groups and they hypothesised a relationship between structural

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centrality and influence in group processes. Conti and Kleiner (1997) analysed several types of teams – taskforce or cross-functional team, quality circles, departmental teams, organisational policy-making teams, self-managed teams – and, while most teams have common features, not all teams share a common structure. Network structure varies according to different levels of centralisation, hierarchy, reciprocity of ties, network heterogeneity (heterogeneity/homophily), density of ties (dense/sparse), strength of ties (strong/ weak) and types of ties (e. g. friendship, advice). The structure of social relationships that interconnect team members affects team performance and viability (Balkundi and Harrison in Garcia, 2007).

Like the position of a member in a team, numbers also matter in communication networks. The defining feature of a social structure is network density which is operationalised as the number of observed ties over all possible ties and cohesiveness of the network. Its positive implications for the performance of the network have been presented by several authors, specifically in connection with the building of trust in networks (Granovetter, 1985; Coleman, 1990). Strongly knit ties are important instruments for avoiding the potential strategic advantage of any actor in the network and, therefore, have a positive relationship with collective action. One of the most powerful interventions in terms of developing network cohesiveness is to put people together in teams since working together towards a shared goal is a great way to develop or strengthen relationships (Anklam, 2003: 27). Network density also enhances communication, co-ordination and team performance (Reagans and Zuckerman, 2001). Still, when groups become too tightly knit and information passes only among a select few, networks can become competency traps (Smith-Doerr and Powell, 2003). Tie strength also influences performance. Hansen (1999) showed how weak inter-unit ties help a project team search for useful knowledge in other subunits but inhibit the transfer of complex knowledge, which tends to require a strong tie between two parties for such a transfer. Having weak inter-unit ties also speeds up projects when the knowledge involved is not complex but slows them down when the knowledge to be transferred is highly complex.

Since team members bring skills and experience (different perspectives, knowledge, and information) together that exceed those of any individual it is important to know who those individuals that form the team are and how the team composition influences performance. Reagans and Zuckerman (2001) found that network heterogeneity has a positive influence on a team's performance. In a survey of 224 research and development teams from seven industries network heterogeneity proved to have a positive influence on a team's performance. Teams with members from diverse demographic categories benefitted because such teams generated links between people with different skills, information and experience, enjoyed

an enhanced learning capability and capacity for creative problem-solving. The density of the boundary-spanning ties of team members was positively related to team performance and was particularly valuable when the team members were more densely connected within a team. Their findings are in line with the structural holes approach (Burt, 1992) based on which a team's value is thought to derive from bridging structural holes or gaps between nodes in a social network. Actors who develop ties with disconnected groups gain access to a broader range of ideas and opportunities than those who are restricted to single one.

Network centralisation and team performance

Our study will focus on the degree of centralisation which is one of the key features of a communication network (Shaw, 1964) since it provides information on the extent of equality regarding how communication in a team is distributed and the extent to which all members of a network participate in the decision-making process. Teams are, by definition, collectivities of equal experts which implies a flattened hierarchical structure. In this article we are interested in finding out how this equality of team members is reflected in their communication networks and how it contributes to team performance.

The idea of centrality as applied to human communication was introduced by Bavelas in 1948. The communication networks that were observed varied in the way communication channels connected different positions in the network. Their studies revealed five different communication networks: completely connected, circle, chain, wheel and line. The wheel network is considered the most structured and hierarchical on the basis of the highest level of the centrality measure (number of steps to communicate) with a central decision-making position. Communication runs quickly with unequal opportunities to communicate. In contrast, we have a completely connected network where all members communicate between themselves which gives them equal opportunities to communicate, a high level of overall satisfaction yet, on the other hand, slow decision-making. These first applications of network centrality showed that centrality was related to group efficiency in problem-solving, the perception of leadership and the personal satisfaction of the participants. A decentralised network provides a more or less equally distributed communication process and all network members participate in the decision-making process. In a more centralised or leader-centred network, communication is constrained, information and the decision-making process is restricted and distributed according to hierarchical structures.

When studying teams and their communication structures, it is also

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important to explore the main tasks of the teams and their complexity since they influence the way communication between the team members is structured. Brown and Miller (2000) explored 48 groups of a total of 216 undergraduate students, each consisting of 4 or 5 participants, and asked them not to sign up for the experiment with friends or acquaintances. Groups working on a high complexity task tended to adopt a more decentralised communication pattern than groups working on a low complexity task. Members who were higher in dominance tended to be more central in the emergent group communication network.

A study of the communication structure of two teams and its influence on team performance[1]

Research background

In studying teams as networks, we tried to detect the basic communication structures already acknowledged in previous research (Bavelas, 1948) and their importance for the team performance. The structure of relations, represented by patterned communication flows, reveals the possibilities of actors to communicate with a certain number of actors in a network and with actors holding specific positions in a network. The centralisation of the communication network provides an insight into the equality of the tie distribution and the participation of the team members.

Our study explores international team collaboration supported by a Phare programme which purpose was to align the legislation of a candidate country with the acquis communautaire of the EU that had already been introduced in the member states. Teams were composed of two distinctive groups of experts, national experts, representing a candidate country at that time, and foreign experts, representing a partner institution from a member state country. The transfer of knowledge was the focal point of their collaboration. In pursue of attaining this end, Phare mechanism was developed to provide the same framework for all of the collaborative projects. This framework covered standardized approaches and tools for the whole process, from the planning of the project, implementation, monitoring and to the final evaluation. Such technical assistance programs were regularly monitored. Evaluation of the Phare projects carried out in 2003 (European Commission Directorate, 2004) showed that more than one third of the projects in the period from 1999 till 2001 were not successful. This data indicates that there must be some other element apart from the formal framework of

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[1] *This survey formed part of the PhD research »Knowledge Transfer Between Organizations in the Public Sector« (Kovačič, 2008).*

project-based approaches to institutional reform which influences the performance. Since transfer of knowledge was the main goal of these projects and communication plays an important role in the knowledge transfer process our main research question was how the communication between the team members was structured and how it affected the performance of these teams.

For the purpose of understanding how communication structure of the relationships between team members influences team performance, we explore in detail a communication pattern that developed within those teams. Previous studies showed that a group level of centralisation may have positive or negative effects on group performance (Bavelas, 1948), depending on the complexity of the tasks involved (Brown and Miller, 2000). During the collaboration between the national and foreign experts, the members of both teams were exposed to a high amount of new knowledge in the fields that they were already familiar with. Therefore, we might predict that, to promote the transfer of knowledge and decision-making, teams would adopt a decentralised communication structure. At the same time, we might expect team members to develop strong ties with each other (Coleman, 1990) in order to build trust, mutual understanding and enhance knowledge transfer. Teams were composed of experts coming from different countries, with more or less different experience and knowledge, and since knowledge transfer is the main goal of their collaboration, we might expect their heterogeneity to positively contribute to the overall team performance (Reagans and Zuckerman, 2001).

Method

In our survey, we included two teams of national and foreign public officials and experts who were involved in the process of aligning Slovene legislation to the acquis communautaire of the EU for the period of 2 years. Their main forms of collaboration were foreign experts' visits, seminars, workshops and study visits to a member state country. These were all important opportunities for the national public officials and experts to gain a firsthand knowledge about the experiences with specific laws and regulations of their counterparts.

The data on communication structure were collected in 2007. Communication relations of the two teams were measured using a survey data collection method. The members of each team reported their ties with others in terms of their contact relations. Contact relations were used as a proxy variable for the opportunities that team members used to communicate and transfer knowledge. To measure the frequency of contact, respondents were asked to answer the question "How frequently were you in contact

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with the following persons during the project?" on a Likert scale ranging from 0 meaning "never" to 5 meaning "very frequently". The question was followed by a list of team members. The final number of team members included in the survey was 35 (Team 1) and 27 (Team 2). We used a measure of centrality to detect the different positions actors held in the network. To calculate the centrality of each team's structure we used the degree centrality (Freeman, 1979) based on degrees of points which are indexes of communication activity. We used an additional method of direct observation and high level of researcher's involvement in both projects, in order to assure the reliability and validity of the data and results.

Project teams' performance was evaluated externally. Both projects were evaluated at the end by the Official Evaluation (European Commission Directorate, 2004). Their evaluations revealed differences in the performances of both teams. The performance of Team 1 was successful, while Team 2 was evaluated as unsuccessful. The main evaluative dimension was the teams' effectiveness, which means the achievement of project goals, which in the case of both teams studied was the process of knowledge transfer.

Comparative analysis and results

Our study tried to detect the importance of a communication structure for the team performance. Based on the findings from the literature on knowledge transfer and organizational teams we included three main features of a communication structure: density of relations; level of centralization; and heterogeneity of relations. In order to control for the other contingency factors, such as characteristics of knowledge source and knowledge recipient, teamwork design and barriers to transfer knowledge, a Mann-Whitney U test was conducted for assessing whether these two teams have equally large values on these dimensions. The results of the tests were significant[2] so we could not reject the null hypotheses that there is no significant difference between the two samples.

We were primarily interested in the overall presence of relations between the team members. Cohesiveness was explored as the main network structure characteristic. We used density of relations as a measure of network cohesiveness. On the group level, the density of ties in both teams reveals a difference between the two networks with a density in Team 2 of 0.5627 compared to a density in Team 1 of 0.4882. The mean number of ties is higher in Team 2 than in Team 1, which means Team 2 is characterised by a higher number of ties between the team members. By examining the frequency of relations, the results reveal that people were overall densely

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[2] *All Z values below 1.96.*

connected, which gave them a lot of opportunities to communicate and learn from each other. This is in line with the assumption of a learning process about the presence of dense connections between the actors to facilitate the free flow of information.
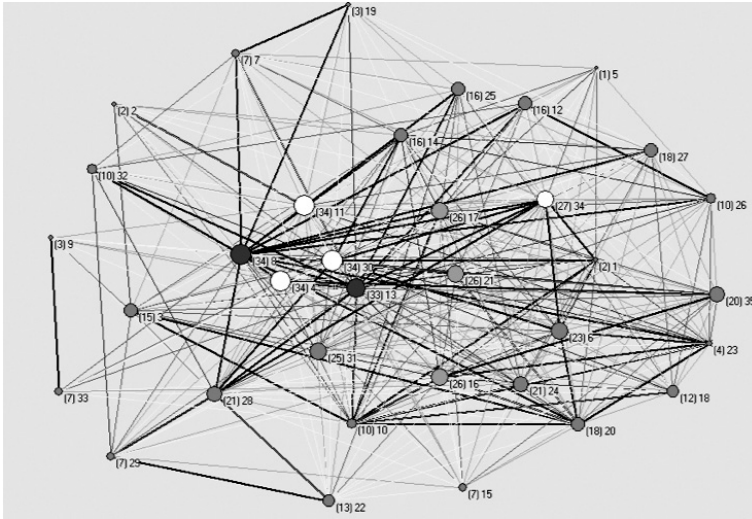
We also compared both teams regarding to the strength of their ties. Members of Team 2 have overall stronger ties than members of Team1, which means members of Team 2 are more directly connected to each other by cohesive bonds which should enhance the team performance. Even though members of Team 2 were exposed to a high(er) number of connections and at the same time experienced stronger connections than members of Team 1, the performance of Team 2 resulted in a low satisfactory level, which means we cannot support the assumption on the mutual contribution of density and strength of ties to the learning process.

We also looked at how connections, more or less dense, were located in the network aside from just the existence of network relations. We compared the two teams according to the range of actor centralities. If we compare the two networks to the different communication patterns introduced by Bavelas (1948), our two teams form a decentralized structure with more or less distributed communication process where all network members participate in a learning process and can take direct or indirect part in a decision-making process. If we compare the level of decentralization, the network of communication ties in Team 2 reveals greater level of decentralization with almost no communication restrictions on any team member (see Graph 2). Members of this team are closely connected with relatively strong ties which form a so-called "each-to-all" system. In contrast, in Team 1 communication ties are more hierarchical and concentrated around a few centralised team members who have direct ties with peripheral members with less and less connections as we move further away from the centre of the team (see Graph 1). This structure provides room for the accumulation of knowledge about task procedures which might have a positive influence on the time and ease of decision-making and performance.
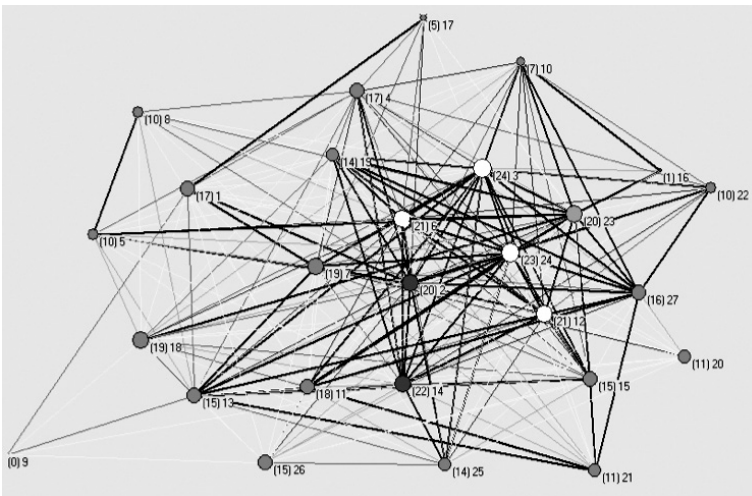
Both teams were composed of different members belonging to different institutions and holding two opposite positions in the knowledge transfer process, that is, knowledge source and knowledge recipient. The teams also differ according to the position different team members hold in each network. Looking for the heterogeneity of the teams and their position in the network the graphs show additional features of the two communication networks. Comparison of the team members with the highest centrality in the network shows that, in Team 1, four members have a central position in the team and are affiliated with three different institutions. In Team 2, two members are central but belong to the same institution. Since learning process builds on the communication between the knowledge source and

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recipient and teams can benefit from the heterogeneity of members' knowledge, experiences and skills, we found that heterogeneity of the members holding a central position played an important role for the team learning and performance.

Graph 1: THE NETWORK OF TIES IN TEAM 1

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Graph 2: THE NETWORK OF TIES IN TEAM 2

Results of our comparative analysis complement the already existing knowledge on the learning process in social networks and on the importance of elements of communication structure, like network density,

strength of ties and heterogeneity for a team performance (Granovetter, 1985; Coleman, 1990; Hansen 1999). Our study confirmed the importance of all those elements in the process of knowledge transfer. In addition to the findings from this literature, our research shows that not just high network density, strong relations or high team members' heterogeneity contribute to the knowledge transfer process but heterogeneity of the central team members revealed to be the distinguished feature of both teams and proved to be the main facilitator of this process.

Conclusion

The corporate world has adopted teams to increase quality and reduce costs, and remain competitive in world markets. The greater use of a team as a unit of organisational structure is effecting the development of modern organisations. Teams are often formed around important business processes such as quality or new product development, bringing employees from different departments together. Teams are developing in a way that ever more freedom is being imposed on them, in terms of their composition, ways of carrying out their tasks, and overall management. In order to be able to manage teams effectively a deeper understanding of team dynamics in needed. This was also the purpose of our study.

We analysed the basic element of teamwork, namely team communication structure and its implications on team performance. In the two teams under study, forming of relations was a critical way of co-operation with others for obtaining information and transferring knowledge. The Phare programme provided a highly standardised framework for teamwork, still a performance of the teams that carried out these projects was highly different.

This article highlights three different elements of a team's communication structure: density and strength of relations; level of centralization; and heterogeneity of relations. Our comparative analysis of the two teams working under the same conditions and achieving different results complements the already existing knowledge of the communication structure of organisational teams.

Firstly, our study showed that dense ties were an important element for the knowledge transfer to occur since a denser network provides more opportunities for the members to communicate and learn from each other. Both teams developed dense communication structures, but those dense connections were different in terms of their strength. We could not support the assumption that strong ties between the two parties were required for the knowledge transfer to occur. Strength of ties did not contribute to a greater knowledge transfer.

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Secondly, we can support this finding with the insights we made into the communication structure. Closely connected team formed a connected network with a high degree of decentralisation which had a negative impact on the communication and decision-making in terms of time, which is an important dimension of today's working processes. What is different in comparison to the team network which performed well is the division of connections from the periphery towards the central decision-making unit.

Thirdly, in addition to these two structural elements, the heterogeneity of the central actors played an important role for the team performance. The heterogeneity of members in both teams provided them with a diversity of information and knowledge, which was necessary in the process of learning. Still, the networks performed differently. What contributed to a team's performance was not the heterogeneity on the network level, but the diversity of the team members holding the central positions in these networks. This is the main finding of our research and holds an important implication for the learning theory and the performance of the knowledge transfer process.

Looking at the teams from a network perspective, we can also point out implication for managing teams. Our study shows that teams are more than just window dressing as their communication structure importantly contributes to the performance of teamwork. Managers should therefore need to pay special attention to the informal relations between team members and whether the centrality in these networks is consistent with the formal role of these actors.

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