

THE EFFECTIVENESS OF CENTRALIZED AND DECENTRALIZED COMMUNICATION NETWORKS IN TEAMWORK

К.І. Шиман¹, О.В. Міннікова², О.О. Ходирева³

¹ бакалавр кафедри менеджменту, НТУ «ХПІ», Харків, Україна

² бакалавр кафедри менеджменту, НТУ «ХПІ», Харків, Україна

*³ доцентка кафедри менеджменту, Ph.D. з економіки, НТУ «ХПІ», Харків, Україна
oksana.khodyrieva@khpri.edu.ua*

Contemporary organizational environments demand sophisticated coordination mechanisms to navigate complexity, uncertainty, and distributed knowledge across team members. Communication networks, defined by patterns of information exchange among team members, constitute fundamental infrastructure for team performance and organizational effectiveness. The structure of these networks—whether centralized with concentrated communication ties or decentralized with evenly distributed connections—profoundly influences team coordination, knowledge sharing, and collective problem-solving capabilities [1]. In the context of digital transformation, global collaboration, and increasingly complex organizational tasks, understanding the differential effectiveness of communication network structures becomes critical for optimizing team design, enhancing productivity, and fostering innovation in both Ukrainian enterprises and international organizations facing dynamic competitive pressures.

The objective of this research is to systematically analyze the comparative effectiveness of centralized and decentralized communication networks in teamwork, examining how network structure interacts with task characteristics, environmental conditions, and team processes to influence performance outcomes. This investigation addresses fundamental questions regarding optimal network configurations for different organizational contexts, exploring how centralization affects information flow efficiency, decision-making speed, knowledge integration, and adaptive capacity [2]. Particular attention focuses on contingency factors that moderate the relationship between network structure and team effectiveness, including task urgency, tie strength, knowledge diversity requirements, and innovation demands.

Centralized communication networks concentrate information exchange through one or few central members who mediate communication among otherwise disconnected peripheral members. This structure offers several advantages including clear accountability, reduced communication overhead, faster decision-making under time pressure, and efficient coordination [1]. Research demonstrates that centralized networks excel in contexts of strong task urgency, where rapid coordination and decisive action outweigh benefits of broad participation, as central members can quickly synthesize information and direct team activities without extensive consultation [2]. Additionally, centralized structures facilitate performance when tie strength among members is weak, as formal coordination through a designated central member compensates for absence of strong interpersonal relationships that would otherwise enable informal coordination [3]. The effectiveness of centralized networks depends critically on characteristics of the central member, particularly communication activity, task expertise, and capacity to manage information flow without creating bottlenecks [1]. However, centralized structures impose cognitive demands on central members, create single points of failure, and may suppress participation and innovation from peripheral members who lack direct communication channels with teammates.

Decentralized communication networks distribute information exchange more evenly across team members, enabling direct communication among all or most participants without dependence on central coordinators. This structure promotes knowledge diversity utilization, encourages broader participation, facilitates emergent coordination, and supports innovation through cross-pollination of ideas [2]. Decentralized networks demonstrate superior effectiveness under conditions of weak task urgency, where time availability permits collaborative deliberation and consensus-building processes that leverage distributed expertise throughout the team [2]. When tie strength among members is strong, characterized by trust, frequent interaction, and mutual understanding, decentralized structures capitalize on these relational assets to enable fluid coordination without formal hierarchies [3]. Research on knowledge sharing reveals that decentralized networks facilitate sustainable knowledge exchange practices by promoting trust, open communication, and collaborative cultures that encourage members to contribute and access expertise across organizational boundaries [4]. Decentralized structures particularly benefit complex, ambiguous tasks requiring integration of diverse perspectives and creative problem-solving, as broader participation surfaces alternative approaches and enables collective intelligence [5]. However, decentralized networks may suffer from coordination costs, slower decision-making, potential for conflict, and diffusion of accountability when tasks demand rapid integration or clear authority structures.

Research findings reveal that network structure effectiveness is fundamentally contingent on task and contextual characteristics rather than universally superior. Experimental evidence demonstrates that under strong task urgency conditions, centralized networks yield significantly higher collective effectiveness including both objective performance and subjective member satisfaction, whereas under weak urgency conditions, decentralized networks achieve superior outcomes [2].

In conclusion, the effectiveness of centralized versus decentralized communication networks in teamwork depends critically on contingency factors including task urgency, relationship quality, knowledge distribution requirements, and available time for coordination. Organizations should adopt diagnostic approaches to network design that assess task characteristics and contextual conditions before imposing communication structures, recognizing that optimal configurations vary across projects and organizational contexts. Future research should examine network structure effectiveness in virtual and hybrid work environments, investigate cultural variations in optimal network configurations, and develop algorithms for dynamic network adaptation based on real-time assessment of task characteristics and team performance trajectories.

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