Coordination

RONALD E. RICE, ERIC J. ZACKRISON, and DAVID R. SEIBOLD
University of California, Santa Barbara, USA

Coordination is necessary to manage complex interdependencies and uncertainty among organizational actors, structures, processes, tasks, resources, and goals.

Defining coordination

Coordinating, coordination, coordinating mechanisms, and outcomes are related but distinct concepts. First, *coordinating* and *coordination* are distinct. *Coordinating* is the organizational process of applying coordinating mechanisms to attain higher extents of coordination, resulting in outcomes (expected and unexpected, intentional and unintentional, positive and negative). *Coordination* is the extent to which the in situ interactive integration of organizational members' work activities is logical and coherent in managing interdependencies toward some goal.

Second, *coordinating* and *coordinating mechanisms* are distinct. *Coordinating* describes the overarching process. Coordinating may be external to a group (i.e., the manager is coordinating that group by giving it direction on an upcoming task) or internal to the group (i.e., the group has a high extent of coordination toward completing a task). This blending of external and internal was a constant issue in the earliest coordination research (e.g., design contingency: Thompson, 1967). To resolve this earlier confounding of terms, *coordinating mechanisms* are those processes, structures, artifacts, or interactions that exist to facilitate coordination of a group, or of the organization, that generally exist "before" coordination, and that are either intentionally brought to bear or stored for use in situ.

Third, *coordination* and *outcomes* are distinct. The common conception of coordination as accomplishing some output logically leads scholars to include some aspect of goal achievement in the measure of coordination. Another reason for misconstruing outcomes as part (and thus an indicator) of coordination is the common assumption that the only valid goals for a work group are the official organizational ones. Yet the success or failure of a coordinative action is in many instances and contexts a subjective perception, with differing relevance at different levels. The goals of the organization, administrators, groups, and individuals are not always clearly defined, may differ, and may be opposed. Further, Perrow (1961) notes that which of these goals takes precedence changes over time. Depending on whose goals are being measured when, the interpretation of success or failure of a coordinated effort could vary drastically.

Two useful operationalizations of coordination include measures of in situ interaction, and of the alignment of work. In situ interaction includes information

The International Encyclopedia of Organizational Communication. Craig R. Scott and Laurie Lewis (Editors-in-Chief), James R. Barker, Joann Keyton, Timothy Kuhn, and Paaige K. Turner (Associate Editors).

DOI: 10.1002/9781118955567.wbieoc045

that is exchanged in a timely manner, quick negotiation of differences, low or resolved disagreement, helping, and problem solving capabilities (Faraj & Sproull, 2000). Alignment of work includes coherence of work, lack of duplication of work, everyone in the group doing the tasks they are supposed to do, people able to do their jobs without getting in each other's way, no delays in the process, subtasks closely harmonized, and goals understood by the members (Gittell, 2001).

Communication is central to organizational coordination, either explicitly such as through feedback, monitoring, and mutual adjustment, or implicitly such as through plans and programming, which require communication to establish and maintain (March & Simon, 1958/1993; Thompson, 1967). For example, research on communication and organizational constitution – that organizations emerge from and are maintained by communication processes – notes the coordination inherent in communication.

Coordination has been conceptualized as simple (group members adopting the same decision) to complex (interrelationships among team members, strategies, integration, and alignment). Coordination may be a structure (some pattern of actors with interdependent obligations working with shared objects) or a process (integrative interactions over time). And coordination may represent the accomplishment (working together effectively) or an intention or attempt (oriented toward achieving a common goal). Some consider coordination as existing before (and thus affecting) interaction (such as administrative coordination), or as being created in situ (such as through sensemaking). Other distinctions include being internal or external to a group; or being based in knowledge (cognitive, expertise, anticipation), interactions (relationships, discourse, activities), routines, or temporal relations (Faraj & Sproull, 2000).

Prior definitions or operationalizations of coordination include at least five common errors. First, coordination is conceived of simply as a mathematical representation of the allocation and sequencing of tasks within a group. Second, coordination is operationalized as an outcome, such as attaining quality, quantity, or delivery of product or service. Third, coordination is operationalized as a coordinating mechanism, such as asking if planning was well conceived, if schedules were clear and adequate, or if members have a shared cognition. Fourth, variables that are more descriptive of the context are included rather than those specifically coordinative in nature. For example, coordination has been defined as how many functions a task group shares with another and with how many other tasks the group must interact. Although these certainly influence the coordination process, they do so indirectly by increasing interdependencies and uncertainties. Fifth, there is little clarity on the role of various moderators. For example, while mutual respect may strengthen the relation between coordination and outcomes, group members need not like each other to accomplish the group's task.

In addition to studying coordination as a primary variable (whether as an influence or as an outcome), researchers also have analyzed coordination as a secondary variable (such as affecting leader–member relations), an intervening variable (such as between leadership style and productivity), and a control variable (such as when analyzing the transfer of managers).

Perspectives on organizational coordination

Scholarship on coordination covers a broad range of contexts and levels of analysis. Microlevel interpersonal interactions include how individuals utilize material signals in an attempt to coordinate everyday actions, how individuals negotiate conversations in interpersonal interactions, and how teams manage relational and organizing microdynamics. Mesolevel contexts range from urban planning to the coordination of crisis responses. Macrolevel contexts consider multinational and interorganizational coordination, as well as market and supply chain coordination.

Coordination paradigms

One broad framework for identifying perspectives on coordination is van Fenema, Pentland, and Kumar's (2004) three paradigms of coordination theory. The contingency paradigm views coordination as processes or structures that can and should be manipulated to increase organizational effectiveness within varying contexts. The relatedness of structure and process paradigm recognizes that process and structure are not necessarily mutually exclusive, and includes theories that focus on their interrelationships, how structures affect interaction, and how interaction, discourse, and conversations create structure. The crafting inner and outer world paradigm views coordination as beginning with the individual. Coordination is accomplished through coherence, or forming a unified whole, in the connection between individuals' outer worlds (structures and processes that exist outside the individual) and inner worlds (how individuals interpret and interact differently with those outer worlds). This paradigm concentrates heavily on the communicative nature of coordination and embraces the ways that organizations and coordination are created through interaction and communication.

The first paradigm is the most familiar and traditional approach. The organizational design/contingency paradigm was dominant for much of the twentieth century (e.g., Thompson, 1967). The main argument is that no single organizational structure is most effective; rather, structure or design should be contingent upon (match) environmental demands. The contingency/design approach attempts to identify possible coordinating mechanisms from which a typology of matches between situation, coordinating mechanisms, and the attainment of positive coordination can be developed. This approach has generated a rich taxonomy of contingencies and mechanisms affecting coordination (Malone & Crowston, 1994). At least three problems arise from these typologies, however. First, the number of possible interdependencies and contextual differences makes it nearly impossible to develop an exhaustive catalogue of matched organizational situations and coordinating mechanisms. Second, it is unclear how organizational members might actually identify, access, and implement these mechanisms. Third, there is little specificity about how the coordination mechanisms work, especially for specific contexts. However, this rich paradigm has identified and developed two concepts central to understanding the need for coordination: interdependencies and uncertainty.

Interdependencies

The alignment and management of interdependencies are core properties of coordination. Actors, tasks, processes, and organizations exhibit both weak and strong interdependencies based on exchanges of various resources, responsibilities, social capital, and specific actor and organizational needs, goals, abilities, and processes, to accomplish particular goals or tasks. Thompson (1967) identified three types of interdependencies (in order of complexity from least to most): pooled, in which one person's contribution may move the group forward, but the rest of the group does not rely on that person's contribution per se; sequential, in which one member's actions are required for another's to take place; and reciprocal, in which the members rely on each other in a give and take process. Van de Ven, Delbecq, and Koenig (1976) added a fourth level, team, which does not include the temporal aspect of sequential or reciprocal interdependencies, but instead refers to those times when components work jointly and simultaneously (for example, sports teams). Crowston (1997) proposed three other kinds of interdependencies: task to task interdependencies arise when one task is reliant on another being accomplished; task to resource interdependencies include situations where a resource is required by a task; and resource to resource interdependencies are those situations where one resource depends on another. Interdependencies differ across contexts, and may change throughout the life cycle of a project. Interdependencies also may be sufficiently complex, ambiguous, and temporally lagged to make it difficult to even know what to coordinate, or to coordinate at a broad enough level, in order to avoid or resolve dysfunctional processes (Rice & Cooper, 2010).

Uncertainty

With interdependencies comes uncertainty, such as (in the communication sense) divergences in meanings, as well as (in the pragmatic sense) who is responsible for what task when. Much of the earliest work examining coordination drew its inspiration from finding ways to reduce, manage, or resolve these uncertainties. For example, the introduction of large-scale railways for shipping and traveling required the development of standard time zones and train schedules, as well as ways of keeping track of rail cars. This need to reduce uncertainty grew with increased industrialization and the spread and complexity of markets and administration.

Much of this early work concentrated on design: first of work, then of management, and finally of the organization, in attempts to increase management control (van Fenema, Pentland, & Kumar, 2004). Taylor's scientific management concentrated on ways that humans and their work actions could be more standardized, mechanized, and efficient, thus reducing the uncertainty of production. Developing at much the same time were theories of departmentalization (often called administrative management theory), including the work of Fayol, Gulick, and Urwick. Building on early design theorists' attempts to plan formal elements to accomplish coordination, a substantial shift in focus began with March and Simon's book *Organizations* (1993), first published in 1958. Rather than attempting to guide the specific worker through planning and training, management should focus instead on the design of systems that limited uncertainty and allowed near-complete coordination (or reduced the need for it).

Model of organizational coordination

Zackrison, Seibold, and Rice (2015) propose that central influences on coordination include interdependencies and uncertainty as just noted, as well as organizational and knowledge mechanisms, and routines. From a structurational approach (Poole & McPhee, 2005), these influences may reinforce, reproduce, or reshape coordination, with intended and unintended organizational outcomes, all in organizational members' ongoing streams of activity, meaning, and interaction.

Organizational coordinating as both mechanism and outcome of coordination

Structural, conscious, and stored organizational coordinating mechanisms are created based on specific actions of an organization in an attempt to increase coordination.

Structural coordinating mechanisms (SCM) include organizational components such as rules, roles, and power structures that constrain and enable any interaction, including coordination. SCM are established at two points, through planning by the organization and through the interaction of organizational members. The first, planning, is well established in the coordination literature as both nonphysical though observable (e.g., hierarchical arrangements, rules, and departmentalization) as well as physical (formal information systems, physical space design: March & Simon, 1958/1993). The second, interaction of members, follows from the centrality of communication in both coordinating mechanisms and integrating conditions as well as the structuration of coordination. Through the interaction of members as they enact and experience the planning of the organization, these mechanisms are (re)created.

Conscious interaction mechanisms involve direct interpersonal or group communication to any member of a group by an organizational member external to the group, with the intent of facilitating coordination of the group. Conscious interaction coordinating mechanisms are similar to what March and Simon (1958/1993) called feedback, or what van de Ven, Delbecq, and Koenig (1976) referred to as group or personal mechanisms. However, they are not the same as the concept of mutual adjustment, which is identified by Thompson (1967) as occurring in the process of action. The difference is that mutual adjustment is something that occurs during group interaction or during coordination, whereas conscious interaction mechanisms originate externally from the group, whether face to face or mediated (Rice & Leonardi, 2013).

Stored organizational coordinating mechanisms are artifacts created by organizations that do not require direct interpersonal interaction in the facilitation of coordination, but that still exist for that purpose. These include training manuals, budgets, memos, plans, databases, programming, or other mechanistic, formal, or impersonal artifacts, as well as any information (physical, digital) that the organization has created and stored to increase coordination. These require some agency to access on the part of the group or organizational member, and may have at one point been

part of *conscious interaction mechanisms* (e.g., during training employees are given an orientation manual). These mechanisms interact directly with resource knowledge mechanisms (see below) and are only as effective as organizational members' ability to access, understand, and use them.

Early theory assumed that these organizational mechanisms were set forth by management, implemented, accepted, and endured until later organizational changes in procedures. However, these structural components may be more or less appropriated through the organizational members' interactions, and be more or less adjusted in alignment with the intentions of the organization (Poole & McPhee, 2005). Thus, organizational coordination mechanisms may themselves be outcomes of coordination.

Knowledge as both mechanism and outcome of coordination

Based on such diverse concepts as tacit knowledge, transactive memory, expertise, and implicit coordination, knowledge includes facets of coordination for which actors utilize modes that are neither completely without thought (but based on repeated patterns such as routines, explained below) nor fully conscious. Two communication based knowledge mechanisms are resource knowledge and relational knowledge.

Resource knowledge includes information, skills, and materials. Knowledge about resources allows members of the group to identify the location of needed resources, whether that means knowing whom to approach in order to obtain materials, in what database information is shared, or which group member has information about a given task or decision, both within and outside the organization. For example, boundary spanners know where to access external resources.

Relational knowledge allows members to better access those resources that require interaction. Knowledge does not have to be about facts, but can be about how others in a team interact (a central aspect of transactive memory). As groups interact, they learn more about each other. In subsequent interactions they have a better idea about not only who knows what, but also how others in the group might react. The relational knowledge mechanism allows members to better predict the needs of other group members in a situation, or to be more aware of how group and organizational members will react in a situation. Both kinds of relational knowledge reduce task interaction time and errors. Relational knowledge also includes understanding how to "read" and interpret the other group members during interaction (i.e., interpreting nonverbal behaviors, paralinguistics, politics, network roles, and so forth), resulting in better understanding of each other and, ideally, better performance.

Routines as both mechanism and outcome of coordination

Routines are those patterns of action that emerge from repeated, patterned interaction and that allow us to act with little to no conscious thought (Becker, 2004). Contingency/design theorists present routines as facilitating coordinated action by prespecifying the sequences of tasks and who should perform them, thus reducing the need for workers to interact, and reducing the cost of coordinating work. Routines develop

over time and become more deeply ingrained in minds and unconscious practice, to the point that actors not only enact them without much thought but also implicitly believe that other actors also are enacting them. Successful routines embed the knowledge and organizational coordinating mechanisms necessary to accomplish tasks across individuals and organizational units. Routines can function at multiple levels, from the individual and group to the organization. Once established they can promote stability, but also reduce organizational flexibility and innovativeness. As small changes occur to routines, they are adjusted and then retained for future enactment. Routines enable and constrain action, but by their selection and use in interaction they are further established as routine.

However, routines may both embed and reinforce dysfunctional interdependencies and coordination strategies, thus becoming *unusual routines*, leading to short- and long-term group and organizational negative consequences (Rice & Cooper, 2010). Conscious interaction mechanisms and relational knowledge, along with benefits, may be localized within the group generating the unusual routine, thus making it more difficult to identify and resolve the unusual routines, while harming other groups' or the organization's processes and goals, yet without being identified or explained. In general, unusual routines can be prevented or resolved by increased feedback, and feedback about the feedback (e.g., double-loop learning; see Rice & Cooper, 2010), involving both organizational mechanisms and knowledge mechanisms.

Organizational outcomes of coordination

Beyond the three (re)produced outcomes of coordination (organizational mechanisms, knowledge mechanisms, and routines), the general and primary goal of coordination is to accomplish organizational outcomes. These actual outcomes may be more or less expected, more or less intentional, and more or less positive. Expected, intentional, and positive goals are often confounded with coordination, with the logical understanding that a higher extent of coordination should result in more successful attainment of organizational goals. Organizational goals and thus expected outcomes can be either official, which are the understood purposes (from the perspective of the organization), or operative, which more closely represents the actual operating policies of the organization (Perrow, 1961). Operative goals do not necessarily align with official goals and may even run counter to them (a central assumption of agency theory). There may seem to be a high extent of coordination that manifests as alignment toward attaining an unofficial operative goal at the individual or group level, but the net organizational-level result could be unintended or unwanted outcomes.

Future directions

Coordination examined through an organizational communication lens is a somewhat nascent area of study, thus allowing significant room for future research. A key area of future focus should be on the ways in which the various mechanisms moderate and mediate each other in their effect on the extent of coordination attained. An additional

direction of particular promise is the examination of coordination during times of disruption, both planned and unplanned. Disruption should make coordination more salient through the conscious application of mechanisms by management and the difficulty in relying on established routines. Furthermore, it will be important to focus on other possible variables and their effect on coordination. Likely prospects include supervisory style, the extent of disruption, and personal attributes like adaptability. Finally, coordination as energy in conversation (CEC) theory, coordinated management of meaning (CMM) theory, and the high-reliability organizations (HRO) perspectives all focus on the nature of coordination, communication, and meaning making in organizations. Investigations such as those just noted, and especially the model of organizational coordination proposed by Zackrison, Seibold, and Rice (2015) and summarized above, have the potential to enhance and extend those prominent theoretical perspectives.

SEE ALSO: Contingency Theory; Decision Making Processes in Organizations; Feedback; Scientific Management; Structuration Theory; Uncertainty

References

Becker, M. C. (2004). Organizational routines: A review of the literature. *Industrial and Corporate Change, 13*, 643–677. doi:10.1093/icc/dth026

Crowston, K. (1997). A coordination theory approach to organizational process design. *Organizational Science, 8*, 157–175. doi:10.1287/orsc.8.2.157

Faraj, S., & Sproull, L. (2000). Coordinating expertise in software development teams. *Management Science, 46*, 1554–1568. doi:10.1287/mnsc.46.12.1554.12072

Gittell, J. H. (2001). Supervisory span, relational coordination, and flight departure performance: A reassessment of post bureaucracy theory. *Organizational Science, 12*, 468–483. doi:1047-7039/01/1204/0468

Malone, T. W., & Crowston, K. (1994). The interdisciplinary study of coordination. *ACM Computing Surveys, 26*, 87–118. doi:10.1145/174666.174668

March, J. G., & Simon, H. A. (1958/1993). *Organizations* (2nd ed.). Cambridge, MA: Blackwell.

Perrow, C. (1961). The analysis of goals in complex organizations. *American Sociological Review, 26*, 854–866. doi:10.2307/2090570

Poole, M. S., & McPhee, R. D. (2005). Structuration theory. In S. May & D. K. Mumby (Eds.), *Engaging organizational communication, theory, & research: Multiple perspectives* (pp. 171–196). Thousand Oaks, CA: Sage.

Rice, R. E., & Cooper, S. D. (2010). *Organizations and unusual routines: A systems analysis of dysfunctional feedback processes*. Cambridge, UK: Cambridge University Press.

Rice, R. E., & Leonardi, P. M. (2013). Information and communication technology in organizations, 2000–2011. In L. Putnam & D. K. Mumby (Eds.), *Sage handbook of organizational communication* (3rd ed., pp. 425–448). Thousand Oaks, CA: Sage.

Thompson, J. D. (1967). *Organizations in action: Social science bases of administrative theory*. New York, NY: McGraw-Hill.

Van de Ven, A. H., Delbecq, A. L., & Koenig, R., Jr. (1976). Determinants of coordination modes within organizations. *American Sociological Review, 41*, 322–338. doi:10.2307/2094477

Van Fenema, P. C., Pentland, B., & Kumar, K. (2004). Paradigm shifts in coordination theory. Academy of Management Annual Meeting, New Orleans, August. Retrieved

from http://www.bencana-kesehatan.net/images/regional/tt_1/referensi/4_paradigm_shifts_in_coordination_theory.pdf

Zackrison, E., Seibold, D. R., & Rice, R. (2015). Organizational coordination and communication: A critical review and integrative model. In E. Cohen (Ed.), *Communication yearbook 39* (pp. 195–233). Thousand Oaks, CA: Sage.

Further reading

Adler, P. S. (1995). Interdepartmental interdependence and coordination: The case of the design/manufacturing interface. *Organization Science, 6*, 147–167. doi:10.1287/orsc.6.2.147

Argote, L. (1982). Input uncertainty and organizational coordination in hospital emergency units. *Administrative Science Quarterly, 27*, 420–434. doi:10.2307/2392320

Cheng, J. L. C. (1983). Interdependence and coordination in organizations: A role-systems analysis. *Academy of Management Journal, 26*, 156–162. doi:10.2307/256142

Gittell, J. H., & Weiss, L. (2004). Coordination networks within and across organizations: A multi-level framework. *Journal of Management Studies, 41*, 127–152. doi:10.1111/j.1467-6486.2004.00424.x

Grote, G., Weichbrodt, J. C., Gunter, H., Zala-Mezo, E., & Kunzle, B. (2008). Coordination in high-risk organizations: The need for flexible routines. *Cognition, Technology & Work, 11*, 17–27. doi:10.1007/s10111-008-0119-y

Janicik, G. A., & Bartel, C. A. (2003). Talking about time: Effects of temporal planning and time awareness norms on group coordination and performance. *Group Dynamics, Theory, Research, and Practice, 7*, 122–134. doi:10.1037/1089-2699.7.2.122

Lawrence, P. R., & Lorsch, J. W. (1967). *Organization and environment: Managing differentiation and integration*. Boston, MA: Harvard University Press.

Martinez, J. I., & Jarillo, J. C. (1989). The evolution of research on coordination mechanisms in multinational corporations. *Journal of International Business Studies, 20*, 489–514. doi:10.1145/174666.174668

Okhuysen, G. A., & Bechky, B. A. (2009a). Coordination in organizations: An integrative perspective. *Academy of Management Annals, 3*, 463–502. doi:10.1080/19416520903047533

Rico, R., Sanchez-Manzanares, M., Gil, F., & Gibson, C. (2008). Team implicit coordination processes: A team knowledge-based approach. *Academy of Management Review, 33*, 163–184. doi:10.5465/amr.2008.27751276

Sutton, J. (2008). Between individual and collective memory: Coordination, interaction, distribution. *Social Research, 75*, 23–48. Retrieved from http://www.academia.edu/313908/Between_Individual_and_Collective_Memory_coordination_interaction_distribution

Ronald E. Rice is Arthur N. Rupe Chair in the Social Effects of Mass Communication in the Department of Communication at the University of California, Santa Barbara. His 13 coauthored or (co)edited books include *Organizations and Unusual Routines*, *Social Consequences of Internet Use*, *The Internet and Health Communication*, *Public Communication Campaigns*, *Managing Organizational Innovation*, and *The New Media*. He has published over 115 refereed journal articles and 70 book chapters, in public

communication campaigns, computer mediated communication, methodology, organizational and management theory, information systems, bibliometrics, social uses and effects of the Internet, and social networks.

Eric J. Zackrison is a PhD candidate at the University of California, Santa Barbara in the Department of Communication. He brings his 20 years of management experience to his focus on organizational communication, with a particular interest in coordination in complex organizations, organizational change, leadership, and small group communication.

David R. Seibold is professor of technology management, and of the Department of Communication (by courtesy), at the University of California, Santa Barbara, where he also serves as director of the interdisciplinary graduate program in management practice. Author of more than 135 scholarly works, his current research focuses on communication and organizational change, group decision making, social influence processes, and collaborative technologies. A former editor of the *Journal of Applied Communication Research* and member of numerous editorial boards, he is an elected Distinguished Scholar of the National Communication Association and Fellow of the International Communication Association.