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Multiteam Systems: An Introduction

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Over the last 2 decades, the operating work environment has become exceedingly more challenging and complex (Ilgen & Pulakos, 1999). To wit, communication and information technology has grown exponentially, increasing the pace, scope, and scale of work (Hesketh & Neal, 1999). Such technology has also increased the globalism and geographic dislocation of organizational work (Ireland & Hitt, 1999). Because of the global reach of today's business, and the increasing immediacy afforded by current technology, strategic issues, problems, and implications have greater interconnectivity across organizational boundaries. Traditional organizational forms have been typically insufficient to respond effectively to such changes. Accordingly, a number of different organizational forms that complement more conventional structures have emerged, including matrix and virtual organizations, as well as cross-functioning and ad hoc project teams.

One of these forms includes different kinds of collaborations that can exist across traditional team and organizational boundaries. Such cross-boundary collaborations have been observed in the past, of course, in the face of large-scale crisis events that require the interdependent responsiveness of multiple agencies (e.g., see response to Hurricane Katrina; Moynihan, 2007). The collectives formed from such requirements do not resemble traditional organizations or large-scale teams. Nor

do such collectives reflect more recent forms such as team-based organizations, virtual organizations, or matrix organizations. Instead, current environmental challenges have increasingly given rise to a form of aggregation that includes tightly coupled constellations of teams, where the different teams may possess very different core missions, expertise, structures, norms, and operating procedures to the collective effort. However, the performances of such constellations reflect the kinds of integrated and interdependent actions typical of more traditional teams and organizations.

Mathieu, Marks, and Zaccaro (2001) defined these kinds of organizations as *multiteam systems* (MTSs), and argued that they represented a relatively new collective form that has emerged as adaptive responses to the aforementioned environmental challenges. Thus, they noted that "MTSs are usually formed or develop naturally to deal with highly turbulent environments that place a premium on the ability to transform work units and to respond rapidly to changing circumstances" (Mathieu et al., 2001, p. 290). They also asserted that existing organizational or team theories and models do not provide sufficient means of understanding the processes and dynamics of MTSs. Accordingly, they cited the need to recognize and study such collectives in the organizational sciences. Since the publication of Mathieu et al. (2001), several other studies, both empirical and conceptual, have been published that have provided some insight into MTSs (e.g., Coen, 2006; DeChurch & Marks, 2006; DeChurch & Mathieu, 2009; Hoegl & Weinkauff, 2005; Liu & Simaan, 2004a, 2004b; Liu, Simaan, & Cruz, 2003; Marks, DeChurch, Mathieu, Panzer, & Alonso, 2005; Marks, Mathieu, & Zaccaro, 2004; Mathieu, Cobb, Marks, Zaccaro, & Marsh, 2004; Standifer & Bluedorn, 2006). Other studies have examined specific types of MTSs, such as incident command systems (Moynihan, 2007), multisystem coordination in space missions (Caldwell, 2005), multi-unit human-robot systems (Hsu & Liu, 2005), and joint venture teams and other kinds of business alliances (Johnson, Korsgaard, & Sapienza, 2002; Marks & Luvison, 2008). MTSs have also been the subject of several conference papers and symposia at recent annual meetings of the Society for Industrial and Organizational Psychology (e.g., Burke, DeChurch, Salas, & Goodwin, 2008; DeChurch, 2010; DeChurch & Burke, 2009; DeChurch & Marks, 2008; DeChurch et al., 2010; Marks et al., 2010; Wooten et al., 2009), Human Factors and Ergonomics Society (e.g., Dean et al., 2008), Academy of Management (e.g., DeChurch, 2006), and Interdisciplinary

Network for Group Research (e.g., DeChurch, Burke, & Salas, 2009; DeChurch & Resick, 2006; Lyons et al., 2008).

In June 2008, a conference sponsored by the U.S Army Research Institute brought together several scholars to explore in more detail the concept of MTSs. This conference highlighted the necessity for an expanded and deeper focus on the nature of MTSs that (a) describes these organizational forms more fully, (b) builds conceptual frames that can guide research on such forms, and (c) begins developing tools to improve the study of MTSs. The purpose of this book is to respond to these needs. This book contains a series of chapters that expand prior conceptual frames of MTSs, defining in more detail the compositional and linkage attributes that characterize such units. It also explores how such systems emerge and develop, as well as the methods for studying MTSs. The intent, therefore, is to establish and nurture a strong conceptual and methodological foundation that can guide future research and practice with MTSs.

In this first chapter, we provide a summary of the core concepts that define MTSs. We then provide a listing of characteristics and dimensions that distinguish different forms of MTSs. We conclude with a brief summary of the major sections and chapters of the book.

MULTITEAM SYSTEMS: CORE CONCEPTS

In this section, we elucidate some core concepts that define MTSs, and distinguish them from other kinds of teams and organizations. We are summarizing ideas and concepts offered by Mathieu et al. (2001), Marks et al. (2004), and DeChurch and Mathieu (2009). We refer readers to those sources for greater details.

Mathieu et al. (2001) defined MTSs as follows:

Two or more teams that interface directly and interdependently in response to environmental contingencies toward the accomplishment of collective goals. MTS boundaries are defined by virtue of the fact that all teams within the system, while pursuing different proximal goals, share at least one common distal goal; and in doing so exhibit input, process and outcome interdependence with at least one other team in the system. (P. 290)

The above definition indicates several core parameters that distinguish MTSs from other types of collectives in organizations. Regarding composition, Mathieu et al. (2001) noted that although they can include as few as two component teams, MTSs are typically larger in size than most teams but smaller than their embedding organizations. Perhaps one of the more important and interesting features regarding membership, however, is that the boundary of the MTS can cross the boundaries of multiple organizations—that is, an MTS can be composed of tightly coupled teams that are themselves members of different organizations. Mathieu et al. (2001) distinguished between MTSs embedded entirely within an organization (called *internal MTSs*) and those composed of teams from different embedding organizations (called *cross-boundary MTSs*). In the latter, there exists a significant degree of interdependence among component teams, even as they are integrated within other systems. Such MTSs confront complexity of a magnitude greater than their wholly internal counterparts because they need to integrate demands not only from the environmental context common to all of the component teams, but also from their respective and different embedding organizations. Mathieu et al. (2001) noted that with internal MTSs, influences from the external environment are more likely to be filtered through characteristics of the embedding organization such as its goals, strategies, culture, norms, values, and reward systems. Accordingly, internal MTSs are likely to have more shared value, motivational, and cognitive systems than cross-boundary MTSs.

Although the notion of cross-boundary MTSs may resonate more intuitively as a unique organizational form, internal MTSs can appear to resemble other forms of collectives within organizations (Mathieu et al., 2001). For example, most, if not all, organizations above a certain size are structured as a system of interlocked departments and units, each with clearly defined functions (i.e., “subsystems”; Katz & Kahn, 1978). Such subsystems can be characterized as “functional groupings of individuals based on a purpose within the organization” (Mathieu et al., 2001, p. 292). However, an MTS can include and integrate multiple functions that would be the purview of separate subsystems in a traditional organization. More importantly, an MTS is fundamentally a team-based collective, where each of its members belongs to one of the component teams. In many organizations, units are not organized as teams, and members may not be engaged in activities that require the collaborative integration of teamwork. Even when these organization units are organized as teams

(cf. Mohrman, Cohen, & Mohrman, 1995), they are more loosely coupled than in MTSs, without the level of interdependence in the latter that is described below. Collective or joint activity by traditional organizational units typically takes the form of coercion, or pooled interdependence, and sometimes sequential interdependence, where one team may hand its work products off to another team for subsequent additions (see Thompson [1967] and Tesluk, Mathieu, Zaccaro, and Marks [1997] for descriptions of different types of interdependence within teams—in the present discussion, these are extended to the collective activity of multiple teams). MTSs are typically characterized more by what Tesluk et al. (1997) summarized as reciprocal or intensive interdependence, where component teams may exchange work products back and forth, or work in close and intense collaboration to accomplish shared goals.

Mathieu et al. (2001) described other collectives associated with traditional organizations that can have overlapping characteristics with MTSs. These include “subassemblies” (Simon, 1962), matrix organizations (Knight, 1976), and task forces (Hackman, 1990). To this list, we would add distributed teams (Jarvenpaa, Knoll, & Leidner, 1998; Mittleman & Briggs, 1999) and top management groups or executive teams (Hambrick, 1994; Mohrman et al., 1995; Mohrman & Quam, 2000). Subassemblies are organizational units that typically have more autonomy from a parent organization than most traditional units; thus, they share this quality in part with MTSs (Scott, 1998). However, unlike MTSs, such units are structured around specific functions, and they are not necessarily organized as a collection of teams with the level of interdependence that characterizes MTSs. Matrix organizations use teams staffed by members drawn from multiple and different functional units (Davis & Lawrence, 1977). They share with MTSs their quicker responsiveness to turbulent environments and their cross-boundary membership. However, teams in matrix organizations are still loosely coupled if at all, and also do not exhibit the degree of interdependence found in MTSs. Task forces are ad hoc groups that also come together and respond with a significant degree of autonomy to a set of objectives provided by higher levels of an organization (Hackman, 1990). However, like cross-functional project teams, task forces are limited in tenure to the duration of a single project and do not typically function as a collection of teams (Sundstrom, McIntyre, Halfhill, & Richards, 2000).

MTSs also share some characteristics with two other organizational forms—virtual teams and top management teams in team-based

organizations. Virtual or distributed teams are composed of members that do not work together in the same geographic or temporal space (Jarvenpaa et al., 1998; Mittleman & Briggs, 1999). Thus, like component teams in MTSs, members of virtual teams may be embedded within different contexts and have multiple environmental demands. Component teams in MTSs are also often dispersed geographically and temporally. However, unlike MTSs, virtual teams are single units not strongly coupled to other teams, and they typically reside under single organizational umbrellas.

MTSs resemble team-based organizations, especially at the top of such organizations where the managers of such teams are themselves organized into a team. Mohrman and Quam (2000; see also Mohrman et al., 1995) defined *team-based organizations* as ones in which a team represents the key unit that “delivers products or service of value to the customer. Ideally the team is relatively self-contained and contains the various skills and knowledge sets necessary to carry out its task with minimal external intervention” (p. 21). Mohrman and Quam noted that teams in such organizations are embedded within functional business units. They also indicated that the work of such teams can become interdependent with that of other teams, and therefore mechanisms promoting lateral integration and coordination emerge. In such instances, these systems begin to resemble internal MTSs. We would note, however, that in many team-based organizations, teams still operate mostly independently of one another, linking primarily through managerial processes. They tend to stay within the boundaries of single business units, and do not typically cross organizational boundaries. Thus, although MTSs reflect a type of team-based organization, they retain a number of unique features that distinguish them from other types of such organizations.

Perhaps the most distinguishing feature of MTSs, aside from their cross-boundary membership, lies in their high level of reciprocal or intensive functional interdependence not only within but also *across* component teams. Mathieu et al. (2001, p. 293) defined such interdependence as “a state by which entities have mutual reliance, determination, influence, and shared vested interest in processes they use to accomplish work activities.” This mutuality is encoded within the goal hierarchies that direct the activities of the MTS. As noted in the definition of MTSs, component teams (a) have different proximal goals, but (b) share at least one distal goal. The goals of the entire MTS, then, are organized in a hierarchy, where each component team goal is at the lowest level, and the goal or goals common

to all teams are at the highest level (Mathieu et al., 2001). For example, Mathieu et al. (2001) described the proximal and distal goals of an MTS responding to a severely injured accident victim. This MTS is composed of a firefighting unit, an EMT unit, a surgical team, and a recovery team. The ultimate or distal goal of this MTS is, of course, survival of the patient. However, the firefighters and the EMTs have the proximal goals of (a) extracting and stabilizing the injured motorist, and (b) transporting him or her to the hospital, while continuing emergency care. Once at the hospital, the surgical team is responsible for the next-level goal of repairing the patient’s injuries. After the surgery, the recovery team administers to the patient toward survival and full recovery. Note that all of the component teams contribute to the distal goal of patient recovery, but each component team has responsibility for a different proximal goal within the goal hierarchy (Mathieu et al., 2001).

According to Mathieu et al. (2001), such goal hierarchies have several features that are relatively standard across different types of MTSs: (a) MTS goal hierarchies have a minimum of two levels; (b) goals at higher levels entail greater interdependent actions among more component teams than goals at lower levels, (c) the superordinate goal at the apex of the hierarchy rests on the accomplishment by component teams of all lower order goals; (d) higher order goals are likely to have a longer time horizon than lower order goals; and (e) goals vary in their priority and valence; this clarification of goal ordering and priority is a crucial element of MTS effectiveness. As two or more component teams share responsibility for a goal, the quality of interteam action processes becomes more strongly related to the overall success of the MTS (Marks et al., 2005).

What forms of functional interdependencies characterize the actions of component teams working on a common goal? Mathieu et al. (2001) specified three such forms—input, process, and outcome interdependence. They defined *input interdependence* as the sharing by component teams of human, informational, technological, material, and financial resources. Such interdependence also reflects the common environmental challenges that require an integrated response from multiple component teams. Thus, in Mathieu et al.’s (2001) example of an emergency response MTS, “the firefighters and EMTs share inputs such as rescue equipment and face common challenges at the accident scene. Elsewhere, the surgical and recovery teams share resources in terms of facilities, supplies, space, etc. at the hospital” (p. 295).

Process interdependence pertains to the degree of interteam interaction that is required during the completion of goals specified by the MTS mission (Mathieu et al., 2001). Here, component teams share several functions necessary for effective collective action, including boundary spanning and environmental sense making, task ordering and tactical planning, communicating key information, the timing and coordination of sequential and synchronous actions, and the monitoring and backup of MTS actions (cf. Marks, Mathieu, & Zaccaro, 2001). The integration of component team activities can take the form of sequential interdependence, where one component team (or set of teams) accomplishes a task and hands the next step in proximal goal attainment to another part of the MTS (Mathieu et al., 2001). Thus, in the aforementioned emergency response MTS, the firefighters needed to first ascertain the safety of the damaged vehicle and begin cutting part of it away before the EMTs could attend to the victim.

Reciprocal interdependence occurs when there are cyclical accomplishments of proximal goals by separate component teams (Tesluk et al., 1997). For example, DeChurch and Mathieu (2009) described a firefighting MTS composed of fire suppression, ventilation, and search and rescue units. The fire suppression and search and rescue teams will often act in reciprocal interdependence: The fire suppression unit clears the way for the search and rescue teams to enter the site; and, once on site, the latter teams relay information back to the fire suppression teams to assist in their subsequent operations.

Intensive forms of process interdependence represent another type of integrated activity that can be observed in the emergency response and firefighting MTSs (Mathieu et al., 2001). Such interdependence occurs when the actions of component teams need to be integrated in such a manner that they transpire in simultaneous (or rapidly sequential and reciprocal) collaboration (Tesluk et al., 1997). Thus, in the emergency response MTS, once the vehicle is deemed (or made) safe to enter, the firefighters and EMTs must work closely together to extract the accident victim from the care and stabilize that individual for subsequent travel to the hospital. In the firefighting MTS DeChurch and Mathieu (2009) noted that the actions of the ventilation team needed to be carefully synchronized with those of both the fire suppression and search and rescue teams. The ventilation team controls airflow along which fire and smoke will also flow; therefore, the creation of these airflows needs to occur with knowledge of

and coordination with the actions of the other teams so as to not overly impair their activities (DeChurch & Mathieu, 2009).

The third form of functional interdependence that occurs within MTSs refers to *output interdependence*, or the degree to which the outcomes (benefits, costs) for component teams depend upon the goal accomplishments of other teams in the MTS (Mathieu et al., 2001). Although all component teams share the common outcome defined by the superordinate goal at the apex of the MTS goal hierarchy, according to Mathieu et al. (2001) the successful accomplishment of more proximal goals will depend upon the goal outcomes at still lower levels. Obviously, in the emergency response MTS described earlier if the actions of the EMTs and firefighters are not successful in extracting and stabilizing the victim, the surgery team cannot accomplish its goal of patient repair. Thus, although input and process interdependence occur in the accomplishment of particular proximal goals, outcome interdependence resides in the linking of proximal goal accomplishment across the MTS goal hierarchy.

An MTS constitutes subsets of component teams acting interdependently to accomplish at least one proximal goal, with all acting in concert toward a superordinate distal goal. However, the joint and separate actions of component teams can become quite complex in their interdependence. For example, component teams may be responsible for multiple goals within the goal hierarchy, and have to work interdependently with other teams at different times in an MTS performance episode (Mathieu et al., 2001). Thus, one component team may work with another team to meet one proximal goal, but need to work with still another team in accomplishing a second goal, either at the same proximal level or at a higher level in the goal hierarchy. Likewise, goal accomplishment by one team may require intensive interaction with another team at one point in the performance episode, but sequential interdependence with the same team or another team at a different point. Thus, the interactive dynamics among component teams can shift significantly in accomplishing distal goals.

As we have noted, this degree of interdependence in the goal-directed processes of component teams provides one of the key defining features of MTSs, especially when such teams come from different parent organizations. Teams in more traditional organizational forms rarely exhibit the kinds of integration within goal hierarchies that we have described for MTSs. The level of integration within an MTS does not, however, blur the boundaries and unique character of individual teams. Mathieu et al. (2001;

see also DeChurch & Mathieu, 2009) noted that component teams will likely have different functions, proximal goals, and temporal cycles in their own performance episodes. We would add that such teams may differ in terms of their core values, compositional attributes, domains of expertise, leadership structures, behavioral norms, historical cultures, and internal climates. Individual team members are likely to have a greater identification with their component teams than with the MTS as a whole (DeChurch & Mathieu, 2009). Rather than a detriment, we would argue that such diversity actually represents a core strength of the MTS, allowing it to bring a complex variety of skills, knowledge, and functions to the solution of challenges from its correspondingly complex environment.

We would also submit that such diversity, valued in most MTSs, points to another feature that distinguishes this type of collective from more traditional organizational teams, or even from large teams with multiple subunits. Teams and organizations generally operate effectively by establishing significant pressures toward uniformity among their members (Festinger, 1950; Katz & Kahn, 1978) that foster regulated and common beliefs and behaviors. Members who stay within the team or organization develop shared expectations about the goals of the collective, ways of behaving, accepted beliefs and attitudes, and perceptions of outside individuals and teams. In MTSs, such pressures exist only around the points of interdependent actions related to common proximal goals. Otherwise, component member teams of an MTS are often free to exhibit significant degrees of diversity around the core attributes that define them. This quality of MTSs suggests that different kinds of influence dynamics may operate in such systems than in more traditional teams and organizations. The antecedents of intrateam processes within an MTS may be very different from the antecedents of interteam processes. Likewise, the regulatory processes that promote organized and integrated activities around distal goals in the MTS goal hierarchy may in turn be distinct from those processes around proximal goals.

A TYPOLOGY OF MTS CHARACTERISTICS

We have described to this point the features that are generally standard in most MTSs and that distinguish them from other forms of collectives.

However, there are also a number of attributes that define and separate different types of MTSs. In this section of the chapter, we present several of the characteristics and dimensions along which MTSs may differ. We have classified these attributes into three sets, labeled *compositional attributes*, *linkage attributes*, and *developmental attributes*. Table 1.1 indicates the more specific MTS qualities that are grouped into each set.

Compositional Attributes

Compositional attributes include the overall demographic features of the MTS, as well as the relative characteristics of component teams. The most surface attributes of the MTS pertain to the *number* of component teams in the MTS, as well as the total *size* of the MTS in terms of individuals who compose these teams. After Mathieu et al. (2001), we have stated that an MTS can operate with as few as two component teams. We have not put an upper limit of the size of the MTS, but we suspect that too many component teams would make the MTS unwieldy and less able to respond effectively to the environmental challenges for which it was formed. When MTSs are small in terms of number of component teams, goal hierarchies are likely to be flatter and interteam interactions are likely to be more integrated. As the number of teams in the MTS increases, proximal goals are more likely to become unique to subsets of component teams, and overall interdependence across the MTS may begin to exhibit more complex patterns. For example, interteam processes may become less important among some of the component teams that do not share proximal goals. Some teams may exhibit sequential or reciprocal interdependence, whereas others interact intensively. The size of the component teams, which reflects the total number of individuals in the MTS, can have similar effects on the interaction dynamics among component teams. Larger teams may contain subunits, which themselves interact at different levels of interdependence with other component teams (or their subunits). Leadership processes and norm dynamics also may become more complex with increases in both the number of component teams and the numbers of individuals comprising them.

As we noted earlier, MTSs can also be distinguished by the *boundary status* of the component teams. Internal MTSs are composed of teams that are members of the same organization; external MTSs have teams from different organizations (Mathieu et al., 2001). This difference in boundary

TABLE 1.1

Dimensions of Multiteam System (MTS) Characteristics

Compositional Attributes*Number:* Number of component teams within the MTS*Size:* Total number of individual members across teams*Boundary status:* Component teams come from single organization (internal) versus multiple organizations (external or cross-boundary)*Organizational diversity:* In a cross-boundary MTS, the number of different organizations represented among the component teams*Proportional membership:* In a cross-boundary MTS, the percentage of teams from different organizations*Functional diversity:* Degree of heterogeneity in the core purposes and missions of component teams*Geographic dispersion:* Co-located or dispersed component teams*Cultural diversity:* Degree to which component teams come from different nations or cultures*Motive structure:* Degree of commitment of each component team to the MTS; the compatibility of team goals and MTS goals*Temporal orientation:* Level of effort and temporal resources expected of each component team**Linkage Attributes***Interdependence:* Degree of integrated coordination (e.g., input, process, outcome) among members of different component teams*Hierarchical arrangement:* Ordering of teams according to levels of responsibility*Power distribution:* The relative influence of teams within the MTS**Communication structure***Network:* The typical patterns of interteam communication*Modality:* The modes of communication (e.g., electronic, face-to-face, or mixed) that occur across component teams**Developmental Attributes***Genesis:* The initial formation of an MTS as either appointed or emergent*Direction of development:* From emergent to formalized; an evolution from an early formal state*Tenure:* The anticipated duration of the MTS*Stage:* The stage of MTS development from newly formed to mature**Transformation of system composition***Membership constancy:* Fluidity versus constancy of component teams as members*Linkage constancy:* Fluidity versus constancy of linkages among component teams

status can have significant influences on MTS performance requirements and processes. External teams are likely to face greater task and social complexity than internal teams. Task complexity can derive from the levels of information load, information diversity, and information change in the extant environment (Campbell, 1988; Schroder, Driver, & Struefert, 1967). MTSs form in response to turbulent environments (Mathieu et al., 2001), so they are likely to have to operate under high task complexity; however, this complexity will likely be still higher for external MTSs, with attendant consequences for MTS dynamics, where component teams are responding to multiple environments. As suggested by Mathieu et al. (2001), internal MTSs are more likely to be buffered from the full blast of environmental turbulence by their parent organizations.

Social complexity refers to the scope, scale, diversity, and dynamism of stakeholders in the MTS's environment (Bentz, 1987; Zaccaro, 2001). Again, external MTSs composed of teams from different organizations, each with its own constellation of constituents, are likely to have to confront greater social complexity than their internal counterparts. These differences have implications not only for the degree of integration processes that would be required for success, but also for the level of cognitive and social capacities required of leaders and members of the MTS (Zaccaro, 2001).

The boundary status of the MTS can also reflect two finer distinctions among component teams—*organizational diversity* and *proportional membership*. The former refers to the number of different organizations that are represented within the MTS. Higher numbers of organizations can raise the level of social complexity facing MTS members. *Proportional membership* refers to the number of teams in a cross-boundary organization that come from the same parent organization. For example, Marks et al. (2004) described a joint military airborne strike force MTS that was composed of seven component teams—two from Coalition Forces, two from Naval Forces, and three from the Air Force. In this MTS, the Air Force has proportionately higher representation than other organizations. In the emergency response MTS described by Mathieu et al. (2001), two teams were from the county government and two from the hospital, providing an equal proportion. Disparity in proportional representation may have consequences for influence dynamics within the MTS, as well as for the kinds of norms and other regulatory mechanisms established to organize MTS activities (e.g., Lau & Murnighan, 1998, 2005).

The utility of an MTS to address environment challenges resides in part in its ability to bring together teams with different core functional expertise to effectively address a particular problem. Although most MTSs are likely to contain teams having different core functions, they can still range in how much *functional diversity* is represented among the component teams. Functional diversity in teams has been associated with a greater range of cognitive perspectives that can be applied to different team problems (Bantel, 1993; Wiersema & Bantel, 1992). However, diversity can also result in greater conflict and less social cohesion (O'Bannon & Gupta, 1992). Greening and Johnson (1997) found that moderate functional diversity in top management teams helped organizations manage crises better; these effects were reversed, however, as functional diversity reached higher levels. The degree of functional diversity in MTSs may have similar consequences.

MTSs may also be distinguished by *geographic location*, or the degree to which component teams are co-located, partially dispersed (where some teams are co-located, whereas others are geographically dispersed), or fully dispersed. The literature on virtual teams highlights a number of problems that arise when team members are dispersed (Cramton, 2001; Jarvenpaa & Leidner, 1999). These include difficulties in communication, trust building, and member coordination. These kinds of difficulties can become magnified in MTSs where component teams are located in different physical settings, especially when these component teams operate at different temporal schedules. When cross-boundary MTSs include teams that extend over national boundaries, then geographic dispersion may also reflect another MTS dimension, *cultural diversity*, or the degree to which component teams come from different national cultures.

The mix in motive structures among component teams is another compositional factor that can distinguish MTSs. The *motive structure* within an MTS refers to the degree of compatibility between team and MTS goals, with attendant consequences for strength of the team's commitment to the MTS. Some component teams may have shared responsibility for only a single proximal goal in the MTS goal hierarchy, whereas others may have responsibility for multiple proximal goals within an MTS's performance episode. Moreover, the distal goals in the MTS may be indifferent to, or even partially conflict with, the core mission and goals of one or more component teams. For example, MTSs associated with U.S. and NATO efforts in Afghanistan may have as distal goals to "extend the authority

of the Afghan central government, promote and enhance security, and facilitate humanitarian relief and reconstruction operations" (Dziedzic & Seidl, 2005, pp. 1–2). These MTSs will likely be composed of Army combat forces, Army civil affairs units, Red Cross and other humanitarian units, and mixes of applicable international and nongovernmental organizations. For the sake of parsimony, we can divide teams from these organizations into civilian and military teams. The following is a description from Dziedzic and Seidl of the kinds of conflicts that can characterize an MTS with a mixed and complex motive structure:

There are fundamental differences in the way the civilian assistance community and military leaders conceive of a secure environment. The military emphasizes national security, public order, and force protection—all of which are enhanced by assertively addressing and reducing sources of threat. Civilian assistance providers, on the other hand, equate security with ensuring that belligerents do not perceive them as a threat. (P. 2)

Dziedzic and Seidl (2005) described how even the goal of providing "humanitarian assistance" to locals may be perceived differently by teams from each type of organization in the MTS. They noted,

Humanitarian organizations seek to alleviate suffering without regard for the aid recipient's affiliation with any of the parties to a conflict. When military units in a combat provide "humanitarian-type" relief, it is typically associated with political objectives. For military forces confronting an insurgency, it may be a matter of military necessity to ensure that assistance is provided to displaced civilians and that civic action projects are undertaken to cultivate popular support and increase force protection. When the focus shifts from humanitarian assistance to reconstruction, the salient concerns that arise are the blurring of civil and military roles and interference with each other's efforts. (P. 2)

Thus, an MTS composed of military and civilian units in such settings can reflect mixed-motive structures that result in more complex interteam processes than MTSs where the core missions of component teams are more compatible with each other and with the distal goal of the MTS. As incompatibility in team motive structures increases, members of teams, although committed to a proximal goal, may be less committed to the overall goal hierarchy of the MTS. Thus, if the distal goal in a

joint military–civilian MTS is security and force protection, component teams from humanitarian organizations may have less commitment to such goals. Indeed, Dziedzic and Seidl (2005) noted that in such MTSs in Afghanistan “civilian assistance providers insist that they cannot allow their efforts to be perceived as part of a campaign plan of a belligerent force” (p. 2). Alternatively, if the distal goal in such MTSs becomes providing reconstructive aid, then any combat component units could lessen their commitment to all but their particular proximal goals.

The motive structure may be associated with the last compositional attribute in Table 1.1, *temporal orientation*. This refers to the level of effort and time expected to be devoted by component teams to the goals of the MTS. In some MTSs, all teams are expected to provide comparable personnel and temporal resources to goal accomplishment. In others, some teams are expected to provide disproportionately more, or less, of such resources.

Compositional attributes will arguably be a significant driving force on the interteam dynamics within MTSs. They may also influence the attachments of team members to the overall MTS, and of teams to each other. Recent work in the team composition literature has emphasized how certain demographic patterns can produce faultlines in teams that can in turn foster subgroups and coalitions within them (Lau & Murnighan, 1998, 2005). Similar processes can occur in an MTS. For example, a faultline can form when (a) there exists some diversity in MTS compositional attributes (e.g., national origin, parent organization, motive structure, geographic colocation, or core function), or (b) component teams possessing one or more compositional attributes align more strongly with teams having similar attributes than with teams with different characteristics. As with teams, strong aligning faultlines in MTSs can foster perceptions of ingroup–outgroup status, less interteam communication, greater interteam conflict, and less overall cohesion (Hogg & Terry, 2000; Lau & Murnighan, 2005; Thatcher, Jehn, & Zanutto, 2003). Thus, compositional attributes have important consequences for MTS effectiveness—we believe this represents a particularly important avenue for future MTS research.

Linkage Attributes

The different kinds of linking mechanisms that connect component teams serve as other ways of distinguishing MTSs. We have already noted that MTSs can vary in terms of the degree of *interdependence* required of its

component teams to meet collective goals. All MTSs exhibit some level of interdependence in the interactions among their teams. We regard this as a necessary condition that makes MTSs different from more traditional organization forms. However, in some MTSs, some or all of their teams may coact in patterns of sequential or reciprocal interdependence, whereas in others the component teams are required to engage intensively with one another. These differences in the levels of required interdependence will have significant consequences for the amount of interteam processes necessary for MTS effectiveness (Marks et al., 2005).

Two other related linkage attributes include the hierarchical arrangement of component teams and the power distribution among them. *Hierarchical arrangement* refers to the ordering of teams within the MTS according to their levels of responsibility for goal attainment. Some teams could be responsible for only a single proximal goal, whereas others could be required to manage and accomplish multiple proximal goals. The latter teams may also need to address goals at different levels of the MTS goal hierarchy. This requirement gives them more responsibility for coordinating goal accomplishment at these multiple levels.

Power distribution refers to the relative influence that component teams have within the MTS. Some teams by virtue of their higher placement in a hierarchical arrangement would likely have more power than those at lower levels with fewer goal responsibilities. Teams may also gain disproportionate power within an MTS because of their larger size, their functional centrality to the core mission of the MTS, and/or their appointment by parent organizations as having authority and prime responsibility for MTS decisions. Both hierarchical arrangement and power distribution will likely influence the patterns of communications and interactions among the component teams.

MTSs may also be distinguished by their normative communication structures, specifically their dominant communication networks and communication modalities. In team research, *communication networks* refer to the structured patterns of interaction flow in a collective (Leavitt, 1951; Shaw, 1964, 1978). Such patterns can be fully decentralized, where all members communicate with all other members; fully centralized, where all members communicate to and through a single member; and various combinations of patterns between these extremes (Shaw, 1964). Communication networks have significant consequences for task efficiency—centralized networks yield greater efficiency on simple tasks,

whereas decentralized ones are better for more complex tasks where information saturation may be higher (Shaw, 1964). Also, when members are in more central positions in a network, they report greater satisfaction and commitment than members in more peripheral positions (Eisenberg, Monge, & Miller, 1983; Lovaglia & Houser, 1996). Similar kinds of effects may accrue in MTSs with different communication structures. Also, MTSs may vary in terms of *communication modality*, or the degree to which communication occurs primarily face-to-face, electronically, or a mix of the two. This attribute would be specifically tied to the degree of geographic diversity in the MTS, with dispersed component teams more likely to communicate electronically (Griffith & Neale, 2001; Kirkman & Mathieu, 2005). Research on dispersed teams indicates that teamwork in such teams may often be less efficient and effective than in their co-located counterparts (Cramton, 2001). We would expect similar kinds of issues in MTSs where component teams need to communicate electronically.

Developmental Attributes

The final category of attributes that can be used to distinguish different types of MTSs includes those characteristics pertaining to their developmental dynamics and patterns. For example, MTSs can differ in terms of their *genesis*, or their mode of initiation. Some MTSs may be appointed or created by leaders or superordinate executive committees from parent organizations. These leaders would establish the mission parameters and the distal goals of the MTS. Other MTSs may emerge from the collective initiative of several teams that would eventually comprise the MTS. In these types of MTSs, the proximal and distal goals would likely emerge from negotiations and interactions among the component teams. Thus the MTS's mode of initiation can have a determinative influence on how its missions, goal hierarchy, and perhaps other structural elements emerge as well.

Although an MTS may begin as an appointed or emergent entity, it may change as component teams pass through subsequent performance episodes. Thus, the *direction of development* in an MTS may begin as it emerges informally or on an ad hoc basis in response to a crisis or national incident; however, it may then become more formalized as a relatively permanent guard against similar future events. Indeed, some MTSs composed of national security agencies and civilian relief organizations that emerged in the immediate aftermath of the terrorist attacks on September 11, 2001,

become formalized by subsequent government actions. Other MTSs may have a different developmental path, where they are formally planned in outline to anticipate possible emergencies or crises, but actually evolve in membership and linkages when these events do occur.

MTSs may also differ in terms of their expected duration, or *tenure*, and their *stage* of development. Models of group development describe the stages or processes that such collectives go through in becoming mature and effective systems (and, in some cases, dissolving when their mission expires) (Chang, Duck, & Bordio, 2006; Gersick, 1988; Tuckman, 1965). These stages reflect processes of moving from relative member independence to effective interdependence through the resolution of disagreements or incompatible member agendas, and the development of normative or social regulatory systems (Tuckman, 1965; Tuckman & Jensen, 1977). MTSs as collectives will likely go through similar processes as they become mature systems. A particular MTS developmental stage also may determine the efficiency of its interteam processes (cf. Kozlowski, Gully, McHugh, Salas, & Cannon-Bowers, 1996).

As MTSs develop and move through performance episodes, they may also experience changes in composition and linkages among component teams. The remaining two attributes in this set pertain to such *transformation of system composition*. *Membership constancy* refers to the fluidity versus constancy of component team membership in the MTS. MTSs can typically be relatively stable in terms of their membership. However, in highly turbulent environments, when strategic challenges are constantly changing, then MTSs operating in such contexts may well change their component team membership on a fairly regular basis (cf. Mathieu, Maynard, Rapp, & Gilson, 2008, p. 463, on such transitions within teams). In such instances, new teams would be required to become quickly integrated into existing MTS norms, structures, and procedures. Models of team member socialization suggest that this entry process would entail reciprocal evaluation and commitment processes, where new members and the existing team evaluate each other for potential gains versus costs of membership, and, as gains outweigh cost, commit to each other (Moreland & Levine, 1982). Moreland and Levine (1982) suggested that this evaluation and commitment process is a dynamic one that can change at various stages of new member socialization, integration, and perhaps removal from the team. We expect that a comparable process, albeit a

more complex one, may occur when new component teams are recruited and socialized into an existing MTS.

Even if MTS membership is constant, the nature of the ties and interdependencies among component teams may shift as MTSs develop across performance episodes. Thus, MTSs can differ according to their *linkage constancy*. Some MTS maintain fairly steady hierarchal arrangements, power and communication structures, and patterns of interdependence. However, in more turbulent and dynamic environments, MTSs may be required to display considerable adaptability in the coordinating structures among component teams. Recent research on team adaptation has emphasized how teams adjust their role structures and task-related relationships among members as operating environments change (LePine, 2003; Stagl, Burke, Salas, & Pierce, 2006). LePine (2003) emphasized that such role structure adaptation is particularly important for teams that are required to make decisions in different situations over extended periods of time. He noted that "production teams involved in long linked and continuous flow processes, surgical teams, flight crews, and command and control teams do not have the time to stop and plan a rational response to an unexpected change that makes their established role structure inappropriate ... these teams must be capable of adapting on the fly to be effective" (p. 28). We have described briefly in this chapter (see also Chapters 2 and 3) several examples of MTSs that contain just these kinds of teams. LePine's admonishment about teams in such settings applies as well to MTSs. We have noted the arguments of others that MTSs are an adaptive response by organizations to a complex and turbulent environment (DeChurch & Mathieu, 2009; Mathieu et al., 2001). Accordingly, we expect that role structure adaptation, or adjustments in other kinds of linking arrangements, will be a particularly important developmental attribute in effective MTSs.

We have described three sets of attributes that we believe distinguish different types of MTSs. Such a classification is important as a driver of future research on MTS processes and effectiveness. In our discussion, we have noted only briefly how MTS attributes might influence MTS processes. We believe a simple model of MTS effectiveness might look like the one in Figure 1.1, where compositional, linkage, and developmental attributes serve as antecedents of different intrateam and interteam processes. The effects of these attributes on overall effectiveness would be mediated by these processes. We expect that future

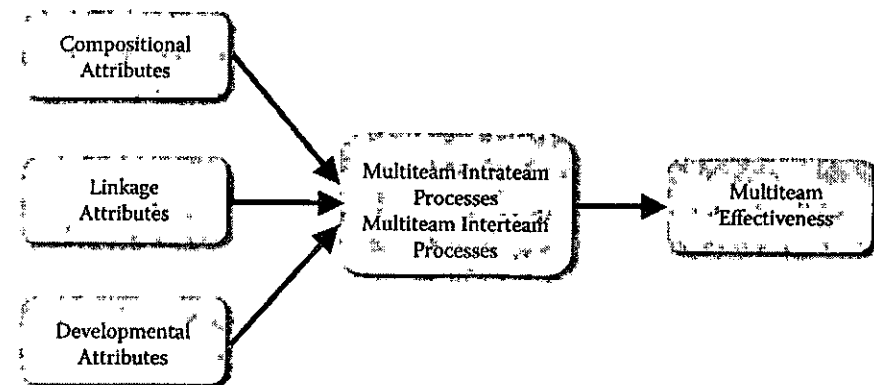


FIGURE 1.1
A model of multiteam system effectiveness.

MTS research will lead to specifications of more complex versions of this model.

One purpose of this book is to foster a deeper exploration of these attributes and their influences on MTS processes and outcomes. Accordingly, three of its sections correspond to these three sets of attributes. We turn now to a broader overview of this book and its contents.

AN OVERVIEW OF THIS BOOK

We noted earlier that in June 2008, a conference sponsored by the U.S. Army Research Institute (ARI) brought together several scholars to explore in more detail the concept of MTSs. Early research on MTSs and the discussions at that ARI conference have highlighted the necessity for an expanded and deeper focus on the nature of MTSs. We can identify five needs that are, in turn, reflected in the approach and contents of this book. First, at the ARI conference, scholars interested in MTSs argued for more detail and elaboration on the features that distinguish MTSs from other conventional and unconventional organizational forms. This suggests a need to define more firmly what the boundaries of MTSs are, and what kinds of systems are excluded by these boundaries. Thus, the present chapter provides definitional material on the nature of MTSs. The next two chapters provide examples of such systems from multiple domains.

In Chapter 2, Michelle Marks and Dave Luvison describe two examples of MTSs from the business world. The first example refers to MTSs within an organization responsible for launching new products; the other example is a strategic alliance between teams from different organizations. Thus, Marks and Luvison offer descriptions of—and a contrast between—internal and external MTSs. Chapter 3 by Gerald Goodwin, Peter Essens, and David Smith provides examples of three MTSs in the public sector. The first of these is a description of railway management in the Netherlands, the second of public safety arrangements in Canada for the 2010 Olympic and Paralympic Games, and the third of security force assistance and stabilization operations in the U.S. military. This chapter provides examples of MTSs within different nations, as well as a multinational or multicultural MTS.

The second need driving this book reflects the fact that MTSs raise the focus from individuals to component teams as the unit of analysis; accordingly, research questions abound in terms of the compositional properties of unit teams and the MTS as a whole. For example, we have noted that the overlapping and complex goal structures of the component teams reflect a range of competing motivational processes—component teams have commitments to stakeholders and constituents that can both support and contrast with the commitments made to the MTS. Likewise, component teams in an MTS have multiple attachments, including to their home organization, which can create complex social identities. We have also noted that when particular component teams have greater commonality (in terms of function, values, and cultures) with each other than with other component teams, deleterious faultlines can develop in the MTS.

These complex and interesting issues form the basis for several chapters in Section II of this book. Chapter 4 by Ruth Kanfer and Matthew Kerry examines motivation processes that may operate in MTSs. They define *motivation* as reflecting goal-directed processes, including goal choice, goal accomplishment, and particularly the allocation of resources across multiple goals. In MTSs, individuals and teams are faced with choices to allocate resources to self, team, and MTS goals. Kanfer and Kerry provide elucidation of some of the issues and concerns related to such choices.

The nature of MTSs often means that members can belong simultaneously to multiple collectives—their parent organizations, their teams, the MTSs, and, in rare cases, multiple teams within the MTS. The remaining three chapters in Section II of this book are concerned with different

aspects of this multiple-membership quality of MTSs. Chapter 5 by Stacey Connaughton, Elizabeth Williams, and Marissa Shuffler examines social identity issues that can arise from several compositional attributes of MTSs, including boundary status, and the multiple forms of diversity that can exist in such entities. *Social identity* refers to the derivation of an individual's self-image in part from his or her social memberships (Tajfel & Turner, 1986). The presence of diversity within the MTS can hinder the emergence of an MTS-level social identity. Thus, an interesting question concerns how a collective social identity necessary for effective MTS functioning emerges from—or is thwarted by—members' multiple memberships; also of interest is how a collective identity contributes to MTS-level processes and conflict resolution, especially in MTSs with high levels of diversity. The chapter by Connaughton et al. provides some insight into these and related questions. Chapter 6 by Michael O'Leary, Anita Woodley, and Mark Mortensen describes in more detail the potentially complex nature of multiple team memberships (MTMs) within MTSs, including how MTMs can influence learning and productivity. The final chapter in Section II, by Joann Keyton, Debra Ford, and Faye Smith, introduces a variant of MTSs called the *representative MTS*. In such forms, "individuals from different organizations form teams to problem solve for a third-party organization" (Keyton et al., Chapter 7, this volume p. 174). This chapter also associates communication, collaboration, and identification linkage processes to multiple compositional attributes of representative MTSs.

The third need driving this book pertains to the interrelationships and linkages among the component teams. The effectiveness of MTSs will derive mostly from the ability of component teams to integrate their actions successfully in response to the kinds of environmental events that instigated their formation. Although much work has been completed on the attributes that promote effective interdependence and coordination within teams (see review by Mathieu et al., 2008), the findings of such research do not translate easily and isomorphically to the MTS level. Thus, a series of chapters in Section III of the book will focus on the linking mechanisms, such as communication dynamics, leadership, and between-team action processes, that promote effective MTS performance. Chapter 8 by Marshall Poole and Noshir Contractor considers MTSs as an ecosystem of networked individuals and groups, in which links depend upon the nature of the work and goals addressed by the network. Joan Rentsch

and Melissa Staniewicz outline in Chapter 9 the various kinds of cognitive similarity configurations that promote effective coordination in MTSs. Chapter 10 by Stephen Zaccaro and Leslie DeChurch explores the leadership functions within and between teams in an MTS that can enable its effectiveness. They also describe the different forms that leadership can take within MTSs.

The first three chapters in Section III offer greater understanding of the processes that foster collaboration among teams in an MTS. However, the presence of multiple forms of diversity in most MTSs suggests a greater likelihood of conflict among units. Chapter 11 by Verlin Hinsz and Kevin Betts explores the nature of such conflicts, and offers remedial strategies. Finally, the various forms of linkages within the MTS, and the differences in the nature of these linkages among alternate types of MTSs (e.g., external versus internal MTSs), suggest multiple forms of boundary-spanning processes that may operate in such organizational forms. The final chapter of this section, by Robert Davison and John Hollenbeck, provides a framework for conceptualizing different types of boundaries and boundary-spanning activities within MTSs.

Chapters on how MTSs emerge and develop in response to environmental contingencies form the fourth section of this book. Component teams need to derive coordination patterns, as well as the capacity to maximize their adaptability as events change. Chapter 13 by Sijr Uitdewilligen and Mary Waller examines how MTSs form, respond to dynamic environmental contingencies, and then disband; their description of these processes is provided within the backdrop of the Port of Rotterdam in the Netherlands. Their chapter, as well as others in this volume, emphasizes the complexity that confronts MTSs, and the concordance between such complexity and their emergent structures. Chapter 14 by Rhett Standifer, explores the temporal synchrony of component team actions, and how teams develop their coordinating structures in a manner that maximizes their degree of responsive adaptability as organizational forms.

The final section of the book focuses on the need to examine and discuss the kinds of tools and strategies needed to study MTSs. Many researchers have commented on the unique challenges in research on organizations and groups, as well as the strategies needed to conduct such research. These challenges may increase exponentially when studying MTSs. Chapter 15 by Juliet Aiken and Paul Hanges highlights the challenges in conducting research on MTSs, and suggests some methodologies from the

domain of complexity science. The chapter by Corinne Coen and Andrew Schnackenberg describes the nature of MTSs as complex systems, including the use of computational simulations to study them. Chapter 17 by Christian Resick, Shawn Burke, and Daniel Doty examines the challenges of conducting experimental or lab-based research on MTSs. The final chapter in the book, by John Mathieu, integrates this material with the rest of the book's content and summarizes key topics and questions for future research in this area.

Our hope is that the chapters in this book accelerate the burgeoning interest and research in MTSs as new organizational forms. As operating environments for today's organizations become increasingly more complex, and as multi-organizational collaborations become more necessary to meet such complexity, we expect that MTSs will grow in number, becoming a more standard organizational form. If researchers simply try isomorphic application of existing models of team or organizational processes to understand MTS processes, we believe such efforts would be insufficient and perhaps misleading. We hope that the contributions by the various scholars in this book will provide new pathways to understanding the MTS as an evolving organizational form.

REFERENCES

- Bantel, K. A. (1993). Strategic clarity in banking: Role of top management team demography. *Psychological Reports*, 73, 1187-1201.
- Bentz, V. J. (1987). *Explorations of scope and scale: The critical determinant of high-level effectiveness* (Technical Report No. 31). Greensboro, NC: Center for Creative Leadership.
- Burke, C. S., DeChurch, L. A., Salas, E., & Goodwin, G. F. (2008, April). Modes of coordination in multiteam systems. In G. Grote & R. A. Roe (Chairs), *Team Coordination in High-Risk Environments*. Symposium conducted at the meeting of the Society for Industrial and Organizational Psychology, San Francisco, CA.
- Caldwell, B. S. (2005). Multi-team dynamics and distributed expertise in mission operations. *Aviation, Space, and Environmental Medicine*, 76(6), Sec. II, B145-B153.
- Campbell, D. J. (1988). Task complexity: A review and analysis. *Academy of Management Review*, 13, 40-52.
- Chang, A., Duck, J., & Bordio, P. (2006). Understanding the multidimensionality of group development. *Small Group Research*, 37, 327-350.
- Coen, C. A. (2006). Seeking the comparative advantage: The dynamics of individual cooperation in single vs. multiple team environments. *Organizational Behavior and Human Decision Processes*, 100, 145-159.

- Cramton, C. D. (2001). The mutual knowledge problem and its consequences for dispersed collaboration. *Organization Science*, 12, 346-371.
- Davis, S. M., & Lawrence, P. R. (1977). *Matrix*. Reading, MA: Addison-Wesley.
- Dean, C., MacMillan, J., Bennett, W., Jr., Merket, D., Salas, E., Zaccaro, S. J., et al. (2008, September). *Challenges in teams-of-teams training and assessment*. Panel presentation at the 52nd annual meeting of the Human Factors and Ergonomics Society, New York.
- DeChurch, L. A. (2006, August). Defining the challenge of leadership in multiteam systems. In L. A. DeChurch & C. J. Resick (Chairs), *New Directions in Team Leadership Research*. Symposium conducted at the meeting of the Academy of Management, Atlanta, GA.
- DeChurch, L. A. (Chair) (2010, April). Multiteam imperatives for leadership and organizations. Symposium presented at the 25th annual conference of the Society for Industrial and Organizational Psychology, Atlanta, GA.
- DeChurch, L. A., & Burke, C. S. (Co-Chairs) (2009, April). Multiteam systems: Exploring an emerging organizational form. Symposium presented at the meeting of the Society for Industrial and Organizational Psychology, New Orleans, LA.
- DeChurch, L. A., Burke, C. S., & Salas, E. (2009, July). A multiteam perspective: Coordination within and across teams. In R. Rico (Chair), *New Trends in Team Coordination*. Symposium conducted at the meeting of the Interdisciplinary Network for Group Research, Colorado Springs, CO.
- DeChurch, L. A., & Marks, M. A. (2006). Leadership in multi-team systems. *Journal of Applied Psychology*, 91, 311-329.
- DeChurch, L. A., & Marks, M. A. (2008, April). Leader mental models and multiteam system effectiveness. In L. A. DeChurch & M. A. Marks (Chairs), *Leading the Team, and Above*. Symposium conducted at the meeting of the Society for Industrial and Organizational Psychology, San Francisco, CA.
- DeChurch, L. A., & Mathieu, J. E. (2009). Thinking in terms of multiteam systems. In E. Salas, G. F. Goodwin, & C. S. Burke (Eds.), *Team effectiveness in complex organizations: Cross-disciplinary perspectives and approaches* (pp. 267-292). New York: Taylor & Francis.
- DeChurch, L. A., & Resick, C. J. (2006, July). *Task interdependence in multiteam systems: Examining differences in critical leader functions*. Paper presented at the meeting of the Interdisciplinary Network for Group Research, Pittsburgh, PA.
- DeChurch, L. A., Resick, C. J., Doty, D. A., Murase, T., Jiménez, M., Mathieu, J. E., et al. (2010, April). Examining leadership in complex network environments. In L. A. DeChurch (Chair), *Multiteam Imperatives for Leadership and Organization*. Symposium conducted at the meeting of the Society for Industrial and Organizational Psychology, Atlanta, GA.
- Dziedziec, M. J., & Seidl, Col. M. K. (2005). Provincial reconstruction teams and military relations with international and nongovernmental organizations in Afghanistan (Special Report No. 147). Washington, DC: U.S. Institute for Peace. Retrieved from <http://www.usip.org/resources/provincial-reconstruction-teams-military-relations-international-and-nongovernmental-organ>
- Eisenberg, E. M., Monge, P. R., & Miller, K. I. (1983). Involvement in communication networks as a predictor of organizational commitment. *Human Communication Research*, 10(2), 179-201.
- Festinger, L. (1950). Informal social communication. *Psychological Review*, 57, 271-282.
- Gersick, C. J. G. (1988). Time and transition in work teams: Toward a new model of group development. *Academy of Management Journal*, 31(1), 9-41.
- Greening, D. W., & Johnson, R. A. (1997). Managing industrial and environmental crises: The role of heterogeneous top management teams. *Business and Society*, 36, 334-361.
- Griffith, T. L., & Neal, M. A. (2001). Information processing in traditional, hybrid, and virtual teams: From nascent knowledge to transactive memory. In B. Staw & R. Sutton (Eds.), *Research in organizational behavior* (Vol. 23, pp. 379-421). Stamford, CT: JAI.
- Hackman, J. R. (1990). *Groups that work and those that don't*. San Francisco: Jossey-Bass.
- Hambrick, D. C. (1994). Top management groups: A conceptual integration and reconsideration of the team label. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior* (Vol. 16, pp. 171-214). Greenwich, CT: JAI.
- Hesketh, B., & Neal, A. (1999). Technology and performance. In D. R. Ilgen & E. D. Pulakos (Eds.), *The changing nature of performance: Implications for staffing, motivation, and development* (pp. 21-55). San Francisco: Jossey-Bass.
- Hoegl, M., & Weinkauff, K. (2005). Managing task interdependencies in multiteam projects: A longitudinal study. *Journal of Management Studies*, 42(6), 1287-1308.
- Hogg, M. A., & Terry, D. J. (2000). Social identity and self-categorization processes in organizational contexts. *Academy of Management Review*, 25(1), 121-140.
- Hsu, H. C., & Liu, A. (2005). Multiagent-based multi-team formation control for mobile robots. *Journal of Intelligent and Robotic Systems*, 42, 337-360.
- Ilgen, D., & Pulakos, E. (1999). Employee performance in today's organizations. In D. R. Ilgen & E. D. Pulakos (Eds.), *The changing nature of work performance: Implications for staffing, motivation, and development* (pp. 1-20). San Francisco: Jossey-Bass.
- Ireland, R. D., & Hitt, M. A. (1999). Achieving and maintaining strategic competitiveness in the 21st century: The role of strategic leadership. *Academy of Management Executive*, 13(1), 43-57.
- Jarvenpaa, S. L., Knoll, K., & Leidner, D. E. (1998). Is anybody out there? Antecedents of trust in global virtual teams. *Journal of Management Information Systems*, 14(4), 29-64.
- Jarvenpaa, S. L., & Leidner, D. E. (1999). Communication and trust in global virtual teams. *Organization Science*, 10(6), 791-815.
- Johnson, J. P., Korsgaard, M. A., & Sapienza, H. J. (2002). Perceived fairness, decision control, and commitment in international joint venture management teams. *Strategic Management Journal*, 23, 1141-1160.
- Katz, D., & Kahn, R. L. (1978). *The social psychology of organizations* (2nd ed.). New York: Wiley.
- Kirkman, B. L., & Mathieu, J. E. (2005). The dimensions and antecedents of team virtuality. *Journal of Management*, 31, 700-718.
- Knight, K. (1976). Matrix organization: A review. *Journal of Management Studies*, 13, 111-130.
- Kozlowski, S. W. J., Gully, S. M., McHugh, P. P., Salas, E., & Cannon-Bowers, J. A. (1996). A dynamic theory of leadership and team effectiveness: Developmental and task contingent leader roles. *Research in Personnel and Human Resources Management*, 14, 253-305.
- Lau, D. C., & Murnighan, J. K. (1998). Demographic diversity and faultlines: The compositional dynamics of organizational groups. *Academy of Management Review*, 23, 325-340.
- Lau, D. C., & Murnighan, J. K. (2005). Interactions within groups and subgroups: The effects of demographic faultlines. *Academy of Management Journal*, 48(4), 645-659.

- Leavitt, H. J. (1951). Some effects of certain communication patterns on group performance. *Journal of Abnormal and Social Psychology*, 46, 38-50.
- LePine, J. A. (2003). Team adaptation and postchange performance: Effects of team composition in terms of members' cognitive ability and personality. *Journal of Applied Psychology*, 88, 27-39.
- Liu, Y., & Simaan, M. A. (2004a). Noninferior Nash strategies for multi-team systems. *Journal of Optimization Theory and Applications*, 120(1), 29-51.
- Liu, Y., & Simaan, M. A. (2004b). Noninferior Nash strategies for routing control in parallel-link communication networks. *International Journal of Communication Systems*, 18, 347-361.
- Liu, Y., Simaan, M. A., & Cruz, J. B., Jr. (2003). An application of dynamic Nash task assignment strategies to multi-team military air operations. *Automatica*, 39, 1469-1478.
- Lovaglia, M. J., & Houser, J. A. (1996). Emotional reactions and status in groups. *American Sociological Review*, 61(5), 867-883.
- Lyons, R., Jiménez, M., Burke, C. S., DeChurch, L., Salas, E., & Goodwin, J. (2008, July). Understanding the coordinative mechanisms in multiteam systems: A historiometric analysis. Poster presented at the meeting of the Interdisciplinary Network for Group Research, Kansas City, MO.
- Marks, M. A., DeChurch, L. A., Mathieu, J. E., Panzer, F. J., & Alonso, A. A. (2005). Teamwork in multi-team systems. *Journal of Applied Psychology*, 90(5), 964-971.
- Marks, M. A., & Luvison, D. (2008, April). Understanding leadership in multiteam alliances. Paper presented at the 23rd annual meeting of the Society for Industrial and Organizational Psychology, San Francisco, CA.
- Marks, M. A., Mathieu, J. E., Hollenbeck, J. R., DeChurch, L. A., Zaccaro, S. J., & Goodwin, G. F. (2010, April). A discussion of current research on multiteam systems. Panel discussion presented at the 25th annual meeting of the Society for Industrial and Organizational Psychology, Atlanta, GA.
- Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. *Academy of Management Review*, 26(3), 356-376.
- Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2004). Using scaled worlds to study multi-team systems. In S. G. Shiflett, L. R. Elliott, E. Salas, & M. D. Covert (Eds.), *Scaled worlds: Development, validation, and applications* (pp. 279-296). Burlington, VT: Ashgate.
- Mathieu, J. E., Cobb, M. A., Marks, M. A., Zaccaro, S. J., & Marsh, S. (2004). Multiteam ACES: A research platform for studying multiteam systems. In S. G. Shiflett, L. R. Elliott, E. Salas, & M. Covert (Eds.), *Scaled worlds: Development, validation and applications* (pp. 297-315). Burlington, VT: Ashgate.
- Mathieu, J. E., Marks, M. A., & Zaccaro, S. J. (2001). Multiteam systems. In N. Anderson, D. Ones, H. K. Sinangil, & C. Viswesvaran (Eds.), *International handbook of work and organizational psychology* (pp. 289-313). London: Sage.
- Mathieu, J. E., Maynard, M. T., Rapp, T., & Gilson, L. (2008). Team effectiveness 1997-2007: A review of recent advancements and a glimpse into the future. *Journal of Management*, 34, 410-476.
- Mittleman, D., & Briggs, R. O. (1999). Communication technologies for traditional and virtual teams. In J. R. Katzenbach (Ed.), *The work of teams* (pp. 246-270). Boston: Harvard Business Press.
- Mohrman, S. A., Cohen, S. G., & Mohrman, A. M., Jr. (1995). *Designing team-based organizations: New forms for knowledge work*. San Francisco: Jossey-Bass.
- Mohrman, S. A., & Quam, K. (2000). Consulting to team-based organizations: An organizational design and learning approach. *Consulting Psychology Journal: Practice and Research*, 52, 20-35.
- Moreland, R. L., & Levine, J. M. (1982). Socialization in small groups: Temporal changes in individual-group relations. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 15). New York: Academic Press.
- Moynihan, D. P. (2007). *From forest fires to Hurricane Katrina: Case studies of incident command systems*. Washington, DC: IBM Center for the Business of Government. Retrieved from www.businessofgovernment.org/report/forest-fires-hurricane-katrina-case-studies-incident-command-systems
- O'Bannon, D. P., & Gupta, A. K. (1992, August). The utility of homogeneity versus heterogeneity within top management teams: Alternate resolutions of the emerging conundrum. Paper presented at the annual meeting of the Academy of Management, Las Vegas, NV.
- Schroder, H. M., Driver, M. J., & Streufert, S. (1967). *Human information processing*. New York: Holt, Rinehart & Winston.
- Scott, W. R. (1998). *Organizations: Rational, natural, and open systems*. Saddle River, NJ: Prentice Hall.
- Shaw, M. E. (1964). Communication networks. *Advances in Experimental Social Psychology*, 1, 111-147.
- Shaw, M. E. (1978). Communication networks fourteen years later. In L. Berkowitz (Ed.), *Group processes*. New York: Academic Press.
- Simon, H. A. (1962). The architecture of complexity. *Proceedings of the American Philosophical Society*, 106, 467-482.
- Stagl, K. C., Burke, C. S., Salas, E., & Pierce, L. (2006). Understanding adaptability: A prerequisite for effective performance within complex environments. In C. S. Burke, L. G. Pierce, & E. Salas (Eds.), *Understanding adaptability: A prerequisite for effective performance within complex environments*. Amsterdam: Elsevier.
- Standifer, R. L., & Bluedorn, A. C. (2006). Alliance management teams and entrainment: Sharing temporal mental models. *Human Relations*, 59, 903-927.
- Sundstrom, E., McIntyre, M., Halfhill, T., & Richards, H. (2000). Work groups: From Hawthorne studies to work teams of the 1990s and beyond. *Group Dynamics: Theory, Research, and Practice*, 4(1), 44-67.
- Tajfel, H., & Turner, J. C. (1986). The social identity theory of inter-group behavior. In S. Worchel & L. W. Austin (Eds.), *Psychology of intergroup relations* (pp. 7-24). Chicago: Nelson-Hall.
- Tesluk, P., Mathieu, J. E., Zaccaro, S. J., & Marks, M. A. (1997). Task and aggregation issues in analysis and assessment of team performance. In M. T. Brannick, E. Salas, & C. Prince (Eds.), *Team performance assessment and measurement: Theory, methods, and applications*. Mahwah, NJ: Lawrence Erlbaum.
- Thatcher, S. M. B., Jehn, K. A., & Zanotto, E. (2003). Cracks in diversity research: The effects of diversity faultlines on conflict and performance. *Group Decision and Negotiation*, 12, 217-241.
- Thompson, J. D. (1967). *Organizations in action*. New York: McGraw-Hill.
- Tuckman, B. W. (1965). Developmental sequences in small groups. *Psychological Bulletin*, 63, 384-399.
- Tuckman, B. W., & Jensen, M. A. C. (1977). Stages of small group development revisited. *Group and Organization Studies*, 2, 419-427.

- Wiersema, M. F., & Bantel, K. A. (1992). Top management team demography and corporate strategic change. *Academy of Management Journal*, 35, 91-121.
- Wooten, S., Doty, D., Murase, T., Burke, C. S., DeChurch, L. A., & Pierce, L. (2009, April). A taxonomy of platforms for MTS research: A critical review. In W. Bedwell & F. J. Panzer (Chairs), *Research on Teams and Multiteam Systems: Selecting Game-Based Research Platforms*. Symposium conducted at the meeting of the Society for Industrial and Organizational Psychology, New Orleans, LA.
- Zaccaro, S. J. (2001). *The nature of executive leadership: A conceptual and empirical analysis of success*. Washington, DC: APA Books.

2

Product Launch and Strategic Alliance MTSS

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This chapter details two examples of MTSSs in business environments. Though both are organizational MTSSs, they differ in purpose, configuration, and operation of MTSSs, as well as in the fact that one example is intraorganizational whereas the other example is interorganizational. These business examples illuminate the high prevalence of MTSSs in today's workplaces. We describe the purpose and the structural characteristics of the MTSSs, illustrate how the MTSSs operate and change over time, and then categorize them based on the typology dimensions presented in Chapter 1.

PRODUCT LAUNCH MTSS

MTSSs are fundamental structures in our workplaces today. The product launch activities for a large, high-technology company offer a good example of the way in which complex MTSSs can operate within a single firm. This process involves all of the activities required to take a product from the development stage through the initial introduction and growth stages of its sales cycle. Such an endeavor, especially for a firm that offers a product incorporating a combination of hardware and software components such as a network communications vendor, involves numerous coordination points across multiple teams. When a firm brings a new