

## **20<sup>th</sup> ICCRTS – C2, Cyber, and Trust**

### **“Command and Control in Multiteam Systems: Measuring and Building Trust between People and Groups”**

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# **Command and Control in Multiteam Systems: Measuring and Building Trust between People and Groups**

## **Abstract**

Multiteam systems are collectives that collaborate across traditional team and organizational boundaries, as for example, when teams from multiple agencies must cooperate in response to natural disasters. Individual teams in a multiteam system will likely possess very different core missions, expertise, structures, norms and doctrine, but they are expected to function in the aggregate – as a team of teams, per se – to achieve integrated actions as would be expected of a traditional organization (Zaccaro, Marks & DeChurch, 2013).

There is currently a significant coordination problem when traditional military staffs work with outside organizations in Complex Endeavors. Often, the mission is constantly changing, new mission partners come and go, and there are a large number of organizations involved. The construct of multiteam systems (from organizational psychology) is useful in representing and analyzing the command and control of a complex endeavor. Of particular interest is when a highly effective and narrowly focused military staff must operate with an external organization that it has not worked with before. While the behavior of individual and groups has been extensively studied, the behavior of teams of teams (multiteam systems) is a new area.

In a complex endeavor with many organizations, a key issue is how to operate effectively. How to build “swift trust” has been proposed as key element. The structure of a Multiteam system can be represented as a social network and analyzed using tools developed for Dynamic Network Analysis. Diversity and the ability to share mental models are other key elements in multiteam systems. In this paper models of trust from the psychological literature are surveyed and then a framework for examining trust in multiteam systems working on Complex Endeavors.

## **1. Introduction**

Operational Command and Control is concerned with accomplishing a mission. Large and complex missions require organizations and equipment. There has recently been substantial research on information technology to support the C2 process, as well as on the best organizational structures to perform C2.

A vexing problem is when organizations are required to work with other organizations to accomplish a mission. This is clearly related to C2, but has many interesting elements that make it complex. There is not a “team” of individuals, but rather a “team of teams”. These teams can be very structured (as in a military organization) or very unstructured (as in a volunteer organization). In this paper I call such “systems” multiteams. This paper is particularly interested in when multiteam systems address Complex Endeavors.

Alberts and Hayes (2007) define Complex Endeavors as “characterized by both the nature of the collection of participants who are working toward a shared purpose and the nature of the effects of interest. Put succinctly, complex endeavors are characterized by a large number of disparate entities that include not only various military units but also civil authorities, multinational and international organizations, non-governmental organizations, companies, and private volunteer organizations. The effects of interest go far beyond military effects to include social, political, and economic effects. The nature of the participants makes the collective action space complex while the multi-domain effects space contains complex interactions among effects of various types.”

Alberts and Hayes (2007) in the same publications said that the state of the art for planning response to Complex Endeavors remains “very immature” and that “the organizations involved have not developed (mutual) perceptions of competence or the trust necessary to plan together and be genuinely interdependent. This, in turn, impacts the willingness and ability to share information and/or rely upon one another.”

There is a notable failure of agencies and organizations that perform Complex Endeavors to work together effectively. This is often attributed to a lack of trust. In this paper I focus on how trust affects multiteam systems – an area that requires multi-disciplinary study. The environment is that of a Complex Endeavor – high stress, high-risk, time-critical and uncertain. The scope of this is given by Tatham & Kovács (2010) who cite the sheer numbers of humanitarian organizations involved in disaster relief. They give as an example that in the UK there are 3,000–4,000 internationally operating humanitarian organizations, and that a recent analysis suggested that over 30,000 such international NGOs exist world-wide (Roberts, 2001). As a result, a disaster can see the arrival of many such organizations into the disaster area leading to huge co-ordination challenges—72 inter-agency co-ordination meetings were held weekly in Banda Aceh (for the 2004 Indian Ocean earthquake and tsunami) alone. It is estimated that over 400 official international NGOs and over 5,000 associated staff were present in Indonesia at this time.

There is a vast and complex literature on trust. The roots of this are in the fields of psychology and the social sciences, but cover every aspect of individuals and teams. And there is a brand new science that is now concerned with trust. This is the study of trust in social networks based in computer science. In this formulation of trust, trust can be measured, evaluated and assessed. However this trust is between individuals and “services” as well as organizations. A reference definition of trust to start out with is “an expectation that the promise of one individual or group can be relied upon by another individual or group”. Many other definitions of trust will be examined in later sections of this paper.

Because of the enormous number of models and theories about trust, this paper will be scoped such that it is concerned only with a limited domain – that of trust as it affects organizations working with other organizations to accomplish an operational mission. Trust is deal with both as an individual trait and at a team level. Trust will be evaluated as it influences team functions like communications and decision-making. Explicitly excluded will be “system trust” – dealing with trusting computer software and hardware.

The approach is to examine existing research in other areas to determine what factors are important in the trust relationship between organizations and also make recommendations on how to develop higher levels of trust.

In this paper I first examine the new concept of multiteams to set the context for the rest of the paper. I then do a survey of the most relevant conceptualizations of trust (mainly from psychology and social networks) and examine the literature on how trust affects organizations in a multiteam setting. I then review the current trust models and construct one applicable for complex endeavors. I conclude with an analysis of how trust can be developed for more effective operations.

## **2. The Context - Multiteams**

In an increasingly complex and dynamic world, ad hoc teams from various organizations and cultural backgrounds must cooperate and collaborate in order to solve difficult problems and accomplish desired ends. Thus, I view cooperative decision making in multiteam systems as the key research topic. Multiteam systems are collectives that collaborate across traditional team and organizational boundaries, as for example, when teams from multiple agencies must cooperate in response to natural disasters. Individual teams in a multiteam system may possess very different core missions, expertise, structures, norms and doctrine, but they are expected to function in the aggregate – as a team of teams, per se – to achieve integrated actions as would be expected of a traditional organization (Zaccaro, Marks & DeChurch, 2013).

Enabling effective multiteam systems is critical across a range of U.S. DoD capabilities contributing directly to distributed Service, Joint, and Coalition missions. There is a large and growing problem in addressing the requirement for U.S. Combatant Command (COCOM) commanders and staffs to extend control and coordination to a much broader spectrum of organizations, both inside and outside the traditional military chain of command. Moreover, the cultural mix and geographical distribution of these staffs are often in continuous flux, which complicates coordination and trust-building during a rapidly changing crisis, such as a Complex Endeavor.

### **2.1 Characterizing Multiteam Systems**

The new construct of multiteam systems requires examining current theories of teamwork along a new dimension. In order to fully understand the underlying cognitive and social processes leading to cooperative activities in multiteam systems, a multi-level approach is needed. Research is needed that considers interactions between individuals, individuals and teams, and teams in a systems context. Key factors are the structure and leadership of both teams and multiteam systems as they evolve over time in response to a changing environment. A key research area is to identify how team cohesion affects multiteam system performance (e.g., increasing team cohesion may not necessarily lead to improved multiteam system performance).

Modeling organizations in Complex Endeavors as social networks representing a multiteam system would allow them to be studied with new tools and new disciplines. Although individual and group decision making have been studied extensively in the social sciences, new tools from

computational social science promise major advances (Lin & Carley, 2003). Simulations can now model teams as complex adaptive systems with much greater rigor than in the past. Advanced social network analysis techniques can be applied both for analysis and intervention in experiments. Further, the interplay of dynamic social, communications, and information networks adds a new dimension to our understanding of collaborative team processes. Social identity theory provides a foundation for modeling many social traits (Hogg, 2014). Also, understanding the global properties of teams as networks can provide new understanding of emergent characteristics: tendencies toward individual, dyadic, and triadic relationships, and the propensity for particular behaviors, such as trust, cooperation, and competitiveness.

## 2.2 Intent in Multiteam Systems

Intent is a key concept in C2. There have been efforts to distinguish between the intent of a Commander (Commander's Intent) and the intent that pertains to a particular operation (Command Intent). In the context of teams "Shared Intent" is intent that is communicated between organizations but not the same. This accommodates the case where two organizations have different but consistent goals. "Common Intent" is when all organizations share the same goal (Hieb, 2015). This is one of the key issues when using the multiteam system paradigm for Complex Endeavors. With a large number of teams in a challenging environment, the issue of developing Common Intent between all of the teams is an unsolved problem. In general decision-making literature the intent can be mapped to a broader goal. However, in the multiteam research there is the concept of "shared mental models" which would accommodate both intent and situational awareness.

As can be seen in the discussion about trust below, much of the friction in Complex Endeavors is due to strong team cohesion of individual component teams. Working on better ways to develop "system" goals vs. individual team goals may be one way to develop trust.

## 3. Defining Trust

The most common definition of trust is an expectation of behavior. Below, a number of widely accepted definitions are given to look at trust from several different viewpoints. This is certainly not a comprehensive survey as there is a huge literature that pertains to a wide range of human activities. Rather, I point to several definitions that are particularly relevant to multiteam systems working in Complex Endeavors.

### 3.1 Trust in Psychology

Most of the psychological definitions of trust go back to the individual. Teams consist of individuals and their characteristics influence trust.

Rotter says "Interpersonal trust is ... an expectancy held by an individual or group that the word, promise, verbal or written statement of another individual or group can be relied upon" (Rotter, 1967). Rotter used this definition to construct an Interpersonal trust scale based on Social Learning theory. This is the most common way to measure trust using Likert-type scales.

The most common definition of trust is that given by Mayer and empathizes vulnerability and interdependence: “Trust is the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party” (Mayer, Davis & Schoorman, 1995).

In the context of examining the role of trust in leadership of teams, Burke et al. (2007) use the definition of trust as “a psychological state comprising of the intention to accept vulnerability based upon positive expectations of the intentions or behaviors of another.” (Rousseau et. al., 1998)

Zolin et al. have done extensive research looking at global virtual firms (particularly in the construction industry). They put trust in a more objective context: “trust is the deciding factor in a social process that results in a decision by an individual to accept or reject a risk based on the expectation that another party will perform to the individual’s expected performance requirements” (Zolin, Fruchter & Levitt, 2000). This is a more operational definition, but still characterizes trust as a social process.

### 3.2 Trust in Social Networks

Sherchan, Nepal & Paris have performed a survey of trust in social networks. They compare and contrast the psychological, social and computer science (social network) definitions. They assert that trust is quite different in social networks from the definitions above. Trust is “operationalized” in current social networks such as Facebook or eBay, and can be measured, calculated and evaluated in discrete terms.

They define aspects of trust as Calculative, Relational, Emotional, Cognitive, Institutional, and Dispositional (Sherchan, Nepal & Paris, 2013). Briefly, *Calculative trust* pertains to the cost/benefit reward in trusting another party. For example, if I expect a profit from trusting another party in an economic transaction. *Relational trust* pertains to building up trust over a period of time with repeated transactions between two parties. *Emotional trust* pertains to feelings of security and comfort from experiences with another party. *Cognitive trust* looks at social capital (Coleman, 1988), which is the richness of interactions between members in a social network. *Institutional Trust* is derived from the support an organization gives that encourages cooperation between members and discourages misbehavior (Lewis & Weigert, 1985). And finally Dispositional Trust is the inherent tendency of persons to trust (such as being a “trusting” or “suspicious” individual).

System trust is “the expectation that a device or system will faithfully behave in a particular manner to fulfill it’s intended purpose” (Yao et al., 2010). This definition of trust is quite different from the ones above as it is not dependent upon social processes. However, it does not apply directly to the area of Complex Endeavors. Similarly, Singh & Bawa give a more objective definition: “Trust is a measure of confidence that an entity will behave in an expected manner despite the lack of ability to monitor or control the environment in within it operation” (Singh & Bawa, 2007).

Sherchan et al. note that two important aspects characterize a trust relationship: risk and interdependency (Sherchan, Nepal & Paris, 2013). In their survey of a wide number of different definitions of trust, they note that these two aspects hold true across all of the disciplines they surveyed.

### 3.3 Swift Trust

Swift trust is a new research area that studies how trust can be developed when people or existing teams need to rapidly form and address a task. This trust needs to be rapidly developed without the benefit of historical experience. Fahy (2012) says one of the most important results from this field is the finding that there is a positive initial interaction at the beginning of the team formation is critical to developing swift trust. If the first interactions are not positive, then mistrust develops.

The characteristics of a system that would need to develop swift trust include the following (Meyerson, Weick & Kramer, 1996):

- Participants with diverse skills are assembled by a contractor to enact expertise they already possess
- Participants have limited history of working together
- Participants have limited prospects of working together again in the future
- Participants often are part of limited labor pools and overlapping networks
- Tasks are often complex and involve interdependent work
- Tasks have a deadline
- Assigned tasks are non-routine and not well understood
- Assigned tasks are consequential
- Continuous interrelating is required to produce an outcome

In their examination of swift trust in logistics, Tatham & Kovács (2010) say “trust is present when the one party has a fundamental belief that the other can be relied upon to fulfill their obligations with integrity and will act in the best interests of the other.” They note that the literature on trust mostly deals with long-term relationships where trust in this context is often seen as the obverse of control.

### 3.4 Risky Trust

Rashid & Edmondson have performed case studies in the construction industry that are particularly applicable to the issue of trust in Complex Endeavors. They stress the importance of procedures, clarity and fairness, and involving leaders in developing trust.

*Risky trust* is defined as “inter-personal and/or inter-organizational trust that exists between parties vulnerable to high economic, legal, or reputational risks ...(and involves) forays into novel collaborative agreements for the execution of high-risk endeavors, where much can do wrong and guarantees of success cannot be provided at the outset.” (Rashid & Edmondson, 2011)

#### 4. A Survey of Trust Models

Having looked at a variety of definitions of trust, we can now look at some of the conceptual models to see the relationships between the various concepts and influencing factors that influence trust and how trust influences them.

Most of the models are behavioral and designed to support experiments in a particular domain. They are difficult to apply in a C2 context or for Complex Endeavors, but it is essential to understand these basic models to take advantage of the theoretical work already done.

##### 4.1 Mayer’s Model of Organizational Trust

Proposed in 1995, this model (shown in Figure 1) is the most influential of the trust models in organizational psychology. It highlights the factors necessary for trust, and factors in risk. Trust is then used to determine an outcome. In addition, the disposition of an individual to trust affects all aspects of the development of trust. And there is a feedback loop so that a successful outcome will reinforce trust and a failure will diminish trust. While Ability can be seen as competence and Integrity can be seen as pertaining to an entity’s reputation, Benevolence is more difficult to map into aspects of Complex Endeavors, but it could be seen as the agreement with common goals expressed, or the motivation of the team to work with other teams.

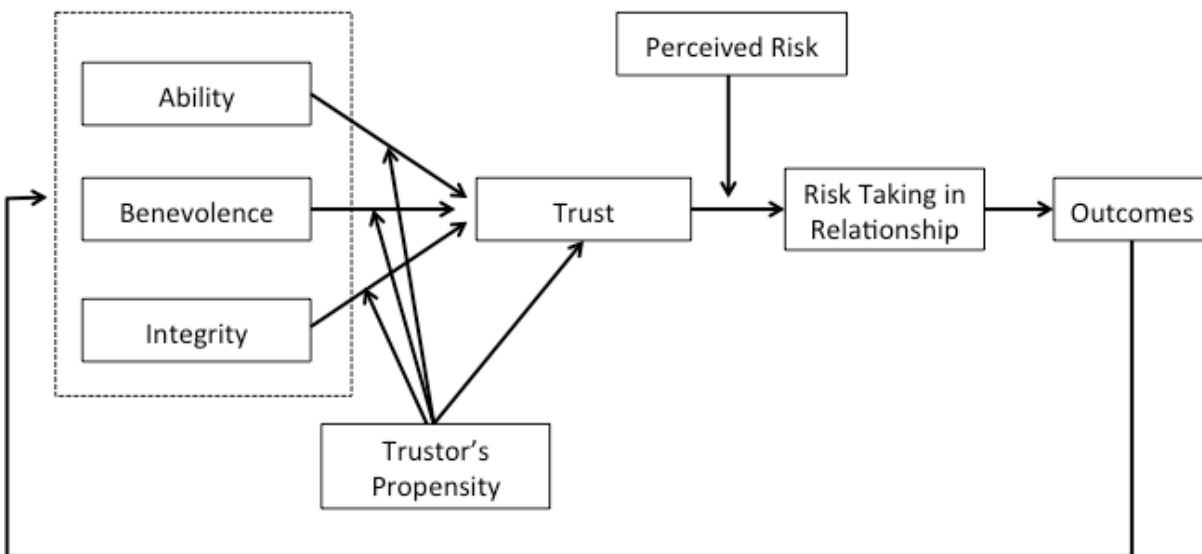


Figure 1 – Mayer’s Trust Model (Mayer, Davis & Schoorman, 1995)



#### 4.2 William’s Model of Group Membership and Initial Trust

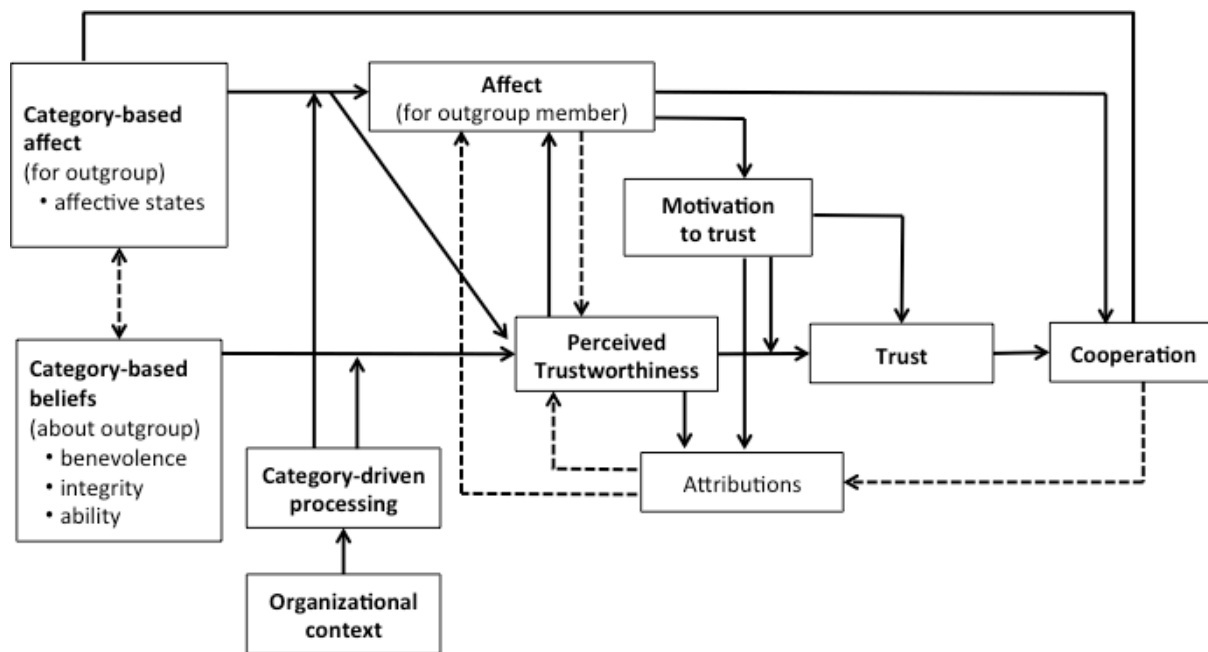


Figure 2 – William’s Model of Group Membership and Initial Trust (Williams, 2001)

Williams actually calls this an Affective-Cognitive Model of Dissimilar Social Group Membership and Initial Trust. In this model (Figure 2), “affect” is how emotions influence judgment (Brief, & Weiss, 2002). It builds on the Mayer Trust model by taking into account emotions and social identity. Rather than trust influencing a general “outcome” this model explicitly models “cooperation”. The model is from the point of view of an individual that belongs to a group (ingroup) in an environment with other groups (outgroups). And feedback is modelled with “attributions” where a trust violation affects multiple parts of the model. Overall, this is a more complicated model that focuses on individual characteristics to give a better prediction of trust in groups, (how ingroup members form beliefs about outgroup members).

#### 4.3 Rashid & Edmondson’s Model of Risky Trust (Rashid & Edmondson, 2011)

The risky trust model shown in Figure 3 stands in sharp contrast to the two preceding models. Since the emphasis is on performing “high-risk endeavors” there are elements to manage risk. There is clearly an emphasis on process to address the effect that adverse behaviors or events can have. Also, there is an explicit representation of intent, similar to that used in C2 contexts. Team behaviors are identified that can increase trust.

There is an extremely large literature on leadership in teams (Burke et al., 2007) and we see leaders represented in this model. If we accept that initial encounters are extremely important, as results from swift trust research cites (Fahy, 2012), then this would be an important part of the leaders’ framing of the team tasks.

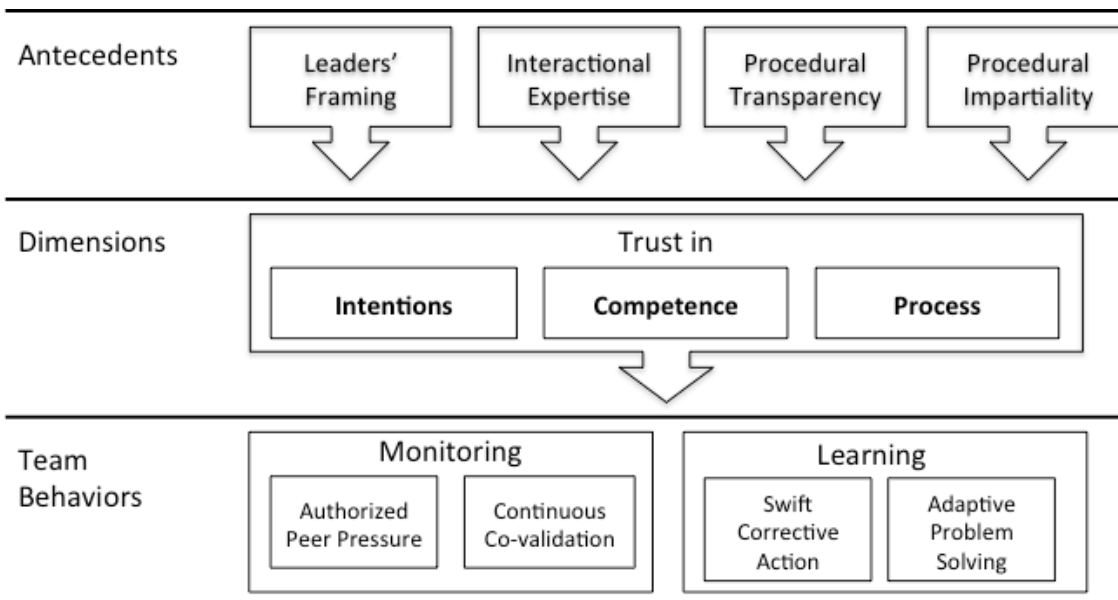


Figure 3 – Model of Risky Trust (Rashid & Edmondson, 2011)

#### 4.4 Analysis

Trust is a difficult concept to work with. The standard models do not cover many of the aspects of trust in Complex Endeavors, especially when represented as multiteam systems. There are common elements in the basic models that apply, but the work in swift trust and risky trust seem to be the most applicable, along with the ability of social network trust to calculate trust.

In his Masters Thesis Fahy (2012) performed a comprehensive study of Interagency Response in New York City. He used the concept of *swift trust* as his basis. This analysis, along with that of *risky trust* by Rashid & Edmondson (2011), have the most in common with trust in Complex Endeavors. Military organizations have a unique mission and culture. Many of the trust models have elements that do not seem to be relevant, such as vulnerability or benevolence. And there are certain aspects of Complex Endeavors that are more constraining than trust between average individuals or groups.

Fahy concentrated on the interaction between the New York City Fire Department and the New York City Police Department. He reviews the impact of training and the Citywide Incident Management System (CIMS).

Fahy reviewed the literature in the area of military, business and virtual organizations and identified the most common variables influencing trust relevant to emergency responders include initial interactions of group members, consistent communication, identifying clear roles, forming a team identity, group leader influence, and organizational culture.

## 5. A Framework for Trust in Complex Endeavors

Taking the innovative work that has been done in swift trust and multiteam systems, a new Framework can be envisioned to study trust in and among teams. The Multiteam Systems for Complex Endeavors (MS-CE) Framework takes some of the concepts from the risky trust model in Figure 3 and from the domain of C2. A key characteristic is the ability to model a Complex Endeavor as a social network and calculate measures of trust on relationships between the teams and actions on the environment.

In MS-CE, I model a team as an “organization” as shown in Figure 4. It has three types of information that it can share with other teams over time: Goals, Situation Awareness (SA) and C2 types of messages (orders, requests, status, etc.) which is called Coordination in the framework. The organization can take action on the environment (to move towards a goal).

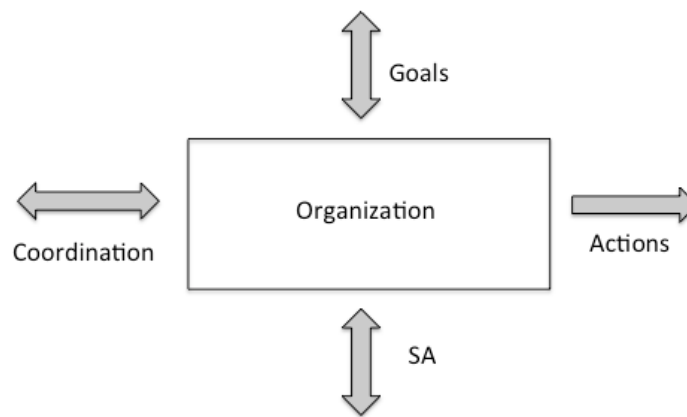


Figure 4 – MS-CE Organizational View

Since the framework is modeling a multiteam system, there are an arbitrary number of teams (n) that can potentially interact with one another. Figure 5 presents this framework. Using the social network concept of trust where interactions can be measured and calculated (Li et al, 2008), trust can be a function of the exchanges of the three types of information as well as the actions taken by the organizations. An overall trust measure could give an indication if a multiteam system operating in a Complex Endeavor was in a “high trust” or “low trust” environment. It could also determine which of the types of information was the most effective in building trust.

Trust (Information) = Function ( Goals shared, SA shared, Coordination )

The element of trust relating to interdependence and shared goals comes from the actions the organization takes. If the actions on the environment accomplish a shared goal as opposed to an own goal, then trust is indicated. This requires goals to be explicitly represented and categorized.

Trust (Actions) = Function (Interdependent Actions / Own Actions)

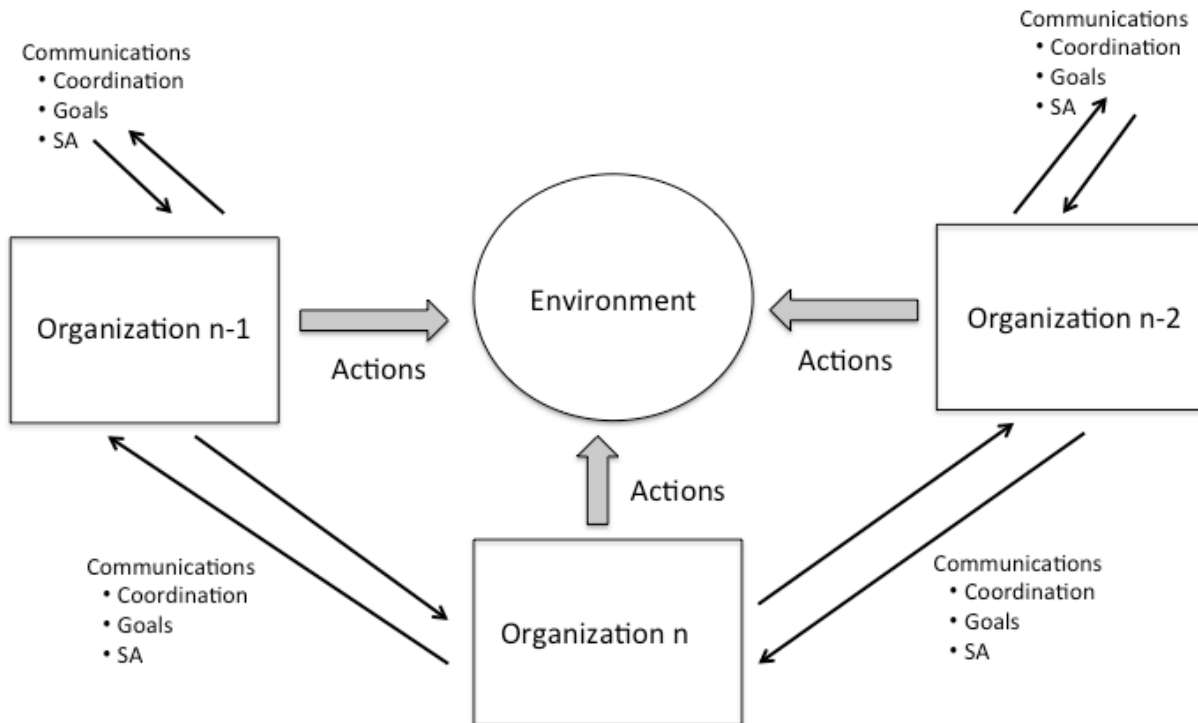


Figure 5 – MS-CE Framework

Either measure would show provide a measure of trust. The Trust (Actions) would be a stronger and more direct measure than Trust (Information). By using social network analysis, the calculation of interactions would be done using existing software and techniques.

Instrumenting a Complex Endeavor to collect this information would be difficult, so limited experiments would need to be conducted first to develop the Framework. However, by integrating the social network concept of calculable trust with a multiteam representation, it would be possible to start to characterize trust in Complex Endeavors.

## 6. Conclusions

In this paper I have surveyed the trust literature to identify those works that apply to the issue of trust in multiteam systems. I have scoped the research to trust between organizations working in a Complex Endeavor. Much of the trust research examined deals with individual trust and does not address the problems seen in current Coalition and Disaster Relief situations. Nor does it deal with multiteam systems.

Several models of trust were examined to determine what model would best apply to Complex Endeavors. A new model, Multiteam Systems for Complex Endeavors (MS-CE) was developed. Future research is to identify how variables impact trust in MS-CE such as: leadership, team cohesiveness, capabilities, organizational structure, and procedures. The work by Fahy (2012) gives some indication of where to begin. The model is designed to determine how trust affects

performance as measured by the achievement of both team goals and shared intent. Thus the model integrates the trust research and the formalizations used in C2.

The outstanding research issue identified is how to measure trust. In the literature, trust in an organizational context is often measured by survey instruments using subjective scales (such as the Likert scale). There is also a temporal element where trust builds or decreases over time that should be investigated. New technologies have created the opportunity to quantify trust and thus create new measurements that were not available previously.

Most important is the anticipated result of addressing this research gap. By better understanding these trust mechanisms, measures (new policies, processes, technologies) could be taken to increase trust in future Complex Endeavors by organizations working in a multiteam system. Such measures can be imagined, but more research is needed, and experiments performed, to determine which are the most effective in developing trust in this context.

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### **References**

- Alberts, D., & Hayes, R. (2007) Planning for Complex Endeavors. Washington, DC: Command and Control Research Program.
- Brief, A.P. and Weiss, H.M. (2002) “Organizational Behavior: Affect in the Workplace”, Annual Review Of Psychology, Vol. 53, pp: 279-307.
- Burke, C. S., Sims, D. E., Lazzara, E. H., and Salas, E. (2007) “Trust in leadership: A Multi-Level Review and Integration”, *The Leadership Quarterly*, Vol. 18, pp. 606-632.
- Coleman, J. S. (1990) Foundations of Social Theory. Cambridge, MA: Belknap Press
- Connaughton, S.L., Williams E.A. & Shuffler, M.L. (2012) “Social Identity Issues in Multiteam Systems Considerations for Future Research” in S. J. Zaccaro, M.A. Marks, , L. DeChurch, (Eds.), *Multiteam Systems: An Organization Form for Dynamic and Complex Environments*. New York: Routledge.
- Fahy, M. J. (2012) Understanding Swift Trust to Improve Interagency Collaboration in New York City, Master's Thesis, Naval Postgraduate School, Monterey, CA. [Dissertation available at <<http://calhoun.nps.edu/public/handle/10945/17362>>]

Hackman, J.R. (1998) “Why Teams Don't Work”, In R.S. Tindale, et al. (Eds), *Theory and Research on Small Groups*. New York: Plenum Press.

Hieb M. R., (2015) “Developing and Communicating Intent for Distributed Staff”. Paper 112 *In Proceedings of the 20th International Command and Control Research Technology Symposium*.

Hogg, M.A. (2014). “From Uncertainty to Extremism: Social Categorization and Identity Processes”, *Current Directions in Psychological Science*, Vol. 23, pp. 338-342.

Lewis, J. D. and Weigert, A. (1985) “Trust as a Social Reality”, *Social Forces* Vol. 63 (4), pp, 967-985.

Liu, H., Lim, E., Lauw, H.W., Le, M., Sun, A., Srivastava, J. and Kim, Y.A. (2008) “Predicting Trusts Among Users of Online Communities: an epinions Case Study”, *Proceedings of the 9th ACM Conference on Electronic Commerce (EC '08)*, pp. 310-319.

Lin, Z. & Carley, K.M. (2003). *Designing Stress Resistant Organizations: Computational Theorizing and Crisis Applications*. Boston: Kluwer.

Mayer, R.C., Davis, J.H. and Schoorman, D.F. (1995) “An Integrative Model of Organizational Trust”, *Academy of Management Review*, Vol. 20 (3), pp. 709–734.

Meyerson, D., Weick, K.E. and Kramer R.M. (1996) “Swift Trust and Temporary Groups” in R.M. Kramer, T.R. Tyler (Eds.), *Trust in Organizations: Frontiers of Theory and Research*. Thousand Oaks, CA: Sage Publications, Inc., pp. 166–195.

Rashid, F. and Edmondson, A.C. (2011) “Risky Trust: How Multi-Entity Teams Develop Trust in a High Risk Endeavor”, *Harvard Business School Working Paper 11-089*.

Rotter, J.B. (1967) “A New Scale for the Measurement of Interpersonal Trust”, (1967) *Journal of Personality*, Vol. 35 (4), pp. 651-665.

Rousseau, D.M., Sitkin S.B., Burt R.S. and Camerer C. (1998) “Not So Different After All: A Cross-Discipline View of Trust”, *Academy of Management Review* Vol. 23 (3), pp. 393–404.

Schoorman, D.F., Mayer, R.C., and Davis, J.H. (2007) “An Integrative Model of Organizational Trust: Past, Present and Future”, *Academy of Management Review*, Vol. 32 (2), pp. 344–354.

Sherchan, W., Nepal, S. and Paris, C. (2013) “A Survey of Trust in Social Networks”, *ACM Computing Surveys*, Vol. 45 (4), Article Number 47.

Singh, S. and Bawa, S. (2007) “Privacy, Trust and Policy Based Authorization Framework for Services in Distributed Environments”, *International Journal of Computer Science*, Vol. 2 (2), pp. 85-92.

Tatham, P., Kovács, G. (2010) “The Application of “Swift Trust” to Humanitarian Logistics”, *International Journal of Production Economics*, Vol. 126, (1), Pages 35-45.

Williams, M. (2001) “In Whom We Trust: Group Membership as an Affective Context for Trust Development” *The Academy of Management Review* Vol. 26 (3), pp. 377-396.

Yao, J., Chen, S., Nepal, S., Levy, D., and Zic J. (2010) “TrustStore: Making Amazon S3 Trustworthy with Services Composition”, *Proceedings of the 2010 10th IEEE/ACM International Conference on Cluster, Cloud and Grid Computing*, pp.600-605, Melbourne, Australia, May 17-20, 2010.

Zaccaro, S. J. Marks, M.A., DeChurch, L. (2012) *Multiteam Systems: An Organization Form for Dynamic and Complex Environments*. New York: Routledge.

Zolin R., Hinds P., Fruchter R., and Levitt R.E. (2000) “Modeling and Monitoring Trust in Virtual A/E/C Teams” *Center for Integrated Facility Engineering (CIFE) Working Paper #62*, Stanford University, <<http://cife.stanford.edu/sites/default/files/WP062.pdf>>.

Zolin R., Hinds P., Fruchter R., and Levitt R.E. (2004) “Interpersonal trust in cross-functional, geographically distributed work: a longitudinal study Information and Organization”, *Information and Organization*, Vol. 14 (1) pp. 1–26.