Shifting Control and Trust: Exploring Implications of Introducing Delegated Decision Support Systems

Stephan Weijman
Royal Netherlands Air Force
s.weijman@mindef.nl

Kenny Meesters
Tilburg University
k.meesters@gmail.com

ABSTRACT

Increased information access and more intelligent information systems enable more operators in an organization to autonomously make decisions. These delegated decision-making opportunities play an important role during critical events, as operators -such as emergency teams and responders- can work independently and rely less on a centralized decision-making structure. Moreover, the operators' perceived level of trust increases while also limiting the coordinators' perceived control.

In this paper, we examine the influence of such systems on the shift in perceived control and empowerment for both operators and commanders. In our experiments, conducted at the Royal Netherlands Air Force, we found that the introduction of these systems indeed affects perceived control and empowerment, specifically as perceived by the coordinator. These factors will play an important role in the effective use of such systems and their transformative effect on an organization. Especially considering the ongoing technical and organizational developments in crisis information management.

Keywords

Command & Control (C2), Information Systems, Delegated decision-making, Empowerment, Trust & Control.

INTRODUCTION

During disasters and other disruptive events organizations, teams and individuals are required to make decisions for example on allocating resources to prevent a further deterioration of the situation and recover from the event. However, during these volatile situations decision makers are faced with a high level of uncertainty limiting their ability to make well-informed decisions best suited to remedy the situation (van den Homberg, Meesters, & Van de Walle, 2014). In these situations, information is a key asset to reduce this uncertainty, for example though improved understanding of the situation (situational awareness), the capacity at their disposal, or the forecasted developments (Comfort, Ko, & Zagorecki, 2004).

While the role and importance of information for effective response to disruptive events has long been recognized, the technological developments in recent years in the field of Information and Communication Technologies have enabled organizations to gather more information than ever before. Even during the early stages of an emergency data can be gathered quickly, using for example remote sensing applications or social media sources (Potts, 2013) (Huang, Chan, & Hyder, 2010). At the same time advancements in technology allow responders to more quickly turn this data into actionable information, employing data-analytics techniques like sentiment analysis (Schulz, Thanh, Paulheim, & Schweizer, 2013) (Ashktorab, Brown, Nandi, & Culotta, 2014), machine learning as well as tools to visualize the data such as GIS for maps (Gunes & Kovel, 2000). These trends combined result in more powerful Decision Support System (DSS) (Imran, Castillo, Lucas, Meier, & Vieweg, 2014).

Technological advancements, such as increased connectivity, mobile technology, and more powerful devices, have created possibilities for people in the field to access, process and use information (Meier, 2012). These DSS are also become increasingly available to a wider range of actors during a crisis, enabling more autonomous operations and decision making. This increased access to information, decision support and subsequent autonomy in decision-making not only empowers the individual but also changes the relationships between actors in an organization (Markus, 1983). During uncertain and volatile situations when organizations need to perform these relationships are put under even more pressure (Van de Walle & Comes, 2015).

Decision-making & organizational structures

Decision-making, organizations and their structures are a common studied aspect in crisis management research. Increasingly scholars critically reflect upon the more traditional constrained 'Command-and-Control' (C2) approach, especially when organizations, communities and agencies are faced with highly complex and uncertain situations that ask for adaptive capabilities (Alberts & Hayes, 2003). The delegation of decision rights, the distribution of information flows and permissible interactions among entities in the organization are angles on which C2 organizations can maneuver. Often depicted as a cube called the "C2 Approach Space" (figure 1), C2 organizations can decide where on the three axis their organization would strive based on its grand strategy (Alberts et. al., 2007) (Alberts & Bernier, 2013). While the a constrained approach provides optimal control for top management to effectively steer operations and deploy assets, this centralized approach can also be a bottleneck as a centralized command may not always have the capacity to digest all information and translate this into specific actions for each asset (Chumer & Turoff, 2006). On the other end of this spectrum we identify 'delegated flexibility'. In contrast with the C2 approach, actors in this setup would experience a high-level autonomy and flexibility to use own information, judgement and experience to make decisions. While such an approach enables more 'in-field' decision-making and reduces the need to gather information in place, it also hinders the efficient usage of scarce material and assets.

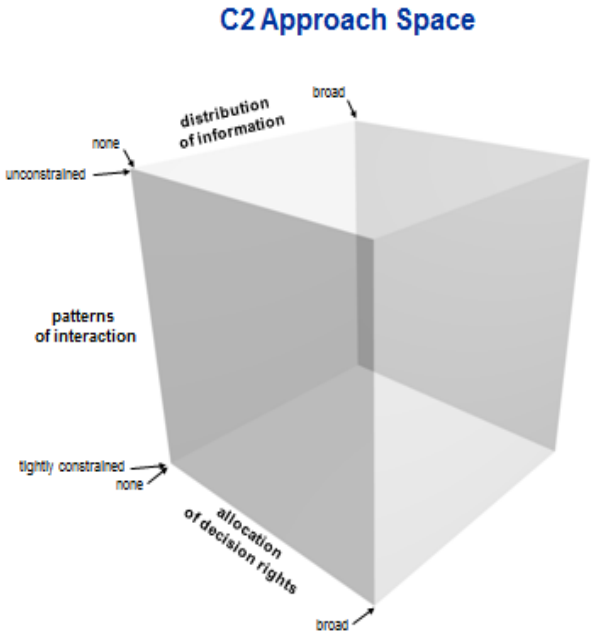

Figure 1. C2 Approach Cube (Alberts et. al., 2007)

An increasingly adopted approach towards crisis management, specifically in relation to information access, sharing and decisions making is the 'Net-centric framework' (Abrams & Mark, 2007). In the Net-centric framework, self-steering parties participate in collective sensemaking by sharing a technological and organizational infrastructure. Net-centric does not limit itself to professional organizations, participation from the public is advocated and captured through the means of Web2.0 platforms (Boersma, Ferguson, Groenewegen, & Wolbers, 2014).Nevertheless, in all its limitations the traditional top-down coordination currently seems to be the primary choice of command structures in crisis response operations (Tierney, Bevc, & Kuligowski, 2006).

Information Systems and Data-driven decision-making

Data analytics has offered possibilities in delegated decision-making that were previously unattainable and has let researchers believe that delegated decision-making is now an effective type of decision-making. Operators with access to data-driven sensemaking tools, they can better interpret the situation and better come to a more effective decision than their coordinators (McAfee, Brynjolfsson, Davenport, Patil, & Barton, 2012). If organizations themselves are more accustomed to decentralized structures and coordinators have accepted the consequential loss of their control, they are more likely to be willing to adopt the self-steering net-centric framework in future response operations. To come to this situation, it is of great importance that response organizations first undergo this transformation themselves. The first step in this process is analyzing and addressing effects of delegated structures to their coordinators and organizational culture. This paper aims to start this analysis by providing an exploration and evaluation method that can be reproduced to find the necessary answers.

Trust, Control and Information

The changes and relationship that the introduction of an information system brings about in terms of organizational culture, hierarchy, trust and control have been highlighted in the seminal article of Markus 'Power, Politics and MIS Implementation' (1983). Today, these changes in the team and organizational dynamics are not only due to the introduction of an information system, but also to the increased availability of information and expertise itself enabling independent decision making. Essentially the introduction of information systems specifically designed to delegate control and empower operators, fundamentally affect the trust & control in the organization and thus the organizational performance (Foster & Flynn, 1984) (Gallivan & Depledge, 2003).

The research presented in this paper therefore focusses on improving the understanding and relationship between the introduction of systems that enable a wider range of actors to autonomously make decisions on the one hand, and the changes in control and trust in command-and-control setting. Specifically, we examine how different the perceived trust and control between interdependent roles in a decision-making process are affected when the access to information and decision support systems changes in organizations and processes that are specifically designed for usage in crisis response settings.

THEORTICIAL BACKGROUND

The research builds on two bodies of research. First, we examine the role of data and information in decision making process. Specifically, in light of ongoing technical and societal developments that not only provide increased availability and access to data and information, but also the advancements in information systems that enables the transformation of this data into information directly supporting or even overtaking some decision-making processes. Next, we examine how increased access to information and information systems enable a wider range of actors to be involved in the decisions making processes.

Data-driven decision-making

Nowadays, many organizations see the benefits from data analytics and aim to work on a fact-based manner (Chen, Chiang, & Storey, 2012). By analyzing data and presenting it through the means of DSSs to their decision-makers, these organizations try to exclude intuition from the decision-making process and focus more on facts in pursuit of better organizational results. Also, they hope that by utilizing the vast amount of data, insights can be generated that were not available before (Provost & Fawcett, 2013). According to Watson (2017), the next generation DSSs will be cognitive decision support. In this futuristic view, decisions are automated using artificial intelligence (AI) to make the decision-making continuum devoid of human interaction. However, this will only be possible in areas where the situational complexity can be fully addressed by AI. If this is not the case, some form of human interaction is still required. Furthermore, the insights from data analytics must be properly embedded in work processes and decision-making structures (Gandomi & Haider, 2015). Simply put, insight is only valuable if it reaches the optimal decision-maker. Therefore, data-driven organizations need to address their decision-making structures whilst acknowledging these challenges to fully leverage the benefits of data analytics (McAfee et al., 2012).

Delegated decision-making

One way to do so is to refrain from the classic HiPPO (highest-paid-person's opinion) culture in which decisions are often based on a manager's opinion. In a HiPPO-oriented organization, intuition keeps winning from fact-based evaluation, at least for important decisions (McAfee et al., 2012). Furthermore, as managers often have a more generic base of knowledge rather than expertise in one subject (Austin, Regan, Gothard, & Carnochan, 2013), their interpretation of the DSS's output might not be as comprehensive as that of a subject matter expert (SME). Therefore, decision-making could be transferred to individuals who qualify as a SME on the matter. By delegating the authority to make decisions to SMEs, the requirement of human interaction is fulfilled and with more in-depth knowledge, a better evaluation of the DSS outcome is expected. At the same time, the managers' intuition is excluded from the decision-making process, thus leading to a more impartial process. In case of crisis response, operators can be seen as the situation's SME as they have hands-on knowledge of the situation's nuances. Allowing them to make decisions that are now made by coordinators with the help of a DSS will help the organization as a whole to become more effective. Nevertheless, the delegation of decision-making comes at a price for coordinators as they lose their influence on the process (Malone, 2003) which might not be easy for them if they would remain responsible for their team's output.

Employee empowerment

Delegation of decision-rights, however, has its benefits in regard to employee empowerment. Empowerment is stated by Yukl & Becker (2006) as: "Empowerment involves the perception by members of an organization that they have the opportunity to determine their work roles, accomplish meaningful work and influence important events". Perception is key in this definition, as all factors described are subjective and can differ among multiple people.

Empowerment is therefore a psychological state and includes four aspects according to Spreitzer (1995):

- **Meaning**: the individuals' values are ideals are aligned with the need of one's job content and output.
- **Self-determination**: the individual has the ability to determine how and when one will do one's job.
- **Self-efficacy**: the individual is confident that one is able to do one's job effectively.
- **Impact**: the individual believes one has a significant impact on the work environment.

Empowerment is a set of cognitions shaped by the working environment in which an individual finds oneself (Thomas & Velthouse, 1990). Therefore, empowerment is heavily influenced by the leadership style managers follow. An authoritarian leader may request subordinates to provide one with all the available information, decide on the matter oneself and coordinating consequent actions. As this strongly limits the subordinate's self-determination, one's perception of being empowered declines. On the other hand, a facilitative manager provides subordinates with the right tools, information sources and procedures to come to the best decision on their own. By doing so, both self-determination and self-efficacy are boosted whilst subordinates might feel more valued and necessary in the organization. Furthermore, lower-level decision-making can benefit the quality of decision-making in an organization (Yukl & Becker, 2006).

METHODOLOGY

We expect that the perception of control and empowerment depend on whether one has access to information and is able to act on it. As both control and empowerment are a perception of the operators, an evaluation method is required that allows for the full immersion of the participants in a scenario (Meesters, 2014). This will increase the likelihood of validly measuring the changes in their cognitive states along the evaluation. One particular research method that facilitates this is an experiment. In an experiment, a situation can be simulated without a lot of resources that feels natural to the participants (. Also, it can be controlled and manipulated via several treatments to affect that situation. Furthermore, an evaluation was held with personnel from the Royal Netherlands Air Force (RNLAF). RNLAF personnel is trained to work in a hierarchic C2 environment where rank determines the outcome of a decision-making process. A more net-centric structure may thus be unnatural for them. Consequently, conducting interviews in which they must imagine such a situation would not be feasible. Therefore, we designed an experiment in which information availability and decision-making authority can be controlled (Meesters & Wang, 2020).

Experimental setup

In this experiment, participants were assigned to an organizational role within a hierarchy and a scenario was simulated in which helicopters were assigned to an important mission. In the experiment the participants had to ensure the helicopters were operational and ready to fly, requiring them to provide parts necessary to serve the helicopters and keep them operational. Spare parts could be obtained on-site, or -if not available- from other sites with various priorities. As spare parts and funds are scarce in the RNLAF, the parts must be acquired in the most efficient way whilst not interfering with the helicopters' maintenance and mission planning. They could do so by completing small tasks which culminated in a decision whether or not an item must be ordered with expensive priority or if normal logistic support would suffice. To assist participants in their decision-making process, a DSS was designed that was solely used by the decision-maker to simulate the information availability associated with the decision-making structure. To measure the changes in the relationship between these actors, changes to the prescribed procedure were made. In total, three different workflows were created to simulate centralized, hybrid and decentralized decision-making structures. Each structure was used for 12 minutes and after a short break, followed by another. A full iteration of the experiment consists of three sessions in which all types of workflows are used. By simulating all three types of decision-making structures, participants were confronted with the reality of sensing a lack of control or on the other hand, feeling empowered.

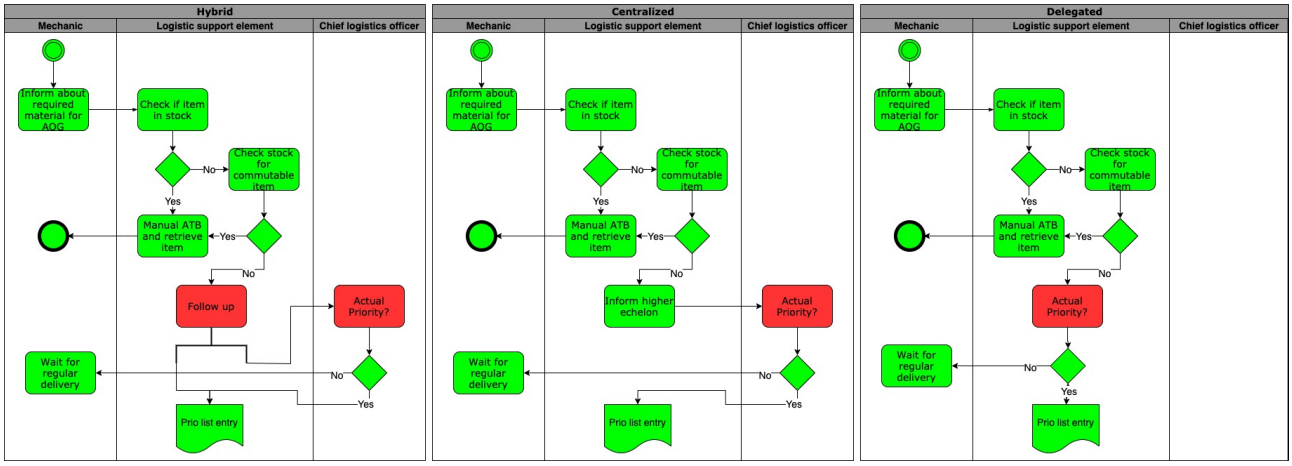

Figure 2. Workflows used, in red the part of the process in which decision-making was triggered

Experiments

Each experiment consisted of three participants who were chosen to have had training and/or the required experience in the respective role of chief logistics officer (coordinator), logistics employee (operator) and technician (customer). After a briefing, participants were handed a role card in which their roles were described and constraints such as a maximum of priority orders were given. To ensure each one understood what their job was, a trial run with one work order was performed. Several workflows, which are presented in figure 1, were created based on actual procedures. At the start of each session of 15 minutes, the participants physically received the workflow that was used in that session, were allowed to study it and keep the print for reference during the experiment. The experiment started for each group with the workflow that mimics the current situation the best, the one classified as hybrid. In this workflow, operators are free to choose whether to present the case to the coordinator or decide its priority themselves. In general, straightforward cases are decided by operators whilst unclear cases are forwarded to the coordinator. Following that, groups randomly used the delegated or centralized version workflow. Each session started by providing the customer with a printed stack of workflows to indicate their workload. For each workflow, one order has to be placed that could be priority, regular or not necessary as the item was available on-site. The distribution of the three possibilities was fixed for each session to ensure reliable comparison between them. The customer relayed the required information from the workorder to the operator and who, depending on the current session, could access a DSS and decide on the item order's priority or had to make a case with the coordinator to order the item with priority. As the DSS did not account for the customer's constraint of only accepting delivery of the item not later than one day before its planned usage in maintenance, operators were challenged to balance operational and financial needs. The DSS simulated the algorithms that are necessary for evaluations with a lookup table in a worksheet.

	A	B
1	**Workorder**	41628693
2		
3	**Items + location**	
4	Item	1000085478
5	Type	Main rotorblade A
6	Location	LSE 301
7		
8	**Delivery**	
9	Lead time	1 day
10	Modality	AOG Chauffeur
11	Recommendation	AOG
12	Motivation	Too late for maintenance on evening December 3

Figure 3. Screenshot of the DSS used in the experiment

Data collection

For this paper, two groups of three participants each were used to test the experimental set up and initial data collection. During the exercise, the participants' perceptions were captured using two questionnaires that were

based on questionnaires in published papers which can be found in table 1. The first questionnaire was held each four minutes and captured their perceived influence (control) on the situation. The second questionnaire was aimed at the participants perception of empowerment and was held after changing the workflow. Concluding, a 20-minute debrief was held with the participants in the form of a group interview after each exercise. During this debrief, participants were asked to reflect on which session they felt most in control, how they felt in specific situations and as a group, how they would design the process if it were up to them. The exercise was designed to mimic a real operation as natural as possible to increase its external validity. This was done by basing the scenario on a situation that actually occurred a few months prior to the exercise and offering tools that closely resemble the tools that are available to the participants in a mission. Furthermore, in the debrief, the participants were asked to reflect on the exercise and how likely they ought it to happen during a mission. Also, the observers noted the number of tasks that were assigned correctly as priority or not as successful completed tasks.

Table 1. Measured constructs

Super construct	Construct
Control (Spector, 1988)	Perceived influence
Empowerment (Spreitzer, 1995)	Meaning
	Competence
	Self-Determination
	Impact

RESULTS

Overall, the sessions in which decision-making was delegated resulted in more successful completed tasks, indicating that delegated decision-making indeed benefits organizational effectiveness. In table 2, the standardized results from the questionnaires are presented. Negative scores reflect that the average score for that setting was N times below the total mean, whereas positive scores are means that are N times above the total mean score. When looking at the scores in italics, they show that when decision-making authority resides with operators, their sense of control and perception of empowerment rises. On top of that, the scores heavily declined in sessions in which decisions were made centralized. For coordinators, the results are in contrast as they benefit from centralized decision-making and are negatively affected by the delegation of decision-rights.

Table 2. Standardized scores for control and empowerment

Workflow	Hybrid		Centralized		Decentralized	
	Control	Empowerment	Control	Empowerment	Control	Empowerment
Coordinator	0.2	-1	**0**	**0**	**-1.6**	**-1.6**
Operator	0.1	0.8	**-0.8**	**0.3**	**0.8**	**0.9**
Customer	0.7	2.7	0	-0.3	0.6	0.6

These results are in line with remarks made during the debrief. For example, control and empowerment was negatively affected in the *decentralized* sessions. When asked about their preferred setting, the coordinators both chose the centralized sessions whereas operators agreed the decentralized sessions were the most beneficial. Furthermore, one of the coordinators added that his role was completely "cut out of the process" and that he completely lost the ability to influence the situation. He did however, chose to install a monitor mechanism in the workflow to be updated on the amount of priority orders to evaluate if his group would exceed the constraint of 20 priority orders. Thus indicating his lack of control. The preference of the delegated decision-making was further addressed by both the operator and customer as they acknowledged that "face to face communication works best in complex situations whereas relaying the situation to a coordinator that was in another room is less effective". Also, when one coordinator ruled multiple times against the wishes of the operator and customer in one of the centralized sessions, the operator became frustrated due to her lack of control and later explained that she was feeling "merely a relay for the coordinator that and was not able to contribute any of her expertise on the matter".

DISCUSSION

Implications resulting from decision-making strategies

For both coordinators and operators alike, the experiment's results show that the perception of control over the situation increases with the ability to make decisions. The opposite has proven to be true as well as their scores are lower in sessions where they weren't allowed to make decisions. This is also reflected by the participant's remarks in the debrief. The "current" workflow allowed the operator to evaluate whether the coordinator was required in that particular decision by themselves.

This evaluation was based on whether it was clear the item has to be ordered with priority or not. The experiment shows that by refraining of HiPPO decision-making and delegating the decision-making authority, the coordinators' perception of control is heavily affected. This reduced perception of control may very well prove to be challenging for C2 practicing organizations who aim to enhance their operations with data analytics. This loss of managerial control is further reflected in the fact that in one iteration of the experiment, the coordinator decided to impose a monitoring mechanism in the process to ensure that his subordinates met the constraints they were given. What is interesting however, is that the operator did not feel controlled by this and even saw the benefit of the mechanism. He was offered complete authority to decide whether he would order an item with priority and only had to report to his coordinator when he did so. The coordinator expressed that he entrusted his personnel to critically assess each situation and that he would be content with the outcome of it. If for some reason, the amount of offered priority orders was not sufficient, the monitoring mechanisms allowed him to identify possible risks to which he could respond in time. By doing so, he changed his leadership style to a more facilitating one which better fits a delegated decision-making structure.

One's perceived empowerment was expected to be higher when decision-making authority was handed over to them as it would improve their perceived ability to influence important situations (Yukl & Becker, 2006). The results show that for this setting, it is indeed the case. On average, the scores of the operators were much higher in the delegated structure than in the centralized structure. In the same light, the coordinators' scores dropped in the delegated version and rose again in the centralized workflow. This shows that employee empowerment could be indeed heavily affected by the authority in decision-making. This has significant impact on the choice to become a data-driven organization that delegates decision-making. For lower-level personnel, this transformation could be brought as beneficial for them as it would help them become more self-determined and have a larger impact on the organization as a whole. From a HR-perspective, fostering delegated decision-making as a data-driven organization can help achieve higher levels of work satisfaction. On the other hand, the coordinators' perception of empowerment drops when they are, as expressed by one of the coordinators in this experiment, "written out of the process". Clearly, the individuals who lose their part of the process need something in return to feel useful again. This could be done by creating a monitoring role for coordinators. Delegating decision-making should therefore not be limited to delegating the authority to make decision from middle management to the SMEs, but should be done at each level as much as possible. In respect to enlarging employee empowerment, delegated decision-making to lower levels of the organization should be strived for as much as possible.

Implications for organizational culture

Organizations, such as humanitarian relief organizations, employ highly skilled workers. This type of personnel is more in need of the individual aspects associated with empowerment to feel needed and valued than "regular" personnel as these people are typified as highly skilled workers who do not just seek monetary rewards but want to have impact (Pearson, 2018). As found in the experiment, operators' control and empowerment scores steeply decline in a centralized environment. This can be explained as their ability to selectively supply information to the decision-maker is now transferred to impartial DSSs whilst control is still exercised top-down, leaving them with little self-determination. However, the coordinators' scores in the experiment are in contrast with those of personnel. This implies that whether an organization decides to centralize or delegate in a data-driven process, one party always loses. This can be countered by the type of leadership styles that are fostered in the organization's culture. If a more facilitating leadership style is advocated rather than the authoritarian style now associated with hierarchic command and control structures, coordinators will get a new purpose in their work. By changing their purpose of excellent operational decision-making by themselves into enabling operators to make the right decision, coordinators can aim to create the best circumstances for their personnel to do so and focus more on procedures and external factors that might limit the operator's ability to perform. However, with the organizational culture of C2 organizations often being intertwined with authoritarian leadership, centralized information streams and top-down decision-making, this may prove to be quite difficult. Nevertheless, it is possible as a perfect example of this leadership style is shown by the one of the coordinators' in his respective delegated session. By creating the circumstances in which operators were able to come to the most effective decision without his interference, he showed that in a traditionally very hierarchic work relation, a culture of facilitating leadership is possible.

One reason why this was possible is due to a certain level of trust in the operator's skills, proven procedures and a sound DSS. This is captured in sociotechnical trust (Fitzhugh, Hoffman, & Miller, 2011) and seems to be crucial for the successful delegation of decision-rights. Organizations can stimulate sociotechnical trust by either creating positive experiences for users and a priori consensus on rule governed activities. Actively including coordinators in the design of new procedures will both benefit their level of sociotechnical trust as well as adhering to their newfound purpose of creating the best possible environment in which their operators can come to the best possible conclusion.

Decision-making structures

Overall, delegated decision-making can be problematic for certain types of organizations. Especially hierarchic C2 structures do not easily accommodate the delegation of decision-rights, as it is in contract with their natural, centralized command structure. Coordinators in organizations that employ these structures are keen on their control and ability to oversee and influence a situation. This is in contrast with the advised delegation of decision-rights. Furthermore, they often employ a more authority/mandate-based approach to decision making which is does not easily accommodate (individual) employee empowerment. Even though operators are expected to come to a more comprehensive evaluation of the DSSs, coordinators will lose some part of their control on the situation and must trust on both the system and operator if their organization seeks to pursue a delegated decision-making strategy. Sticking to the status quo, however, also has its drawbacks for subordinates. Their information gathering role is reduced as this is now taken over by the DSS. With decisions-making still executed top-down, very little challenge remains for subordinates. On the other hand, C2 structures are used for good reasons. They provide clear command structures for both internal and external affairs and arrange responsibility accordingly. Furthermore, the associated hierarchy is often intertwined with organizational culture, which encompasses not only norms and values but also the organizational preferred type of leadership.

Concluding, introducing DSSs to delegate decision-making in order to better fit the requirements for the net-centric framework creates implications for C2 organizations. Doing so will require C2 organizations to not only redesign their current decision-making structures, but also addressing their culture and preferred leadership styles. Coordinators in such organization must therefore be aware of the associated effects of their choice to employ systems that (could) facilitate delegate decision-making.

CONCLUSION

Response organizations have an increasing ability to gather, process and share information. At the same time an increasing number of actors have access to this information. This enables coordinators to better delegate decision-making to operators in order to increase their sense of empowerment. Especially in command-and-control structures, which are often designed to provide a high level of control and reliability through centralization, this can create a dissonance in the organization. In this paper, we examined this interaction between systems and organizational structures in relation to delegated decision-making. While the results are preliminary, the initial findings show indeed that when systems and organizational structures are not aligned, effects include the lost sense of control for coordinators, or a limitation in the operators' autonomy and a lower levels of perceived empowerment. Organizations moving forward and taking advantage of systems that provide information directly to operators and enable more autonomous decision-making, need to be consider the own organizational structures and culture. Especially for C2-type organizations a careful examination of the system, organization and people is required to avoid or reduce this dissonance.

Limitations and future research

This exploration has shown that the introduction of delegated decision-making with assisted by decisions support systems indeed affects coordinators perception of control as well as empowerment among operators. This realization is key in the advocated transformation of responders into less hierarchical organizations to fit the requirements of the net-centric framework. As a proof on concept, the experiment presented in this paper was focused on a specific type of response organization (command-and-control, military setting). In order to be able to validly generalize these results, similar experiments should be held at more response organizations. For example, examining if the absence of delegated decisions support systems in a net-centric oriented organization would reveal a similar relationship. Especially as organizations are transitioning towards a net-centric structure, the role and functions provided by an information system should align with this structure and culture. Furthermore, by expanding this scope to other processes in response organizations, a more holistic understanding of the interaction between structures, information systems and perceived control and empowerment can be obtained. Also, the concept of responsibility and accountability is one that cannot be ignored. Hierarchic C2 is organized to account for responsibility via rank. For instance, the injury of a soldier in battle is accountable to his platoon commander who will be held responsible. However, when DSSs assisted decisions are delegated to operators, delegating responsibility and accountability to operators as well may not be feasible or ethical. An argument can be made that most of the input for decision-making is created by the DSS, who in that case should be held (partly) accountable which leads to numerous problems of its own. Certainly, further studies may enlighten this subject.

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