

Organizational flexibility from a network organizational perspective:

A study of central predictors and moderating factors in military contexts

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Abstract

Purpose. This study focuses on organizational flexibility and explores its antecedents, organizational structure and processes, as proposed by network organization theories. The study also explores the possible moderating effects of power distance (Pd) and cultural diversity.

Design/methodology/approach. Using self-report data from three different multinational military exercises and one laboratory experiment, this study explored the relationships between perceptions of flat organizational structure, decentralized processes, and flexibility. The data from each of these studies were analysed both separately and together.

Findings. The analyses revealed that decentralization had the most consistent relationship to organizational flexibility across each of the four studies. Moreover, when the data were analysed conjunctively, significant positive relationships between decentralization and flexibility and between flat structure and flexibility were observed. No moderating effects of Pd or cultural diversity were found.

Practical implications. The results suggest that decentralizing processes and creating flatter hierarchies may contribute to achieving higher levels of organizational flexibility in military organizations.

Originality/value. This research contributes to empirical support for the central theoretical propositions of network organizational literature, including moderating factors that are essential in multinational organizational contexts.

Keywords: Flexibility, flat structure, decentralized processes, network organization, cultural differences.

Introduction

Military organizations typically operate within high-speed, rapidly changing environments that have become increasingly diverse, complex, and multinational in nature (Alberts & Hayes, 2003; Atkinson & Moffat, 2005). Both the country of engagement and the mission to be undertaken can change rapidly and abruptly. For example, operations can range from peace-keeping missions to full war, from desert to urban operation, and from national operations to multinational NATO missions. Furthermore, because military operations affect the well-being of everyone involved in and affected by a mission and influence both political and international relations, there is a need for military organizations to function optimally at all times.

Both military and non-military organizational theorists have advocated that organizations must be adaptable and flexible to meet the demands of rapidly changing and unpredictable environments (Alberts & Hayes, 2003; Atkinson & Moffat, 2005; Englehardt & Simmons, 2002; Volberda, 1998). In fact, flexibility has been identified as a critical factor in organizational excellence for at least three decades (Bahrami, 1992; Krijnen, 1979; Morgan, 1997; Overholt, 1997; Snow, Miles, & Coleman, 1992; Van der Weerd, Volberda, Verwaal & Stienstra, 2012; Volberda, 1998; Zammuto & O'Connor, 1992). A brief overview of the network organization literature in both civilian and military contexts reveals that flexibility is one of the most central tenets of organizational excellence.

Network organization

By the 1980s, market changes and new technological developments created both the need and the opportunity for organizational change, which provided the impetus for new types of organizations to emerge (Snow et al., 1992). Externally, organizations became more specialized and global, and their structures and processes began to change

internally. This new type of organization, coined 'network organization', emerged by the early 1990s as a conceptual and empirical research focus (Arnold, Cooper, & Robertson, 1998; Morgan, 1997; Snow et al., 1992). Snow et al. (1992) described the new network organizations as more dynamic, more flexible, and less dependent on the hierarchical structures and centralized controls that are typical of traditional organizations. Moreover, Morgan (1997), Symon (2000), Hales (2002), and Borgatti and Foster (2003) have described network organizations as structurally flatter (less hierarchical) and more flexible than traditional organizations. Hence, the civilian literature on network organization suggests that both a flat structure and decentralized processes are characteristics of flexible organizations.

Military theory of network organization

Approximately a decade after researchers began to develop network theories within the context of civilian organizations, researchers began to use these ideas and insights as a theoretical foundation for defining and understanding what network organization would mean in national and multinational (e.g., NATO) military organizations (Alberts, Garstka, & Stein, 1999; Alberts, Garstka, Hayes, & Signori, 2001; Alberts & Hayes, 2003, 2007; Atkinson & Moffat, 2005). Even though the terms network centric warfare (NCW) and network enabled capabilities (NEC) have been employed by the US and UK, respectively, NATO network enabled capabilities (NNEC) is the term that is currently employed by NATO for the collective NATO approach to the development of network enabled military organizations (e.g., Bartolomasi et al., 2005). Although the basic ideas from civilian network organization theories are recognizable in the military literature, and statements such as "NCW is about human and organizational behavior" (Alberts et al., 1999: p. 88) are not uncommon, there is a clear trend in military literature, research, and organizations to focus on technological networks rather

than on the human and organizational components of such networks. However, exploiting new technology may be dependent on organizational issues such as flexibility. For instance, Zammuto and O'Connor (1992) found flexibility to be linked to the successful implementation of new technology. These authors revealed that new technology was not adequately exploited in non-flexible organizations. This finding may be crucial because much of the military network perspective is based on the implementation and use of new information and communication technologies. The successful implementation of such technologies requires changes in both organization and technology. Flexibility may be the key organizational feature to fully realize and exploit new technologies. This finding suggests a need for research that focuses on the organizational issues related to flexibility in military organizations. Consistent with the network literature, the term *flexibility* is presently defined as organizational flexibility, which is understood as the ability of an organization to adapt and successfully respond to the complex, unpredictable, and changing demands of its environment (e.g., Hatum & Pettigrew, 2006).

Research on the antecedents of flexibility

The flat structure - flexibility link

Formalization, which is a classic feature of hierarchical organizations, has been understood as an impediment to flexibility (e.g., Englehardt & Simmons, 2002; Volberda, 1999; Zammuto & Krakower, 1991). For example, when information must travel up and down the many levels of a hierarchy, the information becomes increasingly degraded at each level of processing, and the information sharing process becomes increasingly time consuming (Volberda, 1998). In turn, these processes influence the ability to make good, timely decisions and the ability to take action within the available time. These problems are exacerbated when an organization encounters new challenges

and the hierarchy becomes overloaded with greater amounts of information flowing through the levels of the hierarchy before a decision can be made and any action can be taken. Thus, theory suggests that hierarchical organizations are especially inflexible in situations of new tasks and high demand. Consistent with this suggestion, network theories postulate that flat structures provide the foundation for flexibility. Although there is no lack of theoretical work on this issue, there has with few exceptions (Bjørnstad, 2011) been a lack of empirical investigations from both civilian and military contexts to confirm the existence of a positive relationship between flat structure and flexibility. In this study, the term *structure (flat/hierarchy)* is defined as the degree to which an organization is considered to be flat, as opposed to hierarchical, in terms of the number of levels in the organizational hierarchy (e.g., Volberda, 1998). The current research aims to more deeply examine whether flexibility can be predicted by flat structure in military teams and organizations, including moderating factors (see below). It is hence posited that (Hypothesis 1) *flexibility is positively related to flat structure in military teams and organizations.*

The decentralized processes - flexibility link

In their research of two new US biotechnology firms (sample of scientists and managers), Liebeskind, Oliver, Zucker, and Brewer (1996) found that external social networks combined with a change in internal organization, in terms of hierarchies shifting from a command and control mode to a greater support function, may increase organizational flexibility. This change in the functioning of hierarchies may be understood as a decentralization of organizational processes. Zammuto and Krakower (1991) found a similar link between decentralization and flexibility in a study of 334 universities and colleges in the US (sample of trustees, administrators, and chairpersons). Other researchers have provided theoretical explanations for how the decentralization of

decision-making processes lends more flexibility to organizations (e.g., Englehardt & Simmons, 2002; Volberda, 1998). Consistent with this finding, empirical research from a military context (Bjørnstad, 2011) indicated that decentralization was linked to flexibility. In contrast, the work of Hatum and Pettigrew (2006), who examined data that were collected from family businesses in the pharmaceutical and edible oil industries in Argentina (at the strategic level), suggested that centralization rather than decentralization may increase organizational flexibility. In the current study, *processes (decentralization/centralization)* are defined as the degree to which organizational processes are considered to be decentralized or centralized. The terms decentralized and centralized refer to the organizational processes produced by the distribution of power and authority between the top and lower echelons of an organization. Whereas organizational structure is understood as defining the formal structure of an organization, organizational processes are understood as defining how this structure is implemented.

In sum, although most of the evidence suggests a positive relationship between decentralized processes and flexibility, the results are inconclusive. The collection of data in the research presented above from different industries and countries, and at different hierarchical levels suggests that variations in the researched organizational populations may have contributed to the equivocal findings. Additionally, the proposed relationship requires further investigation in military contexts. Hence, there is a need to explore the relationship between flexibility and decentralized processes in military contexts. The current research aims examine whether (Hypothesis 2) *flexibility is positively related to decentralized processes in military teams and organizations.*

Moderating factors

The increasingly multinational nature of both military and civilian organizations, which is also described in network organization theories (Alberts & Hayes, 2003;

Atkinson & Moffat, 2005), suggests that multinationality and culture may be important issues. Indeed, cultural factors at the national level may have contributed to the equivocal results of the research on the relationship between flexibility and decentralized processes presented above. Both cultural differences and cultural diversity may be pertinent to the current research questions. In this study, culture is defined as national culture, which concurs with the current scope and the field of cross-cultural psychology (e.g., Hofstede, 2001; House, Hanges, Javidan, Dorfman, & Gupta, 2004; Inglehart, Basáñez, Díez-Medrano, Halman, & Luijkx, 2004; Schwartz & Sagiv, 1995).

Power distance (Pd) is defined as “the extent to which the less powerful members of institutions and organizations within a country expect and accept power to be distributed unequally” (Hofstede, 1991: p. 28). Cultural differences in Pd influence whether people from different countries are accustomed and prefer to work in more hierarchical and centralized types of organizations or, conversely, whether they are accustomed and prefer to work in flatter and more decentralized types of organizations (e.g., Hofstede, 1991, 2001). Hence, it is suggested that (Hypothesis 3) *Pd moderates the proposed relationships between flat structure and flexibility, and between decentralized processes and flexibility.*

Flat structure and decentralized processes are proposed to promote flexibility. Additionally, flat structure and decentralized processes may contribute to the recognition of additional knowledge and perspectives in a multinational team or organization. Philips and Thomas-Hunt (2007) suggested that a flatter structure increases the ability of an organization to take advantage of group diversity. Taking advantage of group diversity in terms of increasing problem solving ability may confer increased flexibility. This reasoning suggests that (Hypothesis 4) *cultural diversity interacts with the proposed*

relationships between flat structure and flexibility, and between decentralized processes and flexibility.

The organizational context

As suggested by the equivocal findings regarding the relationship between flexibility and decentralized processes presented above, organizational contexts may influence research results. This situation prompts the question of whether different military contexts also yield different results. That is, are any of the above proposed relationships situation-specific or are they generally applicable to military contexts? Hence, we aim to examine whether the results of Hypotheses 1 through 3 can be reproduced in different military contexts.

Method

Design

To explore the proposed organizational relationships of flexibility, including moderators, in different military contexts, we conducted surveys in three field settings and a quasi-experimental laboratory study. This design enables the exploration of the variable relationships in different military organizational contexts — a triangulation of sources aiming to increase generalizability (e.g., Robson, 1993). The survey data collected from each study were used to determine the hypothesized relationships between structure, processes, Pd, and organizational flexibility. Additionally, the quasi-experimental study was designed to test the possibility of a moderating effect of cultural diversity.¹ The data from the four studies were first analyzed separately and then analyzed conjunctively.

In all studies, the participants were volunteers, and all of the information obtained was treated with confidentiality. Because the working language in both the

experiment and the exercises was English, the questionnaires were presented to all participants in English.

Participants and data collection procedures

Study 1 (field study)

In study 1, survey data were collected from the NATO Response Force (NRF) Allied Warrior exercise in 2004 (AW04), representing a military headquarter (HQ) level context. Personnel at the combined joint operations center (CJOC) of the deployed joint task force (DJTF) HQ in AW04 were recruited for our study. Our 28 respondents were from Denmark (1), Germany (2), Greece (3), Hungary (2), Italy (1), Turkey (1), the UK (8), and the US (10). This sample was predominantly military; 96 % of the respondents were military personnel (82 % officers and 18 % other ranks), and 4 % were civilian. Moreover, 82 % of the respondents were male, and 18 % were female. The respondents were recruited based on information provided at a brief during the exercise (the sample size of 28 represented a 100 % response rate of those who volunteered for the study and 31 % of the DJTF personnel). The data were collected at the DJTF toward the end of the AW04 exercise in Verona, Italy. The aim of the exercise was to train and establish the readiness of the NRF. The activities in the DJTF were at the joint level (i.e., including all services: army, navy, and air force) and included pre-mission training, practicing crisis response planning procedures, and establishing the DJTF and command & control (C2) structure in a theatre of operations. The questionnaires were completed on site towards the end of the two-week exercise.

Study 2 (field study)

In study 2, survey data were collected from the NATO winter exercise Battle Griffin 2005 (BG05), representing a military tactical-level context. The sample consisted of 55 respondents (53 Norwegian and 2 Dutch) from an army unit in the BG05 exercise.

The sample size of 55 represented a 60 % response rate. As a result of missing values for two variables, two cases (both Norwegian) were deleted from the sample before the analyses. This sample was purely military in nature (96 % officers and 6 % other ranks). Of the respondents, 91 % were male, and 9 % were female. The survey data were collected during the last part of the BG05 exercise at an intelligence unit in Steinkjer, Norway. This unit represented a new organizational element that was charged with collecting, analyzing, and distributing information during the exercise. This exercise was a classic NATO winter exercise in cold weather conditions.

Study 3 (field study)

In study 3, survey data were collected from the fourth Multinational Experiment exercise (MNE4) in 2006, representing a military HQ level context. The sample consisted of 156 participants in a NATO multinational coalition exercise (MNE4), with a response rate of 84 %. The respondents were from Canada (21), Denmark (23), Finland (7), France (13), Germany (6), Sweden (8), Turkey (23), UK (12), and the US (43). In this sample, 71 % of the respondents were military personnel (100 % officers), and 29 % were civilians. 95 % of the respondents were male, and 5 % were female. The MNE4 was a three-week distributed collaborative exercise that was conducted within each participating nation and at a NATO HQ. In this exercise, the participants were presented with a hypothetical scenario and four vignettes that provided a focused view of selected aspects of a developing pre-crisis situation in a fictitious country. The task for the participants was to work together as a distributed coalition to halt a pre-crisis situation from developing into a war by identifying and assessing a variety of military and non-military interventions. At the end of the exercise, net-based questionnaires were distributed to all participants in the exercise.

The characteristics of studies 1-3

The descriptions of the studies above indicate that there were three different types of organizations in three different settings at three different points in time. In study 1, the organization was an HQ (operational-level) at a regular NATO exercise that was multinational in nature and included all services. In study 2, the organization was at a lower hierarchical level (tactical), and thus focused more on specialized tasks. It was more homogenously composed in terms of the nationality of the personnel and the representation of services (all army personnel). For study 3, the organization was similar to the first study because it pertained to an HQ level and included all services. Additionally, study 3 included a civilian component. In this exercise, the collaboration was also more distributed than in the first two studies.

Study 4 (laboratory study)

The data for study 4 were collected from military officers participating in the experimental series in 2006 and 2007 by employing a computer game environment of a simulated weapons search mission (i.e., SABRE: Warren, Diller, Leung, Ferguson, & Sutton, 2006). A total of 32 experimental game sessions were conducted, and each session included a team of four participants. Cultural diversity represented the experimental manipulation; 24 teams had a culturally homogeneous composition and eight teams had a culturally diverse composition. The four participants in each culturally diverse team were randomly chosen from the five participating countries.

The participants were military officers from Bulgaria (6), the Netherlands (20), Norway (62), Sweden (6), and the US (34). The nationalities that were included were understood to be culturally different on several dimensions, as indicated by cross-cultural research (e.g., Hofstede, 2001; Hoppe, 1990; House et al., 2004; Inglehart, et al., 2004; Schwartz & Sagiv, 1995; Soeters, 1997). 97 % of the participants were male, and

3 % were female. The total sample size was $N = 128$ at the individual level and $N = 32$ at the group level.

In the game scenario, the participants were arranged in a team whose task was to find caches of weapons in a modern urban environment. Team points were accrued by finding the hidden weapons. To complete their mission, the participants had a set of tools to assist them in the game. These tools were scarce to promote cooperation among the players. The team members needed to assemble, share, and analyze information to solve the problems and make decisions regarding how to find the hidden weapons. There was no predetermined manner for the participants to solve their tasks, in either the way that they chose to use the information that they sought or were given, or in how they organized themselves. The latter point indicates how the game lends itself to the study of organizational variations. In sum, the mission and experimental group tasks were complex. According to Hambrick Davison, Snell, and Snow (1998), the tasks can be classified as a hybrid of coordinative, computational, and creative tasks. Communication among the players occurred through a chat function; there was no voice or other modes of communication. A common language, English, was used for all communication. Computerized survey questions followed each game session.

At the beginning of each session, the participants were assigned to a computer and began a game learning session. One person on each team was randomly assigned to be the team leader. At the conclusion of the learning session, the experimental game session began. The duration of the session was exactly one hour.

Measures of organizational structure, processes, and flexibility

In studies 1-3 (field studies), each of the structure, processes, and flexibility variables were assessed using a one-item five-point bipolar measurement scale, as described by Bjørnstad (2011). An additional questionnaire item was included to identify

any perceived differences between the organization in the field studies and the organization in which the participants normally worked. This general item was added to determine the overall perception of change and was intended to indicate whether the specific questions regarding structure, processes, and flexibility were justified. The participants were asked to rate the degree of difference between the exercise organization and their home organization using a three-point scale that ranged from “yes, very different” to “no, no difference”.

In study 4 (laboratory study), the structure, processes, and flexibility variables were assessed using one-item, 5-point bipolar measurement scales similar to those used in the field studies. However, the assessments in the laboratory study were phrased in a non-comparative manner. Thus, the *structure (flat/hierarchy)* variable was assessed by asking the participants to rate the degree to which they perceived the organization as hierarchical or flat. The response choices ranged from “very hierarchic” to “very flat”. The *processes (decentralization/centralization)* variable was assessed by asking the participants to rate the degree to which they perceived the organization as centralized or decentralized. The response choices ranged from “very centralized” to “very decentralized”. The *flexibility* variable was assessed by asking the participants to rate the degree to which they perceived the organization as rigid or flexible. The response choices ranged from “very rigid” to “very flexible”.

The use of different bipolar descriptive scales, rather than the more common Likert-type scales with identical response denominators (agree/disagree), was intended to decrease the risk of common method bias (e.g., Bergkvist & Rossiter, 2007) and to retrieve the same information by posing one question rather than two questions. The univariate characteristics (M and SD) of all of the items that were included in the current study are presented in Tables 1 and 3.

Moderators

Based on information about participants' nationalities, Hofstede's country index scores on *Pd* were employed in the analyses (Hofstede, 1991, 2001). *Cultural diversity* was operationalized as indicating whether the organizations or teams were composed of single or multiple nationalities. In study 4, this variable represented the experimental manipulation. In studies 1 and 3, the organizations were multinationally composed, whereas the organization in study 2 was nationally composed. Cultural diversity was dummy coded (1 = national composition and 2 = multinational composition).

Statistical analyses

To examine the relationships between the variables structure, processes, *Pd*, cultural diversity, and flexibility, we initially conducted separate correlation analyses for each of the studies. The results of these analyses, including the means and standard deviations, are presented in Tables 1 (studies 1-3) and 3 (study 4). Subsequently, hierarchical regression analyses were performed separately for each study to estimate the moderating effects and the unique relationships of the variables to flexibility. First, a regression model with only the independent variables (i.e., structure and processes) as predictors of the dependent variable (flexibility) was estimated (step 1). Next, *Pd* and cultural diversity were entered into the model (step 2), and all main effects were estimated. Finally, the interaction terms between *Pd* and structure and processes (step 3) and between cultural diversity and structure and processes were included in the model (step 4) (Tables 2 [studies 1-3] and 4 [study 4]). A significant increase in the amount of explained variance (R^2) after the inclusion of the interaction terms indicates that the model is improved and hence that moderating effects are present. To avoid issues of multicollinearity and to aid in the interpretation of the results, all independent variables were mean centered before entering them into the regression analyses. Finally, the

individual-level data from all four studies were collapsed into one file and reanalyzed to calculate average estimates for all the studies (Figure 1).

Results

Studies 1-3 (field studies)

The analysis demonstrated that 86 % of the respondents from study 1, 71 % of the respondents from study 2, and 92 % of the respondents from study 3 reported that the exercise organization in which they worked differed to some degree from the organization in which they worked on a daily basis. This finding indicated that the subsequent items regarding perceived differences in organizational structure, processes, and flexibility in the field studies were justified.

Study 1 (field study)

In study 1, the correlation analysis indicated a statistically nonsignificant relationship between the independent variables, structure (flat/hierarchy) and processes (decentralized/centralized) ($p = .430$). The regression analysis revealed a statistically nonsignificant relationship between flat structure and the dependent variable, flexibility, but showed a significant relationship between decentralized processes and flexibility, explaining 45 % of the variance in the flexibility ratings. The latter finding indicates that when the exercise organization was perceived as more decentralized compared with the respondents' previous experience, the exercise organization tended to be perceived as more flexible. Furthermore, the results show that Pd had neither a significant main effect on flexibility nor any moderating effects on the flat structure-flexibility and decentralized processes-flexibility relationships. The results are presented in Tables 1 and 2.

[Insert Table 1 about here.]

[Insert Table 2 about here.]

Study 2 (field study)

In study 2, the correlation analysis revealed a statistically nonsignificant relationship between the independent variables, structure (flat/hierarchy) and processes (decentralized/centralized) ($p = .134$). The regression analysis revealed statistically significant relationships between flat structure and flexibility, and between decentralized processes and flexibility. This result indicate that when the exercise organization was rated as flatter and more decentralized than the home organization, the exercise organization was also rated as more flexible than the home organizations of the participants. Flat structure and decentralized processes explained 26 % of the variance in the flexibility ratings. The results are presented in Tables 1 and 2.

Study 3 (field study)

In study 3, the correlation analysis showed a statistically significant relationship between the independent variables, structure (flat/hierarchy) and processes (decentralized/centralized). The regression analysis revealed statistically significant relationships between flat structure and flexibility, and between decentralized processes and flexibility. These results were consistent with study 2 in that the participants who rated the exercise organization as flatter and more decentralized than their home organization also tended to rate the exercise organization as more flexible than their home organization (these ratings accounted for 24 % of the variance in flexibility). Furthermore, the results show that Pd had neither a significant main effect on flexibility, nor any moderating effects on the flat structure-flexibility and decentralized processes-flexibility relationships. The results are presented in Tables 1 and 2.

Study 4 (laboratory study)

The laboratory study data enabled the analyses to be conducted at both the individual and group levels. For the group level analysis, aggregated mean scores were computed for each of the variables. Consistent with suggestions regarding the use of aggregated scores (e.g., Rousseau, 1985), within-group agreement for the dependent and independent variables was estimated using the r_{WG} coefficient. The structure ratings had an r_{WG} of .58, the processes ratings had an r_{WG} of .61, and the flexibility ratings had an r_{WG} of .70, suggesting a moderate degree of within-group agreement of ratings (LeBreton & Senter, 2007).² For our purposes, a moderate degree of agreement was considered adequate for analyzing the data at the group level (for a discussion, see LeBreton & Senter, 2007). Two of the r_{WG} values were below the conventionally accepted limit of .70. However, Glick (1985) has suggested that values of .60 and above justifies the aggregation of scores in organizational research. Furthermore, our purposes did not depend on the participants having a very similar perception of the organization. Indeed, because previous organizational experiences necessarily vary within the group and affect the current individual perceptions of the organization, some within-group variance is inevitable. The sum of the perceptions at the group level are therefore considered to be informative, even with some within-group variance.

Individual-level analyses

The correlation analysis indicated that the independent variables, structure (flat/hierarchy) and processes (decentralized/centralized), were significantly related. The results of the regression analysis revealed that their relationships with the dependent variable, flexibility, were in the expected direction. Although neither of the two independent variables were significantly related to flexibility at the 5 % level, the amount of variance in flexibility that was accounted for by the two variables collectively ($R^2 = .07$) was significantly different from zero, thus supporting the inclusion of both flat

structure and decentralized processes as predictors of flexibility. A probable explanation for the lack of statistical significance at the 5 % level associated with each individual predictor is the relatively strong correlation between the two predictors. The moderator analyses revealed that neither Pd nor cultural diversity moderated the effects of structure and processes on flexibility. No significant main effects of either Pd or cultural diversity were found, although the latter nearly reached significance. The results are presented in Tables 3 and 4.

[Insert Table 3 about here]

[Insert Table 4 about here]

Group-level analyses

The results from the correlation and regression analyses based on the aggregated averaged scores at the group level ($N = 32$) were similar to the results obtained using the data from the individual-level responses: the independent variables were significantly related, but their ability to predict flexibility was not significant. Moreover, the relationships between flat structure and flexibility and between decentralized processes and flexibility were observed to be slightly stronger, although, the result was further from significance in comparison with the individual-level analysis ($p = .334$ and $p = .298$, respectively). Even though the variables flat structure and decentralization explained 14 % of the variance in flexibility at the group level, the variance accounted for was not significantly different from zero at this level of analysis ($p = .105$). The moderator analyses revealed that neither Pd nor cultural diversity moderated the effects of structure and processes on flexibility. There were no significant main effects of Pd and cultural diversity, although the latter nearly reached significance ($p = .108$). The results are presented in Tables 3 and 4.

Conjunctive analysis of the data from all four studies

As observed in the previous analyses, the relationships between the ratings of structure, processes, and flexibility were in the same direction in both the field studies and the laboratory study (the only exemption being the very weak and nonsignificant relationship between the ratings of structure and flexibility in study 1). This outcome permitted the conjoint analysis of the data from all studies. New regression and correlation analyses were conducted to calculate the average values of the relationships between the variables. The significant coefficients are presented in the model in Figure 1, showing that perceptions of flat structure, decentralized processes, and cultural diversity are related to organizational flexibility, and explain 24 % of the variance in flexibility. Although cultural diversity exerted a significant, negative main effect on flexibility, no significant moderator effects were found.

[Insert Figure 1 about here]

Discussion

The results from the four studies, including both the separate and conjoint analyses of data, lend support to Hypotheses 1 and 2, which proposed that the flexibility of an organization is positively related to flat structure and decentralized processes. The relationship between decentralization and flexibility was the strongest and most consistent relationship observed (Hypothesis 2). Moreover, in three of four studies (studies 1-3), decentralization was found to relate positively to flexibility. Flat structure was found to relate positively to flexibility (Hypothesis 1) in two of four studies (studies 2 and 3). Although there were no significant separate effects of the independent variables (i.e., flat structure and decentralization) in the laboratory study (study 4), there was a significant collective effect (i.e., the regression model that included both independent variables was significant), which was interpreted as being caused by the relatively high intercorrelation between the independent variables. In the laboratory study, the same

trend in the data was also observed at the group level of analysis, suggesting the same relationships at both levels of analysis.

The moderating analyses revealed no effects of Pd on the flat structure-flexibility and decentralization-flexibility relationships that were suggested in Hypothesis 3. This result was obtained when analyzing the studies both separately and conjointly. Hence, contrary to expectations based on cross-cultural studies (e.g., Hofstede, 2001), Pd was not found to influence the current results. Similarly, cultural diversity demonstrated no moderating effects on the flat structure-flexibility and decentralization-flexibility relationships, which were expected based on the theories of Philips and Thomas-Hunt (2007) (Hypothesis 4). However, cultural diversity was found to exert a negative main effect on flexibility when all of the studies were analysed together. This finding suggests that the organizations have not taken advantage of their cultural diversity. Despite the increased problem solving potential of diverse teams, coordination issues and process loss are, however, well-known challenges (Mannix & Neale, 2005).

Implications and future research

The collective findings of this study, based on both field and laboratory empirical data from international military contexts, provide empirical support for two of the most basic tenets of both civilian and military network theories - that is, the links between flatter organizational structures and flexibility and between decentralization and flexibility (e.g., Alberts & Hayes, 2003, 2007; Arnold et al., 1998; Borgatti & Foster, 2003; Galbraith, 2002; Van der Weerd et al., 2012; Volberda; 1998; Zammuto & Krakower, 1991). However, the decentralization variable appears to be more important for achieving organizational flexibility than the issue of flattening hierarchies. Indeed, decentralization might constitute a prerequisite for flexibility. The reason suggested in military network theories (e.g., Alberts & Hayes, 2003; Roman, 1997) is that

decentralization empowers lower organizational echelons to respond to local conditions and increases the availability of information, thus ensuring the ability to make qualified decisions. This co-location of the decision-making and executing parts of an organization ensures that the organization is able to respond swiftly and to adapt in accordance to current demands. Decentralization also makes an increased number of individuals in an organization more accustomed to, and hence more able to, assemble the information needed, assess the situation, and make the decisions. An organization is thus provided with increased flexibility because more people have the ability and knowledge to take responsibility when necessary. Conversely, when only a few central persons possess this ability, the constraints on the range of possible responses increase from both organizational and situational perspectives. Additionally, the need to wait for centralized decisions when circumstances change abruptly may hinder opportunities for adaptive responses – in both kind and time. Ironically, in the era of network enabled capabilities, organizational development in many military organizations does not reflect a conscientious approach to such issues; rather than a decentralization of processes there have been a centralization in many military operational organizations (Bolia, Vidulich, Nelson, & Cook, 2003; Roberts & Smith, 2003; Vego, 2003). The current study results suggest that this trend may have negative implications for organizations' ability to achieve flexibility.

Although empirical support was not found for the proposed moderating effects of Pd and cultural diversity, the analyses revealed a direct negative effect of cultural diversity on flexibility. The dynamic behind this effect could not be uncovered in the current study. Hence, future research should investigate the effects of cultural diversity in military contexts, with a specific focus on moderating and mediating factors.

Increasing this knowledge may aid military organizations in taking advantage of the potential of multinational organizations.

Methodological issues

These results are based on participants' perceptions. The use of the subjective perceptions of participants to draw inferences regarding the characteristics of an organization is a common approach in organizational research, and studies have indicated the appropriateness of self-report measures to describe organizational phenomena (Patterson et al., 2005; Spector, 1994). The collective reality of an organization may be understood as the sum of the realities as perceived by participants (e.g., Patterson et al., 2005). As such, measuring participants' perceptions of organizational structure, processes, and flexibility provide insights into the relationships between the variables of interest in this study.

The interpretation that decentralization and flat structure *predict* flexibility should be made cautiously because the current study relies on cross-sectional data. Thus, the observed relationships do not necessarily reflect causal relationships. Nevertheless, the theoretical and empirical research on which this study is founded supports this interpretation of the analyses (see Alberts & Hayes, 2003; Arnold et al., 1998; Englehardt & Simmons, 2002; Galbraith, 2002; Kvande, 2007; Volberda, 1998; Zammuto & Krakower, 1991).

Some scholars might argue that the single-item measures of processes (decentralization/centralization), structure (flat/hierarchy), and flexibility constitute a weakness in this study. As indicated by Gosling, Rentfrow, and Swann (2003), single-item scales have frequently been found to be less reliable and valid than multi-item scales, at least for the measurement of underlying psychological constructs, such as personality. However, this potential weakness is less problematic with regard to the

measurement of less obscure constructs, such as the perception of organizational phenomena. For such purposes, single-item measures have often been considered the preferable type of measure (Rossiter, 2002). Single-item scales have the advantages of minimizing item redundancy, time for completion, and participant fatigue (Gardner, Cummings, Dunham, & Pierce, 1998), all of which are central concerns in the present study. Wanous, Reichers, and Hudy (1997) successfully tested and employed a single-item measure of job satisfaction and concluded that the use of single-item measures should not be considered a fatal flaw. More recent research has also demonstrated the usability of single-item measures in studies of student ratings of teaching effectiveness, marketing, perceptions of task difficulty, and group norm and in-group identification (Bergkvist & Rossiter, 2007; Jimmieson, Peach, & White, 2008; 2008; Li, Lee, & Solomon, 2007; Wanous & Hudy, 2001).

The current research cross-validated the same variable relationships in four different samples and organizational contexts, including a slight difference in the tools of measurement that were used in the field and laboratory settings. These factors add strength to the findings in terms of replicability and generalizability.

Conclusion

This study demonstrated that both perceived flat organizational structure and decentralized processes were positively related to perceived organizational flexibility as proposed by military and civilian network organization theories. This finding is particularly applicable to the issue of decentralization. When analyzed collectively, the data revealed significant relationships both between decentralization and flexibility and between flat structure and flexibility. These results indicate that decentralizing processes and flattening the hierarchies may contribute to higher levels of organizational flexibility in military organizations. Thus, an important implication for obtaining more flexible

military organizations (compared with those that currently exist) would involve an increased focus on organizational changes in terms of structure and processes.

Although empirical support was not found for the proposed moderating effects of Pd and cultural diversity, a direct negative relationship between cultural diversity and flexibility was identified. This result suggests the need for further research on cultural diversity in military teams and organizations.

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Notes

- 1 – [Because we depended on military academies for recruiting to this study, participants could not be randomly assigned to the experimental conditions, making the design quasi-experimental (e.g., Shadish, Cook, & Campbell, 2002). Participants in both conditions were, however, recruited from the same population (i.e., military academy).]
- 2 – [Calculating the within-group agreement for the moderators was not justified for the following reasons. In terms of cultural diversity, the groups were either culturally diverse or culturally homogeneous. Similarly, there would be perfect within-group agreement in Pd in the culturally homogeneous groups, although very little within-group agreement in Pd in the culturally diverse groups, where the within-group agreement would be low per definition.]

Tables

Table 1. Means, standard deviations, and zero-order correlation coefficients, calculated separately for studies 1-3 (study 1, $N = 28$; study 2, $N = 53$; study 3, $N = 156$).

| | <i>M (SD)</i> | | | 1 | | | 2 | | | 3 | | |
|--------------------------------|---------------|--------------|---------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | Study 1 | Study 2 | Study 3 | Study 1 | Study 2 | Study 3 | Study 1 | Study 2 | Study 3 | Study 1 | Study 2 | Study 3 |
| 1. Structure (flat/hierarchy) | 3.36 (1.16) | 2.58 (0.97) | 3.24 (1.11) | | | | | | | | | |
| 2. Processes (centr./decentr.) | 2.82 (1.19) | 2.68 (1.07) | 3.24 (1.15) | .155 | .206 | .418*** | | | | | | |
| 3. Flexibility | 3.04 (1.17) | 2.98 (1.12) | 3.01 (1.15) | .045 | .383** | .457*** | .671*** | .429** | .360*** | | | |
| 4. Pd | 41.48 (9.96) | 31.26 (1.40) | 43.94 (12.49) | -.257 | — | .110 | -.258 | — | .027 | -.017 | — | .041 |
| 5. Cult. diversity | 2.00 (.00) | 1.00 (.00) | 2.00 (.00) | — | — | — | — | — | — | — | — | — |

Note. All variables have a scale from 1-5 (high scores = flat structure, decentralized processes, and high flexibility). Because the field studies were either from a culturally diverse context only (study 1 and 3), or a culturally homogeneous context only (study 2), the effects of cultural diversity could not be calculated separately for the field studies. Also, because the study 2 sample was culturally homogeneous the effects of Pd could not be calculated separately for study 2 (this is marked with a dash [—] in the table).

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2. Flexibility (dependent variable) predicted by flat structure, decentralized processes, and power distance (moderator 1). Hierarchical regression analyses. Standardized regression coefficients calculated separately for studies 1-3.

| | Step 1 (Main effects IV) | | | Step 2 (+ Pd) | | Step 3 (+ Interaction 1) | |
|------------------------------------------|-----------------------------|---------|---------|------------------|---------|-----------------------------|---------|
| | Study 1 | Study 2 | Study 3 | Study 1 | Study 3 | Study 1 | Study 3 |
| Structure (flat/hierarchy) | -.061 | .292* | .372*** | -.025 | .372*** | -.026 | .372*** |
| Processes (decentralized/centralized) | .680*** | .354** | .204** | .716*** | .204** | .729*** | .218** |
| Power distance (Pd) | | | | .161 | -.006 | .146 | -.009 |
| Pd x Structure | | | | | | -.096 | .027 |
| Pd x Processes | | | | | | .021 | .076 |
| R^2 | .45*** | .26*** | .24*** | .48*** | .24*** | .48** | .25*** |
| ΔR^2 | | | | .03 | .00 | .00 | .01 |

Note. Because the field studies were either from a culturally diverse context only (study 1 and 3), or a culturally homogeneous context only (study 2), the effects of cultural diversity (moderator 2) could not be calculated separately for the field studies. Also, because the study 2 sample was culturally homogeneous the effects of Pd could not be calculated separately for study 2.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3. Means, standard deviations, and zero-order correlation coefficients from study 4, calculated separately at the individual level ($N = 128$) and at the group level ($N = 32$).

| | <i>M (SD)</i> | | 1 | | 2 | | 3 | | 4 | |
|--------------------------------|---------------|--------------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|
| | Ind. level | Gr. level | Ind. level | Gr. level | Ind. level | Gr. level | Ind. level | Gr. level | Ind. level | Gr. level |
| 1. Structure (flat/hierarchy) | 3.34 (1.05) | 3.34 (0.69) | | | | | | | | |
| 2. Processes (centr./decentr.) | 3.59 (1.05) | 3.59 (0.71) | .442*** | .571** | | | | | | |
| 3. Flexibility | 3.66 (0.87) | 3.66 (0.52) | .221* | .332 | .238** | .339 | | | | |
| 4. Pd | 36.27 (8.53) | 36.27 (5.29) | -.001 | .083 | -.042 | -.101 | -.035 | -.091 | | |
| 5. Cult. diversity | 1.25 (0.43) | 1.25 (0.44) | .086 | .132 | -.035 | -.051 | -.151 | -.256 | .373*** | .608*** |

Note. All variables have a scale from 1-5 (high scores = flat structure, decentralized processes, and high flexibility).

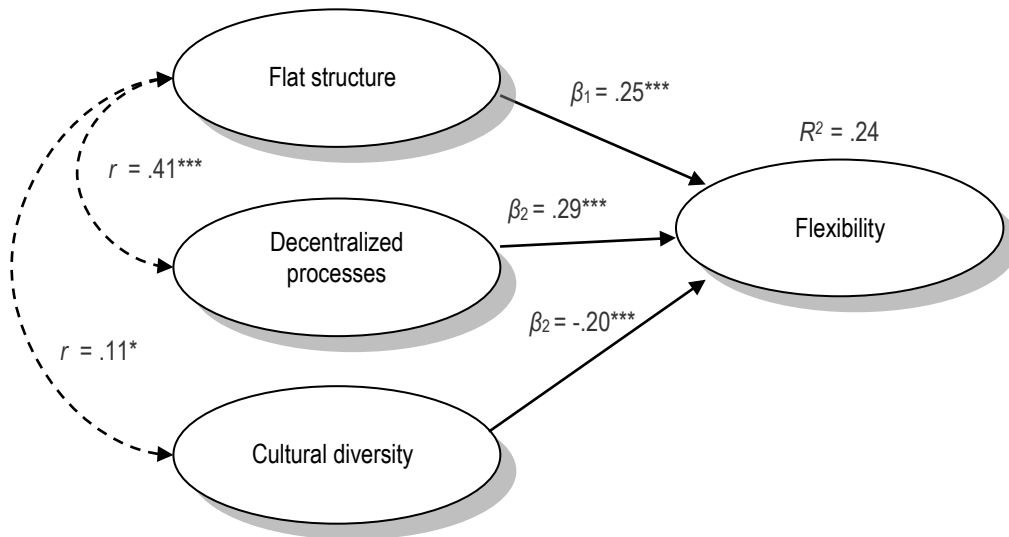
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4. Flexibility (dependent variable) predicted by flat structure, decentralization, power distance (moderator 1), and cultural diversity (moderator 2). Hierarchical regression analyses. Standardized regression coefficients from study 4, calculated separately at the individual and group levels of analysis.

| | Step 1 (Main effects IV) | | Step 2 (+ Pd and diversity) | | Step 3 (+ Interaction 1) | | Step 4 (+ Interaction 2) | |
|------------------------------------------|-----------------------------|--------------|--------------------------------|--------------|-----------------------------|--------------|-----------------------------|--------------|
| | Ind. level | Gr. level | Ind. level | Gr. level | Ind. level | Gr. level | Ind. level | Gr. level |
| Structure (flat/hierarchy) | .144 | .206 | .165† | .266 | .149 | .292 | .142 | .073 |
| Processes (decentralized/centralized) | .174† | .222 | .160† | .181 | .170† | .184 | .171† | .264 |
| Power distance (Pd) | | | .042 | .121 | .042 | .113 | .050 | .144 |
| Cultural diversity | | | -.177† | -.356 | -.177† | -.378 | -.186† | -.444† |
| Pd x Structure | | | | | -.113 | .064 | -.137 | -.362 |
| Pd x Processes | | | | | .025 | -.118 | .005 | -.092 |
| Cult. diversity x Structure | | | | | | | .062 | .491 |
| Cult. diversity x Processes | | | | | | | .075 | -.016 |
| R^2 | .07** | .14 | .10* | .23 | .11* | .24 | .12* | .29 |
| ΔR^2 | | | .03 | .09 | .01 | .01 | .01 | .05 |

† $p \leq .10$. * $p < .05$. ** $p < .01$.

Figures



$N = 365$. ** $p < .001$, *** $p < .001$.

Figure 1. Model predicting flexibility by the variables structure (flat/hierarchy), processes (decentralized/centralized), and cultural diversity. Correlation and standardized regression coefficients are based on data from all four studies.