Person-Team Fit: A Structural Approach

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Abstract

This paper reports the results of an empirical study that examines the interaction between an organization's external fit, expressed in terms of the match between structure and environment, and an organization's internal fit, expressed in terms of the match between structure and the characteristics of its human resources. Using a sample of 107 four-person teams engaged is a command and control simulation, it was discovered that there was no single best structure across different environments or personnel. Functional structures performed best within predictable task environments, whereas divisional structures performed best within unpredictable environments. Also, the effect of individual differences in cognitive ability varied in different structures, in the sense that robust or hybrid structures were particularly demanding in terms of their cognitive ability requirements.

1. Introduction

Many current approaches to individual differences in the applied behavioral sciences have relied on the concept of person-organization fit (Kristof, 1996). Different approaches to person-organization fit exist, but for the most part, the general theme in studies guided by this paradigm is that the relationship between individual differences, on the one hand, and outcomes, on the other, is contingent upon the nature of the organization. Although the idea of person-organization fit seems intuitive, the empirical support for the role of fit in organizations in terms of predicting actual outcomes has not been compelling. In particular, when one eliminates research that inappropriately collapses across various dimensions of fit, and instead focuses only on studies that directly test for the implied interactions across dimensions, these interactions tend to be rare and of marginal explanatory power (Edwards, 1994). Instead, one more often finds that characteristics of people and organizations have main effects on various outcomes, and the size of these main effects dominate any configural effects.
Beyond data analytic strategies, however, there are also three conceptual choices generally made by fit researchers that contribute to the inability to match fit predictions to empirical data. The first of these

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deals with level, in that many studies try to assess fit between individual differences and some organization-level characteristic. Large, complex organizations are difficult to holistically characterize, and there can be large differences between work groups or departments within an organization that betray any notion of "organization-type."

Second, fit researchers have tended to study subjective and perceptually based measures of organizations such as culture and values. This has led to problems associated with aggregation of individual perceptions to the organization level, in particular, interpretive difficulties caused by wide within organization variability in perceptions.

Third, applied psychologists who have worked in this area have focused on the "internal fit" that exists between people and organizations while ignoring the "external fit" between the organization and its environment. That is, even if there is good internal fit between the nature of the people and the nature of the organization, if there is a serious misfit between the organization and the environment, this might neutralize the beneficial effects of a positive internal fit.

The research reported here adopts a fit-based approach to individual differences. However, it avoids perceptually-based and organization-level characterizations. Rather, this study examines the objective characteristics of team-level structure and tests for interactions between different structures and individual differences. This study also considers issues of "external fit" simultaneously with its examination of "internal fit."

Individual differences are described in terms of general cognitive ability, and team structure is defined in terms of resource allocation. More specifically, based upon traditional organization theory (Gerth & Mills, 1946; Wagner, 1998), we examine the role of individual differences in three distinct structures (functional, divisional, and robust) and in two different operating environments (predictable and unpredictable).

1.1 Organizational Structure

Many of the central aspects of an organization's strategy formulation deal with how the work gets done, both in terms of individual job design, as well as the design of organizational structures that link individual jobs to each other and the organization as a whole. An organization's structure needs to be aligned both internally, in terms of who performs the work, and externally, in terms of the environment in which the work takes place. That is, there needs to be an "internal fit," in terms of how the nature of the jobs dictated by the organization's structure matches the characteristics of the job incumbents, as well as an "external fit," in terms of how well the organization's structure matches the environment in which it operates. Structure thus becomes the central link in a three facet model of fit, because it is a key element in terms of both internal and external fit.

An organization's structure reflects a cross-sectional overview of the static relationships between individuals and units that create the outputs. Organizational structure is typically displayed via organizational charts that convey both vertical reporting relationships and horizontal functional responsibilities.

Two of the most critical dimensions or organizational structure are centralization and departmentation. Centralization refers to the degree to which decision making authority resides at the top of the organization as opposed to being distributed throughout lower levels (i.e., authority is decentralized). Departmentation refers to the degree to which work units are grouped based upon functional similarity or on similarity of work flow. Although there are an infinite number of ways to combine centralization and departmentation, two common configurations of organizational structure tend to emerge in organizations. The first type, referred to as a functional structure, employs a functional departmentation scheme with relatively high levels of centralization. High levels of centralization tend to go naturally with functional departmentation because individual units in the structures are so specialized, that members of the units may have a weak conceptualization of the overall organization mission. Thus, they tend to identify with their department, and cannot always be relied on to make decisions that are in the best interests of the organization as a whole.

Alternatively, a second common configuration is a divisional structure, which combines a divisional departmentation scheme with relatively low levels of centralization. Units in these structures act almost like separate, self-sufficient, semi-autonomous organizations, and are organized around different problems, products or geographic regions.

1.2 External Fit -- Matching Structure and the Environment

A fundamental proposition of organizational theory is that no one structure is ideal across all environments. Because of their regional focus and semi-autonomous nature, divisional structures tend to be more flexible. They can detect and exploit opportunities in their environment faster than the more centralized functionally structured organizations. Thus, divisional structures should be most appropriate in unstable, unpredictable environments, where it is difficult to anticipate demands for resources, and coordination requirements are not consistent over time.

On the downside, however, divisional structures are not very efficient because of the redundancy associated with each group carrying its own functional specialists. Also, within divisional structures, there are opportunities for destructive internal competition and "self-cannibalization," where gains achieved in one semi-autonomous unit come at the expense of another unit.

Alternatively, functional structures are very efficient and help support organizations that are trying to minimize costs, because they minimize redundancy across units. Functional structures also eliminate opportunities for destructive internal competition and self-cannibalization because of the strong interdependency among units. These structures tend to be inflexible and insensitive to subtle differences across regions, however. Thus, functional structures should be most appropriate in stable, predictable environments, where the demand for resources can be well-anticipated, and coordination requirements between jobs can be refined and standardized over consistent repetitions of activity.

1.3 Internal Fit -- Matching Structure and Personnel

Different organizational structures create different personnel requirements because the choice of organizational structure influences the nature of individual jobs within the organization. Jobs in functional structures tend to be narrow and highly specialized. These structures promote efficiency by

breaking jobs down into small, simple components that are executed repetitively. Efficiency is also enhanced by eliminating any redundancy of support services, so that jobs are structured into functional clusters where everyone in the cluster is performing similar work.

People working together within these functional clusters learn a great deal about how the function can be used to leverage their skills into small amounts of increased efficiency via continuous, evolutionary improvements. Workers in these structures tend not to see "the big picture," however. The jobs are characterized by little decision making authority or responsibility for managing coordination requirements.

Jobs in divisional structures, on the other hand, tend to be more holistic and complex. Individuals within these structures tend to have greater decision making authority and responsibility for coordination between themselves and others. Flexibility is promoted by giving the units their own support systems and decision making authority to take advantage of local opportunities in regional or specialized areas.

The different nature of jobs created within functional versus divisional structures should have implications for the characteristics of people needed to staff such structures. In particular, the narrow and interdependent nature of tasks nested within functional structures should reduce the role of cognitive ability as a major determinant of performance. On the other hand, the complex nature of tasks that exist in divisional structures should enhance the role of general cognitive ability.

1.4 The Effect of External Fit on Internal Fit

Although the predictions made regarding internal and external fit would seem straight-forward, the interplay between the two types are harder to predict. For example, on the one hand, a lack of external fit might neutralize the beneficial effects of certain individual differences or a good internal fit. That is, if the organization's structure is out of alignment with its environment, the presence of otherwise positive predispositions such as cognitive ability might be eliminated. On the other hand, it might be the case that these same positive predispositions or a positive internal fit can compensate for a lack of external fit. That is, the beneficial effects of certain individual differences may neutralize the harmful effects of a poor external fit.

The research presented here tests these predictions regarding the interactive nature of internal and external fit in laboratory study employing four-person teams working on a dynamic, command and control simulation. In this study, the nature of team's structure (functional versus divisional versus robust) is manipulated between subjects, the nature of the task environment (predictable versus unpredictable) is manipulated within subjects, and individual differences in general cognitive ability are measured. The combined effects of structure, individual and environment on team process and performance is assessed using regression techniques.

2. Method

2.1 Participants

Research participants were 428 undergraduate students at a large Midwestern University who were arrayed into 107 four-person teams. In return for their participation, each received course credit and was eligible to earn one of several cash prizes based upon performance.

2.2 Task

The task used in this study was a modified version of the Dynamic Distributed Decision-Making (DDD) simulation. This computerized task simulates a military command and control task where a team of four decision makers, each of whom controls specialized sub-platforms, needs to enforce a "demilitarized zone" (DZ). This DZ is threatened by an enemy, but is also traversed by friendly ground vehicles and aircraft. The goal of the team is to *identify* the nature of all vehicles and aircraft (i.e., friendly versus enemy) that encroach or enter the DZ, and then *attack* enemy targets that enter the DZ, while not harming any friendly vehicles and aircraft.

There were 16 different types of targets that could enter the geographic space. Three quarters of the targets were enemies and one quarter of the targets were friendly. The enemy targets were further subdivided into three levels that designated the power required to successfully prosecute the intruder (low, moderate and high). Half of all the targets were ground-based and moved slowly, and half were aircraft, which moved quickly.

Finally, three quarters of the targets were unambiguous, in the sense that the nature of the target was known exactly upon identification. That is, identification of the unambiguous targets led the icon on the screen that represented that target to turn from a "?" symbol to a "letter/number" icon that revealed the nature and power of the target. That is, the symbology "A3" identified a target as an enemy aircraft that required a moderate amount of power; "G5" was a ground-based enemy that required a high amount of power, A0 was a friendly aircraft that should be ignored, etc.

The last quarter of the targets, however, were ambiguous in the sense that even after identification, the nature of these targets was unknown to team members a priori. That is, upon identification, the "?" symbol for these targets turned into either a U+, U-. U=, or U#. One of these ambiguous targets was friendly, and the other three were enemies requiring either a low, moderate or high amount of power in order to be successfully attacked. Team members could only learn the nature of these four classes of ambiguous targets via trial and error learning, and the speed with which the team figured this out was central in eliminating errors.

Each team had sixteen sub-platforms with which to patrol and protect the geographic space. There were four each of four different types of sub-platforms (4 X 4), and these varied on four dimensions; speed, power, range of vision, and staying capacity (i.e., how long they could patrol without having to return to base to refuel).

The four types of sub-platforms and their rank ordering on each of the dimensions is shown in Table 1.

Table 1
Strengths and Weaknesses of Various Sub-platforms

	Speed	Power	Vision	Staying
Jet	1st	3rd	2nd	4th
AWACS	3rd	4th	1st	2nd
Helicopter	2nd	2nd	3rd	3rd
Tank	4th	1st	4th	1st

As is apparent from this table, the sub-platforms were highly differentiated with each having its own strengths and weaknesses. There was limited horizontal substitutability among sub-platforms. For example, an enemy target that required a high level of power could only be handled via a Tank, and a high speed enemy aircraft was difficult to manage with anything other than a Jet. Thus, the team members had to use each sub-platform efficiently.

Each of the four team members was responsible for roughly one quarter of the geographic space that needed to be protected (the person's "home region"), and each was given four sub-platforms with which to patrol this area. The person could send any sub-platform anywhere, however, and was free to help out any team member who was in trouble or requested assistance by sending sub-platforms from the home region to another region. The allocation of sub-platforms varied by different team structures, described in more detail below.

2.3 Manipulations and Measures

2.3.1. Team Performance

Since the team's mission was to not allow any unfriendly targets into the DZ, the primary dependent variable was operationalized in these terms. Specifically, the team started out with 40,000 points, and lost one point per second for each unfriendly target that was either parked or passing through the DZ. This was automatically tracked by the simulation and the score was fed back to all participants in the form of a bar graph that started at 40,000. This graph visibly bled down, little by little, for each point lost. Thus, teams could graphically see when they were losing points as well as the speed with which the points were being lost. For ease of interpretation and analysis, these scores were standardized within time periods into z-score form.

2.3.2 Structure: Functional versus Divisional

One third of the teams was arrayed into a Functional Structure where each of the four decision makers controlled one single type of sub-platform. Another third of the teams were configured into a Divisional Structure where each of the four decision makers controlled each of the four different sub-platforms. Finally, a third set of teams was set up as a Robust Structure where each decision maker controlled two different sub-platforms, thus forming two separate North/South Divisions. This was a hybrid structure that, on the one hand, did not fit either target set well, but on the other hand, was not poorly suited for either target set.

2.3.3 Environment: Predictable vs. Unpredictable

The nature of the targets that encroached and entered the DZ varied over the course of the experimental session. For half of each session, all the targets (n = 100) entered from various points along the northwest corner of the screen, and proceeded in a straight line across the space, either stopping in the DZ or exiting at various points along the southeast corner. This set of tasks thus created a Predictable Environment, where the functional departmentation scheme would be most appropriate.

For the other half of the session, however, all the targets (n = 100) entered from any point on the screen randomly determined. Also, rather than proceeding in a straight line, each target changed direction as it approached the DZ so that where the target entered the screen could not be used to predict where it would proceed, stop or exit. This set of tasks created an Unpredictable Environment, where the divisional departmentation scheme would be most appropriate. The order of the two sets of tasks (predictable and unpredictable) were counter-balanced across teams so that the nature of the target set was not confounded with time or order.

2.3.4 Individual Differences

General cognitive ability was measured with the Wonderlic Test. The team score on the factor was operationalize as the average score across all team members.

3.0 Results

3.1 External Fit

To test the hypotheses associated with the external fit between structure and the environment, the team's performance score was regressed on the nature of the environment (predictable versus unpredictable), the nature of the teams structure (functional, divisional or robust), and the interaction between the structure and the environment. This is a repeated measures regression, reflecting the fact that the nature of the environment was a within subjects factor (i.e., each team was observed within each environment).

Table 2 shows the results of this regression. There was no statistically significant main effect for structure, supporting the notion that there is "no one best structure" across all situations. There was however, a statistically significant structure by environment interaction that accounted for 10% of the

within team variance in performance. The nature of this interaction is shown in Figure 1, where it is clear that the effects for structure reverse themselves depending upon the nature of the environment.

Table 2 (n = 214 observations)
Test of Predictions Regarding External Fit

DV = Team Performance	Between Teams	Within Teams
	IVs	
(1) Environment		.094*
(2) Structure	.001	
(3) E x S		.106*
Total	.001	.200*

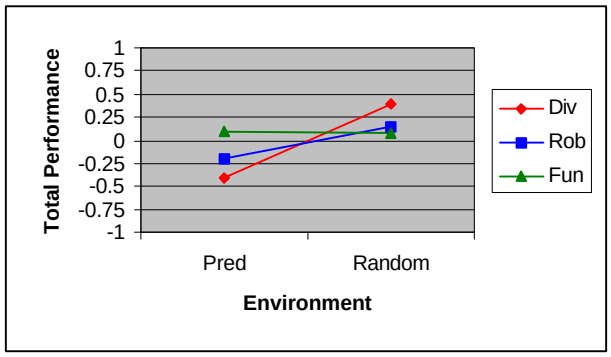

Figure 1.

As predicted, for predictable environments, team performance was higher for teams with functional structures. For teams structured divisionally performance was higher in unpredictable environments. Teams with robust structures performed relatively poorly in both environments.

As a side note, although it did not figure into the hypotheses, there was also a main effect for environment, which explained roughly 10% of the within team variance in team performance. The nature of this effect indicated that team performance was worse in the predictable environment relative to the unpredictable environment. This is probably attributable to the fact that in the predictable environment, the individual with the Northwest Home Region (and to a lesser extent, the Southeast Home Region) is so overloaded with targets that performance suffers to some degree -- even when working with the ideal structure.

3.2 Internal Fit

To analyze the effects for internal fit irrespective of external fit, we examined the relationship between cognitive ability and team performance for people working within different structures across both environments. That is, we regressed team performance on structure, the cognitive ability and then the interaction between the two independent variables. Because this regression does not contain the environment score, this is not a repeated measures regression (i.e., there is single team performance score for each team).

The results of this regression are shown in Table 3. Although there was generally a positive relationship between cognitive ability and team performance, as indicated by the significant interaction, plotted in Figure 2, the nature of this effect varied by structure. Cognitive ability turned out to be most critical in robust structures, and in particular, the combination of a robust structure with low cognitive ability led to the lowest levels of performance regardless of the environment.

Table 3 (n = 76 observations)
Test of Predictions Regarding Internal Fit

DV = Team Performance	Between Teams
IVs	
(1) Structure	.069*
(2) Cognitive Ability	.051*
(3) S X G	.132*
Total	.252*

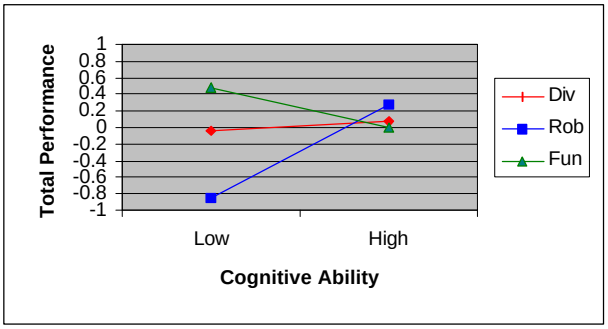

Figure 2.

3.3 The Effect of External Fit on Internal Fit

To see how the effects for internal fit interacted with the nature of the environment, the regressions shown in Tables 2 and Table 3 were repeated separately within each environment. With respect to cognitive ability, the results did not change as a function on the environment, in the sense that the interaction between ability and structure was significant and in the same direction in both environments.

4.0 Discussion

This study used the construct of team structure to bridge notions of internal fit and external fit. In terms of external fit, the results of this study show that no one team structure is best for all environments. Functional departmentation schemes performed best within task environments that were predictable, whereas divisional departmentation schemes performed the best within unpredictable environments. The robust structures examined here seem to capture the worst of both worlds, however, and performed almost as badly as divisional structures in predictive environments, and functional structures in unpredictable environments.

With respect to internal fit, this study found evidence for interactions between individual differences and team structure that were indicative of fit predictions, however the nature of these interactions was not as anticipated. Our a priori expectation was that cognitive ability would be most critical in divisional structures because of the complex nature of the jobs created by such structures. That is, performing the command and control job in the divisional structure forced one to learn the intricacies of four different sub-platforms that differed widely in their strengths and weaknesses. The cognitive demand created by this job seemed much larger than that associated with the job in the functional structure where each team member only needed to manage a single sub-platform.

In reality, however, the role of cognitive ability turned out to be most critical in hybrid or robust structures. Indeed, although these structures performed worse overall relative to the other two structures, this was especially the case when the team was low in cognitive ability. Robust teams that were high in cognitive ability actually performed at levels that were quite similar to that found in divisional or functional structures.

In retrospect, the critical role of cognitive ability in robust structures may be attributable to the fact that at no time during task performance were people in this structure well-matched for their environment. That is, although the changing nature of the task environments meant that both functional and divisional structures were mismatched for half the trials, it also meant that for at least half the trials, they were well-suited for their environment.

The robust teams were never in alignment, however, and the nature of the mismatch changed during the course of the experiment. This created two separate problems in the sense that their structure was too functional in half the trials, and then too divisional for the other half of the trials. Thus, relative to the functional or divisional teams who experienced one type of problem for half the trials, the robust groups experienced two different kinds of problems, and these lasted for the entire duration of the session. This proved devastating for teams that were low in cognitive ability, whereas teams that were high on cognitive ability were at least able to perform adequately under these conditions.

In terms of the interaction between internal and external fit, due to the fact that the robust teams were always mismatched for their environment, it should not be surprising that the negative effects of low cognitive ability were not affected by the nature of the environment. That is, the lack of fit created by having people of low cognitive ability arrayed into robust teams was evident in both environments.

Thus, although the precise a priori predictions regarding cognitive ability did not emerge from this data, the data do support the general theme underlying notions of internal fit. Team structure and individual differences do interact to influence team performance. The data also support the general theme

underlying notions of external fit, that team structure and the nature of the environment interact to influence team performance.

5.0 References

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