Changing Formal and Informal Structure to Enhance Organizational Knowledge

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Resource-based views of the firm (Penrose, 1969; Peteraf, 1993; Rumelt, 1984; Wernerfelt, 1984) argue that imperfectly imitable resources, for example unique human resources and knowledge, are important bases for creating a stable competitive advantage. In this chapter, we investigate the attempts of one organization to enhance its knowledge competencies. We follow the organization for approximately one year, taking advantage of a natural field experiment: a reorganization from a traditional hierarchical structure to a team-based structure. Turning to the literature on knowledge creation and organizational learning, we develop propositions of the ways in which social structures influence organizational learning and the development of knowledge competencies. We use longitudinal data to examine the association between social structure, specifically levels of task-related cohesion and expressive cohesion within teams, and knowledge, operationalized as changes in productivity and product quality.

Our contribution to the literature on organizational knowledge and learning is twofold. First, by emphasizing the important role that social interaction plays in developing knowledge and offering a model of the specific roles played by task-based and expressive interaction, we add depth...
and richness to existing theories. Although we study only one organization (and therefore cannot make claims about the generation of competitive advantage), we provide a detailed look at the steps involved in building knowledge or human-based competencies. Second, we suggest and employ empirical methods that can be used to study the development of knowledge in the firm.

**Organizational Knowledge and Learning**

This section outlines the fundamental assumptions underlying our approach to studying organizational knowledge and learning. First, we follow Cook & Yanow's (1993) action-oriented view of learning, which suggests that performance of a group or organization is the best evidence of an increasing accumulation of organization and task appropriate knowledge. Second, we note that knowledge can take at least three forms: (i) cognitive knowledge in the form of mental constructs and precepts, (ii) skills, and (iii) knowledge as it is embodied in products, well defined services or artifacts (Hedlund, 1994). In this study, we focus on the latter two forms, skills and products, because they are the manifestations of knowledge most closely related to organizational effectiveness.

Third, drawing from theories of the knowledge creation process in firms we recognize that although learning first takes place in individuals' heads, if it is to affect the organization, individually-held knowledge must be transmitted to higher levels, including the small group, the organization and beyond (Simon, 1991; Weick & Ashford, 1996). As Hedlund (1994, p. 75) argues, "Posing the group as an intermediate level allows a more fine grained look at what goes on within the organization. The prominence of small groups, often temporary, in innovation and product development indicates that this is the level at which much of the knowledge transfer and learning take place."

Finally, we adopt a structuralist approach to studying the knowledge transfer and learning process in organizations. Network approaches to studying organizations assume that individuals within an organization do not operate in isolation but develop and work within an informal structure of relationships and interactions (Granovetter, 1992). The informal structure can be observed or measured by examining the interactions across members. The interactions can have various contents, e.g. task-related communication, mutually serving on committees, or going to lunch together.

An informal structure created by any given type of tie does not necessarily mirror the organization’s formal structure, but the two are reciprocally influential, especially as they influence the development of knowledge. Formal organizational structure (that prescribed by the organization chart)
both creates and constrains informal structure or actual interaction. In turn, the informal structure of communication and interaction both generates and constrains the development of knowledge. This process is likely recursive: the formal structure of the organization helps determine the informal structure of interaction; the informal structure of interaction drives learning; in turn, new knowledge and understandings set limits on the extent to which new formal structures are likely to be imposed.

From these assumptions, several questions emerge. First, can firms manipulate this knowledge creation process by altering formal structures in order to enhance organizational effectiveness? Can firms encourage learning and the development of knowledge competencies at the small group level? And second, if they can, what does the process look like? What role does social structure play in enabling one group to learn more than another?

**Can Organizations Facilitate Learning?**

One way organizations can encourage learning, and hence enhance organizational effectiveness, is to recombine currently held knowledge (Kogut & Zander, 1992; McGrath, MacMillan & Venkataraman, 1995). Reorganizing into teams, in essence recombining human resources, creates at least two avenues for learning. First, jobs are often modified. In this case, learning is encouraged by making people stretch into performing new tasks, or performing old tasks in new ways. Second, reorganizing into teams can stimulate learning by encouraging new transfers of knowledge from individuals to the group. The mere suggestion that the team rather than the individual is responsible for the output (and payoff) provides an incentive for the individuals within the team to spread some of their individually-held know-how to the group. Reorganization into teams does not inevitably lead to new knowledge; rather reorganization can enhance organizational learning if it fosters a realignment of the social interaction within the organization. This leads to our first proposition.

**Proposition 1:** Reorganization into teams will increase individual and organizational learning through a realignment of social interaction.

**How is Knowledge Created in Small Groups?**

Learning results as ideas and knowledge are transmitted from individuals to the group and applied to organizational objectives (Simon, 1991). As
individuals interact with others in a newly formed group, they pass on ideas, filter the ideas of others, integrate the approaches of others into their own, and generally act as transmitters, receivers, and integrators of organizational knowledge. In this section, we argue for how different types of interaction lead to different types of learning.

Distinguishing between task-related (or instrumental interaction) and expressive interaction (Brass, 1984; Coleman, 1988), we argue that higher levels of task-related interaction in newly created teams will lead to higher productivity. Group performance research indicates that increased communication is a key factor influencing performance (Katz, 1982). To the extent that a shift to teams opens up new task-related conversations, new learning should result as information about how to do the job more efficiently gets transferred among members of a group.

Proposition 2. Subsequent to a reorganization, higher levels of task-related interaction within a team will result in greater team efficiencies.

But the generation of knowledge sufficiently exceptional to enhance product quality involves a different process. Commitment to the group and to the organization play an important role in developing innovative and creative knowledge in product teams (Nonaka, 1996). Translated into structuralist terms, enhancing quality requires not only that the individuals within the organization communicate about their required tasks, but that they share ideas outside the scope of "normal" task-related conversations. Individuals share more information with friends than with non-friends (Berndt, 1981; Newcomb & Brady, 1982), which may be due to higher levels of contact, greater trust, and the presence of self-disclosure norms typical of close relationships (Roloff, 1987; Argyle & Henderson, 1985). Such expressive interaction generates the group commitment and trust necessary for the development of the knowledge necessary to enhance product quality.

The relationship between expressive interaction and product quality may be even more important during times of structural change. Reorganization is a time of great uncertainty to members of the organization, a time when new objectives may or may not be clear and the methods for achieving them in the newly designed organization are vague. Once expressive ties are established, organizational members may be more willing to take risks with one another and to discuss new ideas that may lead to a better product. This leads to our third proposition.

Proposition 3. Subsequent to a reorganization, higher levels of expressive interaction within a team will result in higher team product quality.
STUDY BACKGROUND

Taking advantage of a natural experiment, we follow one newspaper organization as it altered its organizational routines and structures in order to manage and develop the knowledge of its core human resource, reporters in the newsroom. Literally overnight, reporters were placed into new "topic teams" which allegedly better reflected reader interests than the traditional desks or beats. Intuitively following Chandler's (1962) "structure follows strategy" logic, management hoped that shifting to a team-based production model would democratize content decisions and encourage reporters and editors to think more strategically, making them more innovative and more capable of executing the newspaper's product-market strategy.

The Range is owned by a large, publicly traded newspaper group (the name has been changed to provide confidentiality). Serving a major metropolitan area in the United States, the Range's daily circulation is approximately 130,000, with an additional 20,000 readers on Sunday. While the newspaper faced no direct competition in the area, management was concerned with other competitive media products and the decline of readership penetration (percentage of adult population in the area that subscribes). In the year prior to the reorganization, circulation growth had not kept up with population growth.

Before the reorganization, the executive editor oversaw two assistant managing editors, who, in turn, oversaw the desks and functional departments. The newsroom had four "desks," each comprised of reporters covering an area—metropolitan news, business, features, and general assignment—plus one to three layers of desk editors (supervisors). In addition, there were functional departments—copy editing, art, and photography.

The workflow was sequential across desks and functional departments. Within a desk, the reporter received an assignment from a desk editor, wrote the story with input from the editor, and then passed it back to the editor. When the editor sent the text to the copy department, the story left the reporter and the desk, never to return. Copy editors worked in isolation from the desk as they tightened prose and added headlines. The copy department also included page designers who added graphics and photographs and formatted the article onto the page. Assistant managing editors were then responsible for getting the paper to production by the deadline. Overall, decisions at each step were made independently by whoever was controlling the story at that stage.

The reorganized newsroom is overseen by two "coordinators" who report to the executive editor. The traditional content areas have been modified to focus the reporters on the interests of local readers. Nine new "topic teams" were created. Each team was assigned a specific type of story and point of
view to emphasize. For example, one team was assigned to report on jobs, employment, and work in the metropolitan area, and its charter was to focus more on consumer issues than the economy. The various desk editors have been eliminated and replaced with one supervisory layer, "topic team leaders." The functional departments still exist, but copy editing has been split into two distinct teams—presentation and editing. This reorganization also included a physical move so that the members of each team sit together in the newsroom.

Workflow has been modified to emphasize integration rather than sequential access. Reporters are more involved with the production of the story and are encouraged to work collectively with their team members and functional staff when making decisions about stories. Similarly, but to a lesser degree, functional staff are expected to make their decisions about editing and presentation in concert with reporters and team leaders. Management hoped that these organizational changes would enable reporters to "think more like publishers."

**Design and Data Collection**

The data presented here are part of a larger longitudinal study of organizational change. The methods involved surveying employees in the newsroom, collecting personnel data, and collecting archival data on the articles produced by the newsroom. We surveyed employees four times during the 13 months spanning August 1995 to September 1996: (i) two weeks before the organizational restructuring, which occurred in September 1995, (ii) two months after the change, (iii) seven months after the change, and (iv) one year after the change. The survey was a sociometric questionnaire that asked staff to rate their interactions with every other individual in the newsroom. Archival data on the newspaper product was taken from an electronic database maintained by the newspaper.

Although over 75 people are involved in the newsroom hierarchical structure, we used sociometric data only from members of eight of the primary topic teams, excluding those who operated solely out of satellite offices (each topic team has a color label to provide confidentiality). We excluded one topic team because it only had two people with non-overlapping shifts. The analyses included 31 reporters and 8 team leaders at time one, 29 reporters and 8 team leaders at time two, 29 reporters and 8 team leaders at time three, and 27 reporters and 7 team leaders at time four. Response rates at times one, two, three and four were 94.9%, 86.5%, 89.2% and 91.2%, respectively.
MEASURES

We calculated two dependent variables which measured two of Hedlund's (1994) forms of knowledge. Team productivity, which reflects knowledge in the form of skills, was calculated by taking the total number of articles produced by a team over the two-month period surrounding the survey date and dividing it by the total number of team members. This generates a productivity number that controls for team size and is comparable across teams. (Productivity figures which controlled for the total number and length of the articles in the newspaper and the size of the newspaper resulted in similar findings.)

A second variable, product quality, reflects knowledge in the form of the newspaper product itself. The switch to a team-based production model was supposed to encourage reporters to adopt a new standard of logic of journalism. This new logic, articulated in management's goals at the time of the reorganization, replaces the more insular and traditional journalistic practice of "giving the public what it needs to know" with "giving the public what it wants to see." Our measure of quality taps into the new standards that reporter teams are being asked to learn. Are the articles written for the reader? Do the stories grab the interest of and entertain the reader?

To generate the quality measure, we randomly selected ten articles per team that appeared on the front page of the two main sections in the newspaper (A1 and B1) over the two-month period surrounding each of the survey dates. Two teams, White and Fuchsia, had fewer than ten articles on the front page for one or more of the four time periods so we supplemented a randomly selected subset of A1/B1 pages with randomly selected articles from the appropriate main section or page for the team.

Each article was rated by four independent coders, all of whom were members of the community served by the newspaper. Coders rated each article on seven-point Likert scales in response to five questions. Principal components factor analyses revealed that responses to two of the five questions loaded onto a single factor that was stable across all four time periods: "The article is written to entertain and grab interest (7) or tell facts and disseminate information (1)"; and "The article tells the story in a way that is geared toward readers (7) or just gets the news out on the page (1)". The proportion of variance explained by this factor was 86%, 98%, 80%, and 96% for times one, two, three, and four, respectively. Because of the subjective nature of the rating task and the use of a seven-point scale, perfect agreement across coders was unlikely; coder agreement as measured by pairwise correlation coefficients on these two questions was significant in every case. To produce the final team level measure for product quality, we averaged the four coders' scorers for each article and then averaged each team's scores on the ten articles.
We obtained the independent measures of expressive and task-related interaction patterns from sociometric survey data. Respondents were provided with a list of all newsroom personnel included in the study and were asked to rate each on a seven-point scale indicating how often they talked face-to-face about task-related topics, how often they went to the other person for help, how critical the other person was to their overall productivity, and how often they relied on the other for emotional support. On all but the critical measure, a rating of seven points indicated interaction several times daily, while a rating of one indicated no interaction. For the critical measure, a rating of seven indicated that the other person was extremely critical to their overall productivity, while a rating of one indicated the other as not being at all critical. Across all time periods, the data revealed high associations between task-related interaction, helping interaction and critical work interaction (Chronbach’s alpha = .97 at time one, .97 at time two, .94 at time three, and .93 at time 4). Therefore, we averaged the scores from these three measures into a single measure reflecting task-related interaction. We used the “emotional support” tie as the measure for expressive interaction.

After extracting a matrix for each team on each content tie, we calculated the average level of within-team interaction on the given tie. Within-team cohesion is the sum of the reported levels of interaction between team members divided by the total number of possible ties within the group. This measure reflects how closely tied the members of the team are to one another, where higher scores indicate more frequent interaction among members.

All of our measures are calculated at the team level for each of the four time periods. Note that the teams at time one are fictional, where the “teams” are aggregations of individuals who comprise the actual teams at time two. While the actors knew the teams to which they would later be assigned, at time one they were still working from traditional “desks”.

**ANALYSES AND RESULTS**

We used the propositions developed above to guide our qualitative and quantitative analyses. Proposition 1 was examined by assessing the aggregate changes occurring over the four time periods. Propositions 2 and 3 were examined using qualitative analyses of the data on productivity, product quality, and social ties.

**EFFECTS OF NEWSROOM RESTRUCTURING**

When looking at the newsroom as a whole, Table 8.1 shows that productivity increased after the reorganization. The change from 25.0 articles per reporter during the two-month period at time one to 34.24 articles per reporter at
time two is significant ($p < 0.01$), but none of the increases in productivity after time two are significant.

While productivity across reporters in the study increased sharply right after the reorganization and leveled off, ratings of quality in the news stories show a different pattern. Average ratings of the articles produced by reporters in the newsroom show no significant change after the reorganization.

We also assessed the changes in interaction across all reporters in the teams we studied. The average frequency of both task-related and expressive interaction across these reporters did not increase significantly after the reorganization, as revealed in the last row of Table 8.2. When assessing interaction at the team level, however, a slightly different pattern emerges. Table 8.2 shows that the average levels of within-team, task-based interaction increased significantly from time one to time two (two-tailed $t$-test = 4.13, $p = 0.004$) and then remained constant thereafter. The level of task-related cohesion one year after the change remained significantly higher than the level prior to the change.

Expressive interaction within teams also increased significantly from time one to time two (two-tailed $t$-test = 5.29, $p = 0.001$). The slight decrease at time three was not significant, but the increase in expressive cohesion between time three and time four was marginally significant (two-tailed $t$-test = 1.94, $p = 0.094$). As was the case with task-related interaction, the level of expressive cohesion within teams one year after the reorganization remained significantly higher than the cohesion levels prior to the reorganization (two-tailed $t$-test = 8.75, $p = 0.0001$).

These descriptive analyses reveal that for this organization, restructuring that involved job redesign and the creation of new teams resulted in increased productivity. Our data show that the significant increases in

<table>
<thead>
<tr>
<th>Team</th>
<th>Productivity&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Quality&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 1</td>
<td>Time 2</td>
</tr>
<tr>
<td>Blue</td>
<td>19.14</td>
<td>27.00</td>
</tr>
<tr>
<td>Celadon</td>
<td>24.12</td>
<td>36.40</td>
</tr>
<tr>
<td>Cream</td>
<td>36.63</td>
<td>55.60</td>
</tr>
<tr>
<td>Fuchsia</td>
<td>32.29</td>
<td>33.75</td>
</tr>
<tr>
<td>Red</td>
<td>20.86</td>
<td>25.14</td>
</tr>
<tr>
<td>Sapphire</td>
<td>17.38</td>
<td>32.75</td>
</tr>
<tr>
<td>Turquoise</td>
<td>26.16</td>
<td>32.74</td>
</tr>
<tr>
<td>White</td>
<td>23.38</td>
<td>30.50</td>
</tr>
<tr>
<td>Averages</td>
<td>25.00</td>
<td>34.24</td>
</tr>
</tbody>
</table>

<sup>a</sup>Average number of articles per reporter in a two-month period.<br>
<sup>b</sup>Average article ratings, 1–7 scale.
Table 8.2 Summary of task-related and expressive cohesion data

<table>
<thead>
<tr>
<th>Team</th>
<th>Task-related cohesion (average strength of task ties within team)</th>
<th>Expressive cohesion (average strength of expressive ties within team)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 1</td>
<td>Time 2</td>
</tr>
<tr>
<td>Blue</td>
<td>2.61</td>
<td>5.36</td>
</tr>
<tr>
<td>Celadon</td>
<td>2.95</td>
<td>4.58</td>
</tr>
<tr>
<td>Cream</td>
<td>2.55</td>
<td>6.17</td>
</tr>
<tr>
<td>Fuchsia</td>
<td>6.50</td>
<td>6.00</td>
</tr>
<tr>
<td>Red</td>
<td>1.93</td>
<td>4.04</td>
</tr>
<tr>
<td>Sapphire</td>
<td>1.67</td>
<td>6.00</td>
</tr>
<tr>
<td>Turquoise</td>
<td>3.47</td>
<td>5.00</td>
</tr>
<tr>
<td>White</td>
<td>2.96</td>
<td>4.67</td>
</tr>
<tr>
<td>Within team average (s.d.)</td>
<td>3.08</td>
<td>5.23</td>
</tr>
<tr>
<td>Average across newsroom (s.d.)</td>
<td>(1.50)</td>
<td>(0.78)</td>
</tr>
</tbody>
</table>

Productivity occurring right after the change were sustained over time. Controlling for size of the newsroom, reporters in the newsroom were producing more articles after the change. Our data also show, however, that according to our coders’ ratings, product quality did not change in the year following the reorganization.

Proposition 1 argues that reorganization increases learning through a realignment of social interaction. Our data show task-related interaction and expressive interaction to be fairly constant across time across the entire newsroom. Within-team cohesion after the reorganization is noticeably higher than the average density of ties in the newsroom overall. More importantly, the increase in cohesion among future team members at time one to actual team members at time two suggests that social interaction is realigning as a result of changes in the formal structure. Thus, Proposition 1 appears to be supported. These analyses do not, however, tell us the relationship between social interaction and learning. We turn to this question next.

The Relationship between Social Interaction and Team Knowledge

Proposition 2 asserts that task-related interaction will affect team knowledge as evidenced in production efficiencies. For productivity, we assessed the
pattern of change from one time period to the next. Since we have complete productivity data for each team, statistical significance tests are unnecessary. However, to simplify the categorization of teams' productivity patterns, we considered increases or decreases greater than 20% from one time period to the next to be "significant" changes. (Twenty per cent was a natural cutoff point when the data were rank ordered.) Management had always expected reporters to work as efficiently as possible on their assignments while maintaining the quality of their reporting; thus, a comparison between productivity prior to and after the reorganization is appropriate.

Five teams revealed increases in productivity from time to time two which then leveled off through time four. Of the three remaining teams, one team, Fuchsia, had no change in productivity across all four time periods. Another team, White, showed an increase from time one to time two, no change from time two to time three, and an increase from time three to time four. The final team, Cream, showed an increase in productivity from time one to time two, no change from time two to time three, and a decrease from time three to time four.

To develop descriptions of the teams' task-related interaction patterns we used unpaired \( t \)-tests to assess the significance of the changes in the strength of the dyadic task-related relationships reported by team members. Five of the eight teams showed a significant increase in the strength of task-related ties from time one to time two (Celadon, unpaired \( t \)-test = 2.92, \( p = 0.0059 \); Red, unpaired \( t \)-test = 6.73, \( p = 0.0000 \); Sapphire, unpaired \( t \)-test = 4.82, \( t = 0.0013 \); Turquoise, unpaired \( t \)-test = 2.25, \( p = 0.0316 \); and White, unpaired \( t \)-test = 2.96, \( p = 0.0056 \)). However, for each of these teams, none of the changes past time two was significant. Of the remaining three teams, one team, Fuchsia, had no significant changes in the strength of task-related ties within the team over the four time periods. Another team, Blue, revealed a significant increase in task-related ties from time one to time two (unpaired \( t \)-test = 6.16, \( p = 0.0000 \)) and from time two to time three (unpaired \( t \)-test = 2.87, \( p = 0.0112 \)) but then had a significant decrease from time three to time four (unpaired \( t \)-test = −2.99, \( p = 0.0063 \)). The final team, Cream, had a significant increase in task-related interaction from time one to time two (unpaired \( t \)-test = 6.32, \( p = 0.0002 \)), no changes in task-related interaction from time two to time three, and a marginally significant decrease in task-related interaction from time three to time four (unpaired \( t \)-test = −1.8, \( p = 0.1017 \)).

Table 8.3 provides a summary of the association between changes in task-related interaction and changes in productivity. In six of the eight teams, the entire change pattern for task-related cohesion matches that of productivity. Using each change from one time period to the next as the unit of analysis (as opposed to the entire pattern of change), Table 8.3 also shows that 21 of the 24 possible changes match. Together these results provide support for
TABLE 8.3 Comparison of change patterns: productivity and task-related cohesion

<table>
<thead>
<tr>
<th></th>
<th>Red, Celadon, Turquoise, Sapphire</th>
<th>Blue</th>
<th>Fuchsia</th>
<th>Cream</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>Productivity change pattern</td>
<td>⊤⇒⇒</td>
<td>⊤⇒⇒</td>
<td>⇒⇒⇒</td>
<td>⊤⇒↓</td>
<td>⊤⇒⇒</td>
</tr>
<tr>
<td>Task-related cohesion change pattern</td>
<td>Same</td>
<td>↑↑↓</td>
<td>Same</td>
<td>Same</td>
<td>↑⇒⇒</td>
</tr>
</tbody>
</table>

The symbols represent change patterns from time one to time two, time two to time three, and time three to time four.

Proposition 2. Changes in task-related interaction among team members appear to be positively related to changes in productivity. When task-related interaction increases, productivity increases; when task-related interaction levels off, productivity levels off; and when task-related interaction decreases, productivity decreases. There was no relationship between the change patterns in task-related cohesion and product quality.

As mentioned earlier, an increase in story quality was one of the major thrusts of the organizational change. Not only did management reorganize the newsroom, they also shifted the emphasis of reporting to be more local and more responsive to readers within the metropolitan market. The result was a new definition of a good news story, from one that reported facts and disseminated information to one that captured the attention and interest of the local reader. Changing from a journalistic focus to a customer focus required reporters to take on different story assignments and to learn new, more creative ways of writing. Management hoped that within-team interaction would help reporters to increase the quality of their stories, making them more appealing to readers. Unlike productivity, prior to the time of the reorganization story assignment had not explicitly focused on generating stories that would be geared toward the reader, rendering story content comparisons between time one and the later time periods inappropriate for this analysis. Thus, to assess Proposition 3, we look at patterns of change in our product quality measure and expressive cohesion between times two and four only.

Proposition 3 asserts that increases in story quality will be associated with increases in expressive cohesion. To test this, we compared changes in product quality with changes in the levels of expressive cohesion among teams. We used t-tests from time two to time three and time three to time four to assess the pattern of change in the quality of each team’s product.
For five of the eight teams, ratings on story content showed no significant change between the time immediately following the change and one year subsequent to the change. One team, Blue, showed a marginally significant decrease in product quality from time three to time four (unpaired t-test = -1.78, p = 0.0916). Another team, Celadon, showed a significant decrease in product quality from time two to time three (unpaired t-test = -2.23, p = 0.0385). The last team, White, showed a significant increase in product quality from time three to time four (unpaired t-test = 3.19, p = 0.0051).

We then conducted t-tests across the same time periods to assess the patterns of change in expressive interaction for each of the teams. These analyses revealed that seven of the eight teams showed no significant changes in expressive cohesion. One team, Red, increased its expressive cohesion from time two to time three (unpaired t-test = 2.89, p = 0.0049), but the change from time three to time four was not significant.

These data reveal little association between product quality and expressive cohesion, providing no strong support for Proposition 3. In support of our proposition, however, the greatest positive change in reader oriented content from time two to time four (0.957, unpaired t-test = 1.94, p = 0.0691) was produced by Red, the only team with a significant increase in expressive cohesion during the year after the reorganization.

Understandably, we were unsatisfied with these findings. Contrary to our expectations, only two teams showed any significant increases in product quality once the teams had been formed. (White showed an increase from time three to time four and Red showed an increase from time two to time four). Furthermore, only one team showed any significant changes in expressive cohesion once the teams had been formed. These factors make inferences about the relationship between product quality and expressive interaction problematic.

When originally laying out our propositions, we reasoned that increasing levels of product quality would require trust among team members, the ability to test and question one another, and the willingness to try out new ideas as a team. We argued that increasing levels of expressive cohesion would be positively related to quality. If anything, our data show the negative side of this proposition, namely that without increases in trust over time, quality may suffer.

Our knowledge of the organization led us to question the extent to which members identified with their teams. Some of the teams experienced so much turnover during the year following the reorganization that they likely had a difficult time establishing a strong team identity. We decided to look at the association between turnover and product quality. Using archival data provided by the organization, we classified three teams as having high turnover, those with five or more incidents of entrance or exit in the year
TABLE 8.4 Comparison of change patterns: product quality and turnover

<table>
<thead>
<tr>
<th>Team</th>
<th>Product quality change patterns</th>
<th>Turnover(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Celadon</td>
<td>↓ ⇒</td>
<td>High (8)</td>
</tr>
<tr>
<td>Blue</td>
<td>⇒ ↓</td>
<td>High (5)</td>
</tr>
<tr>
<td>Sapphire</td>
<td>⇒ ⇒</td>
<td>High (6)</td>
</tr>
<tr>
<td>Red</td>
<td>⇒ ⇒</td>
<td>Low (3)</td>
</tr>
<tr>
<td>Turquoise</td>
<td>⇒ ⇒</td>
<td>Low (2)</td>
</tr>
<tr>
<td>Cream</td>
<td>⇒ ⇒</td>
<td>Low (2)</td>
</tr>
<tr>
<td>Fuchsia</td>
<td>⇒ ⇒</td>
<td>Low (2)</td>
</tr>
<tr>
<td>White</td>
<td>⇒ ↑</td>
<td>Low (1)</td>
</tr>
</tbody>
</table>

\(^a\)Time two to time three and time three to time four.

\(^b\)Time two to time four.

following the reorganization. Those with three or fewer incidents of entrance or exit were classified as having low turnover.

**TABLE 8.4** shows a strong association between product quality and turnover in seven of the eight teams. Two of the three teams with falling ratings of product quality (Celadon, time two to time three, unpaired \(t\)-test = −2.23, \(p = 0.0385\); Blue, time three to time four, unpaired \(t\)-test = 1.78, \(p = 0.0916\)) had high turnover. Of the five teams with low turnover, four had flat ratings of product quality. The team with the lowest turnover, White, showed an increase in product quality from time three to time four (unpaired \(t\)-test = 3.19, \(p = 0.0051\)). These findings suggest that turnover is negatively related to the teams’ product quality.

**DISCUSSION AND CONCLUSION**

We began by asking whether firms can manage and grow their core knowledge competencies and, if so, what the process looks like. Our data show that after the structural reorganization, productivity in the newsroom increased while product quality, measured in ratings of how much the individual stories were geared toward the reader, stayed constant. Given that one major goal was to increase the newsroom’s ability to respond to and write for the local reader, the reorganization appears to have been only partially successful. Although the average rating of how much each individual story grabbed the reader was the same one year after the reorganization than it had been prior to the change, the local reader benefited from the change in another way. Controlling for the total number and length of stories in the paper and the number of reporters in the newsroom, our productivity data show that after the reorganization the new
topic teams produced more articles for inclusion in the daily paper. Thus, the newsroom was increasing the overall number of stories targeted toward local readers, replacing stories taken directly from national wire services. The change was successful in this regard.

Our second major question was to ask how knowledge competencies are developed in teams. Specifically, we focused on how newly formed teams are able to create and disseminate knowledge through interaction. We distinguished between two types of knowledge, knowledge about how to do one's current job (skills), which increases efficiency and productivity, and knowledge about how to change one's approach to the job, which results in a more reader-oriented, higher quality product. We also distinguished between two types of interaction, task-related interaction and expressive interaction.

Tying interaction types to these outcomes of knowledge, we proposed and found that new teams which are highly cohesive in task-related connections learned how to be higher producers. We also proposed a positive relationship between expressive interaction and product quality. However, our findings indicate something different. Specifically, we found little or no association between changes in expressive connections and changes in product quality. Additional analyses showed that turnover predicted changes in product quality better than expressive cohesion. High turnover has a negative impact on product quality.

The context of organizational change, specifically the development of new working groups, is a fundamental factor in these findings. Knowledge may develop in very different ways in a stable system than it does after a major reorganization. As new teams come together, task-related interaction helps members coordinate and accomplish their tasks as efficiently as possible. This effect may stabilize as the team begins to rely on accepted routines for accomplishing its objectives. As the team matures and comes to fully "know" its required tasks, the learning resulting from initially high levels of task-related interaction may be formally incorporated into the way the team meets its productivity goals and the effects of additional interaction may be minimized.

We assumed that increases in expressive ties within a newly formed team would also have a positive effect on a team's knowledge, in this case knowledge that is embodied in a more reader-oriented product. Instead we found that within-team turnover may provide an alternative or complementary explanation for differences across teams. Turnover may influence the development of knowledge in at least two ways. First, it could alter the aggregate level of task-specific knowledge in a team (e.g. if reporters new to the area replace more seasoned reporters). Second, turnover may also impede the development of group identification and trust. We suspect that movement in and out of a team destabilizes the existing social structure of the group and
threatens group identity. New members must be assimilated, and departing members leave holes in the social structure of the group. Future research within organizations should attempt to examine the relationship between turnover, the skill base of team members, expressive interaction, the development of group identity and trust, and the development of knowledge.

We undertook this study to see if an organization could increase its effectiveness through changing its structure and to see what role relationships might play in the development of knowledge competencies in teams. Viewed in one light, our data could be interpreted as revealing the classic tradeoff between quantity and quality. Given that management desired increases in both, we believe that the organization’s inability to improve product quality could also have stemmed from the design of the change effort, factors that affected all of the teams in this organization equally. Research examining work teams argues that team performance and learning are facilitated by including specific and measurable team goals that are linked to strategic objectives, information systems which can be used to monitor team effectiveness, a reward system that is linked to team goals, and the training and development of team leaders and members (Cohen, 1994; Hackman, 1990; Mohrman, Cohen & Mohrman Jr, 1995). Although management set a broad overall strategic direction for the newsroom, to date the teams have yet to translate that into clear performance objectives. In addition, the teams have not developed information systems to track their own performance, the organization’s reward system has not been altered to encourage team incentives, and reporters have been given little training in teamwork or in how to write stories in a new and more reader-oriented way.

Despite the important role these design elements could have played in enhancing the performance of all of the teams in our study, our research does suggest the important role that social interaction and the development of new skills and relationships can play when changing structures. Creating and facilitating task-based interaction early in a team’s life cycle and trying to avoid excessive turnover (or at least actively managing its negative effects on morale) can help to foster the team’s development.

Finally, while we have confidence that this study provides some useful insight on the development of knowledge competencies, the assumptions and propositions suggested by our model need to be tested in future research. We observed behavior and outcomes in one organization within one industry. We encountered the difficulty of doing longitudinal analysis with only eight observations (teams) over four time periods. Finally, the specific type of teams we observed in the newsroom may not generalize well to other organizations.

Although our analyses are exploratory in nature, we have provided evidence to suggest that management can encourage learning and the development of knowledge competencies in employees by reorganizing. We
have also provided support for our assertion that changes in the structure of informal interaction drive the development of knowledge competencies, and thus add to the growing understanding of how knowledge is created and disseminated in organizations.

REFERENCES


