CROSSFUNCTIONAL COORDINATION AND CONTROL

Influencing Employee Behavior and Process Outcomes through Organization Design in the Airline Industry

by

Jody Hoffer Gittell

B.A., Political Science, Reed College
M.A., Economics, New School for Social Research

Submitted to the Sloan School of Management in Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy
at the
Massachusetts Institute of Technology

September 1995

© 1995 Jody Hoffer Gittell. All rights reserved.

The author hereby grants to MIT permission to reproduce and to distribute publicly paper and electronic copies of this thesis document in whole or in part.

Signature of Author: 

Department of Management
August 10, 1995

Certified by: ____________________________

Thomas A. Kochan
George M. Bunker Professor of Management
Thesis Supervisor

Accepted by: ____________________________

Birger Wernerfelt
Professor of Marketing
Chairman, Committee for Graduate Students
ABSTRACT

Crossfunctional coordination is a problem that arises from specialization and the division of labor. It is a problem that every organization must solve in one way or another. In addition to the problem of coordination, every organization must also solve the problem of control, understood here as alignment of employee behavior with the goals of the organization. Both crossfunctional coordination and control are critical to operating outcomes. But accepted principles of organization design lead organizations to achieve one at the expense of the other, since traditional ways of achieving control tend to undermine crossfunctional coordination. Through an inductive analysis of recent innovations in the flight departure process by four airlines -- American, Southwest, Continental and United -- a set of practices is derived for achieving both coordination and control.

The effects of crossfunctional coordination and control on outcomes of the flight departure process are tested using employee surveys and performance data from multiple sites for each of the four airlines. Rather than finding horizontal coordination to be a substitute for vertical control, the effects of coordination on operating performance are found to be stronger in the presence of vertical controls. Coordination and control in combination allow airlines to achieve greater operating efficiencies, particularly the rapid turnaround of aircraft at the gate, without the sacrifice of quality outcomes.

The critical factors for supporting crossfunctional coordination include a coordinating mechanism, shared accountability and active dispute resolution across functional lines. Selection and training for crossfunctional teamwork, nonrestrictive work rules and a company culture based on equal status among functional groups are secondary factors that also support crossfunctional coordination. Factors that support vertical control without undermining horizontal coordination include a supporting role for supervisors, qualitative vertical accountability, internal promotions, shared rewards, respect for employee representation and trust building by top leadership.
An examination of airline strategies suggests rapid turnarounds are relevant to airlines whether or not they are pursuing a "quick turnaround" strategy which sacrifices product complexity for the sake of rapid turnarounds. It is not short turnaround times in an absolute sense, but short turnarounds relative to product complexity, that are a source of competitive advantage. Seeking short turnarounds just for the sake of it leads carriers to simplify their product in ways that do not necessarily make sense given their customer base or their capital assets. Shortening turnarounds relative to a given product, on the other hand, generates capital savings and pushes the organization toward increased crossfunctional coordination and learning, mitigating the efficiency/quality tradeoff that organizations often face.

Thesis Supervisor: Thomas A. Kochan, George M. Bunker Professor of Management, Sloan School, MIT
Acknowledgements

I gratefully acknowledge the help I received from many people on this project. For data and moral support, I thank Gary Mihalik of the Office of Aviation Policy, Federal Aviation Administration, and Charles Bradford of the Office of Aviation Statistics, Department of Transportation. For their generosity in opening up their organizations to me, I thank Colleen Barrett, Rollie Lyson, Chris Wahlenmaier and Stan Cielak of Southwest Airlines; Tom Kiernan, Don O'Hare, Jim Nobles and Rob Zurlo of American Airlines; Gordon Bethune, Jeff Willis, Bob Watson and Charles Scully of Continental Airlines; and Bill Burns, Shawn Donohue, Bob Jeffries, Ed Clevenger and Jill Sheffield of United Airlines. For sharing their problems and insights with me, I thank these same people as well as employees throughout their organizations. For introducing me to the issues of crossfunctional coordination and accountability in airline operations, I thank Lynne Heitman and Ralph Craviso, both formerly of American Airlines.

In addition to people in the field, I received critical help from fellow academics. For a conceptualization of the departure process, I thank Rob Shumsky of MIT Operations Research. For assistance with modeling product complexity, I thank Peter Belobaba of the MIT Flight Transportation Lab. For discussions of airlines' strategic options, I thank Maurice Segall of MIT's Strategy Group. For insight into issues of coordination and control, and the role of human resource practices, I thank Deborah Ancona, Maureen Scully, Jim Rebitzer, Tom Kochan and Bob McKersie of the MIT Sloan School.

Finally, for the everyday support and inspiration that made this project possible, I thank my husband Ross and daughter Rose.
Table of Contents

Chapter 1: Introduction
1.1 Coordination and Control
1.2 Horizontal Coordination as a Source of Competitive Advantage
1.3 Selective Review of the Literature
   1. Relative Efficiency of Hierarchy
   2. Alternatives to Hierarchy
   3. Relationship between Coordination and Control
1.4 Summary of Thesis Findings

Chapter 2: Innovations in the Flight Departure Process
2.1 The Flight Departure Process
2.2 Costs of Turnaround Time
2.3 Isolating the Components of Turnaround Time
2.4 Strategies for Improving the Departure Process
   1. Southwest Airlines
   2. Morris, ValuJet, Reno and Midway Airlines
   3. Trans World Airlines
   4. USAir
   5. Continental Airlines
   6. United Airlines
   7. American Airlines
   8. Delta Airlines
   9. Northwest Airlines
2.5 Strategy, Product Complexity and Crossfunctional Coordination
Chapter 3: Efficiency/Quality Tradeoffs in the Flight Departure Process

3.1 Efficiency/Quality Tradeoffs
3.2 Data and Methodology
3.3 Product Complexity
3.4 Efficiency
3.5 Quality
3.6 Effects of Product Complexity on Efficiency
3.7 Efficiency Adjusted for Product Complexity
3.8 Efficiency/Quality Breakthrough?
3.9 Discussion

Chapter 4: Coordination, Control and Operating Outcomes

4.1 Efficiency Breakthrough Due to Horizontal Coordination?
4.2 Data and Methodology
4.3 Coordination and Control
4.4 Crossfunctional Coordination
4.5 Cognitive Frame that Supports Coordination
4.6 Relationship Between Cognition and Coordination
4.7 Coordination and Control, Measured Across Sites
4.8 Efficiency and Quality Outcomes
4.9 Product Complexity
4.10 Rank Correlations Between Coordination, Control and Outcomes
4.11 Effects of Coordination and Control on Efficiency and Quality
4.12 Effects of Coordination and Control Across Strategies
4.13 Savings from Reducing Turnaround Time
4.14 Complementarity Between Coordination and Control
Chapter 5: Practices that Support Coordination and Control

5.1 Coordination Mechanisms
5.2 Shared Accountability for Outcomes
5.3 Qualitative Vertical Accountability
5.4 Supporting Role of Supervisors
5.5 Internal Promotion
5.6 Selection for Team Players
5.7 Training for Teamwork
5.8 Conflict Resolution Across Functions
5.9 Egalitarian Company Culture
5.10 Flexible Workrules
5.11 Shared Rewards
5.12 Respect for Employee Representation
5.13 Trust Building by Top Leadership
5.14 Discussion

Chapter 6: Systems of Coordination and Control

6.1 Southwest: Chicago
6.2 Southwest: Los Angeles
6.3 United Shuttle: Los Angeles
6.4 Continental: Boston
6.5 Continental: Cleveland
6.6 United: Los Angeles
6.7 United: Boston
6.8 American: Boston
6.9 American: Los Angeles
6.10 Discussion

Appendices

Appendix A: Employee Survey
Appendix B: Managerial Interview Format
Appendix C: List of Interviewees
Chapter 1: Introduction

1.1 Coordination and Control

Crossfunctional coordination is a problem that arises from specialization and the division of labor. It is a problem that every organization must solve in one way or another. Coordination can be achieved primarily at the top of a hierarchical organization in which each functional group is relatively autonomous from the other. Or it can be achieved horizontally at each level of a relatively flat organization, across frontline employees and at each level of management. These are two distinct organizational designs, each with a set of supporting human resource and other practices which foster a distinct set of employee behaviors. Horizontally coordinated organizations encourage employees to learn and to see the whole picture through communication with people in other functional areas (Aoki, 1986), while hierarchically coordinated organizations encourage employees to carry out their own part of a process with less regard for the upstream or downstream consequences. Employee goals in a horizontally coordinated organization must be defined broadly, ideally to encompass the whole process in which the employee is engaged, while goals in a hierarchically coordinated organization may be defined quite narrowly (Hammer and Champy, 1993).

But in addition to the problem of coordination, every organization must also solve the problem of control, understood here as alignment of employee behavior with the goals of the organization. An organization that is coordinated at the top can achieve control in a fairly straightforward way, through incentives that align employee behavior with the
relatively narrow goals of his or her functional area. The attainment of narrow goals can be verified through minimal communication and monitoring. An organization that is coordinated horizontally faces a greater challenge in achieving control. Incentives may be designed around the achievement of the broader goals. But even so, the attainment of those goals is not so easily verified. More monitoring may well be required to determine whether in fact the goals have been achieved, whether they were achieved in the right way, and who contributed to the success or failure of the effort. Monitoring in this case requires more than collecting numerical data and evaluating it at arms length. Instead, it requires a dense flow of qualitative information.

Paradoxically then, a horizontally coordinated organization may require more managerial activity rather than less -- not necessarily to carry out coordination, for frontline coordination relieves some of the burden of coordination from the shoulders of management, but to monitor and support frontline employees in the achievement of more broadly defined goals. This hypothesis defies the conventional wisdom that horizontal coordination serves as a substitute for vertical controls, and suggests that organizations introducing teamwork should not necessarily cut frontline supervision and resort to more arms length methods of monitoring. This arms length form of vertical control undermines horizontal coordination and encourages employees to focus on their functional rather than shared objectives. Instead the role of supervisors should be transformed to meet the need of frontline employees for qualitative feedback and support.
Horizontally coordinated organizations have attracted the attention of practitioners as well as students of organizational design. Horizontally coordinated organizations are thought to hold a competitive advantage over hierarchically coordinated ones in their ability to achieve higher quality at lower cost by achieving faster cycle times and by providing a more coherent interface to customers. These organizations can change the nature of competition in an industry by pushing out the efficiency/quality frontier, rather than making efficiency/quality tradeoffs along an existing boundary. In the U.S. auto industry, major gains have already been achieved from improved crossfunctional coordination of the production process (MacDuffie, 1993), with additional gains being achieved in the 1990s from the integration of production and design. These changes have been motivated in large part by product market competition from early Japanese innovators (Womack, Jone and Roos, 1990; Wheelright, Chew and Fujimoto, 1987). Evidence has been found in the garment industry more recently that "the strategic shift to greater coordination shifts the placement of the traditional 'cost/service' curve to a more favorable position" (Hammond, 1993, p. 13). Other industries like telecommunications (Batt, 1993) and airlines are just beginning in the 1990s to realize gains from crossfunctional coordination, as established firms face increased competition from new entrants.

I examine the problem of crossfunctional coordination and control in the context of the airline industry, for four reasons. First, one of the core processes in the provision of commercial air travel, the flight departure process, requires a high degree of
synchronization under time constraints for its successful completion. This study takes the departure process as a focal point for organizational analysis. Second, there is a tradition in the industry of strong functional boundaries and status differences across employee groups involved in the departure process which have impeded the success of crossfunctional coordination. Third, horizontal coordination appears to be a source of competitive advantage for the carrier -- Southwest Airlines -- that is transforming the industry in the 1990s by providing inexpensive ontime service with a speedy turnaround that lowers costs. This airline has served as a model for industry innovation in the early 1990s and was identified by the Department of Transportation in 1993 as the driving force in the industry. Finally, Southwest uses high supervisory levels to support high levels of crossfunctional coordination, and is beginning to influence the industry to reconsider and reformulate the role of supervisors.

This study answers a number of questions. Does horizontal coordination between functional groups improve the quality and efficiency of the departure process? Does horizontal coordination act as a substitute for vertical control, or are they complementary? Which organizational practices foster horizontal coordination, and through what effect on the cognitive frame of participants? Which organizational practices achieve vertical control in a way that supports rather than undermines horizontal coordination? Does the reduction of buffers in the form of shortened turnaround times help to mitigate tradeoffs between quality and efficiency? Are these innovations relevant only to a quick turnaround
strategy, or are they also relevant to the traditional hub and spoke strategy?

Overall, the airline industry appears to have both substantial potential gains from horizontal coordination, and substantial obstacles to it. In both respects, it is a strong test case for these research questions. Although the focus of this study is the departure process in the airline industry, the findings are relevant to other industries with work processes in which short cycle times are highly valued, and in which functional boundaries divide the employees who carry them out.

The following section elaborates the advantages of horizontal coordination over hierarchical coordination.

1.2 Horizontal Coordination as a Source of Competitive Advantage

Crossfunctional coordination has several potential advantages over hierarchical coordination. First, the traditional functional structure is costly because it breaks a natural process into artificial categories and creates the need for administrative and managerial time to reintegrate it. Crossfunctional coordination eliminates many of those reintegration tasks. Second, crossfunctional coordination can make an organization more of a seamless web and easier to navigate from a customer’s point of view. This consideration is especially important for organizations that deliver services directly to the public.

Third, the same skills and mechanisms for crossfunctional coordination within an organization may help that organization to manage its relationships with
other organizations. For firms that participate in a closely integrated supplier/customer relationship and whose boundaries are permeable, the ability to coordinate across internal departmental boundaries might be translated into an ability to coordinate across inter-firm boundaries. Fourth, for firms with a significant degree of employee ownership, the same ability to coordinate across internal departmental boundaries might help employee groups manage their relationships as co-owners. This is an important consideration for employee-owned companies, since conflict among frontline employee groups that have learned to negotiate with management but not with each other can sink an otherwise promising buyout.

Fifth, under time constraints work may have to be coordinated on the spot, as in a symphony orchestra, basketball team or between doctors and nurses. The time consideration can be extended to any process where turnaround time is a critical factor due to the competitive dynamics of the industry, for example the design process in the automotive industry, or where turnaround time improves the product itself and/or substantially reduces its cost. Excess cycle time may play the same role as in process inventories in buffering parts of a process from each other, relieving the pressure to solve problems across organizational boundaries.

Finally, the functional structure is costly because of the missed opportunities for learning that could improve both costs and quality. In a traditional functional organization cost reduction and quality improvement are limited by what economists call subgoal optimization. Each department is typically held
accountable for its own performance outcomes, but not for improving the outcomes of the overall processes in which it is engaged. When something goes wrong, rather than serving as an opportunity for learning, all parties may seek to blame it on someone else. Frontline employees, supervisors and managers in a department together may hide information to avoid blame, and distort information to place the blame on another department. This is a critical defect of functional structures of accountability -- they motivate subgoal optimization, reduce the flow of information that would contribute to problem solving, and turn attention and resources from problem solving to blame avoidance. They discourage effective organizational learning.

Some of these advantages are common across organizations, and some depend on what kind of product a company intends to deliver. But crossfunctional coordination may be introduced as an important source of competitive advantage in any industry, once at least one organization figures out how to implement it in a critical process.

1.3 Selective Review of the Literature

1. Relative Efficiency of Hierarchy

Most organizational theorists agree that traditional hierarchical structures were designed to foster vertical flows of information at the expense of horizontal flows. The central disagreement is whether and under what conditions the advantages of this organizational form outweigh the disadvantages. Barnard (1938), March and Simon (1958), Chandler (1962), Weber (1890) and Taylor (1911) argued for the relative efficiency of coordination at the highest
levels of the organization to achieve control and unity of purpose. They recognized the inefficiencies of bureaucracy -- limits to the managerial span of attention, difficulty of evaluating activities that are organized by function, loss of the gains from cooperation among workers -- but argued that the gains achieved from control outweighed these costs. Some contemporary organizational theorists continue to argue that hierarchy is the most efficient organizational design (Alchian and Demsetz, 1972; Jensen and Meckling, 1976; Williamson, 1985), based on its ability to solve the problem of control in an efficient way.

2. Alternatives to Hierarchy

In the 1950s and 60s there was a concern among organizational theorists and practitioners that the bureaucratic form of coordination was too slow, unresponsive and cumbersome, and out of this concern came a new attention to lateral relations in organizations (Simpson, 1959; Landsberger, 1961; Walton, 1966; Pondy, 1967; Walton and Dutton, 1967; Lawrence and Lorsch, 1967). The matrix organization was conceived of and adopted in the 1960s and 70s as an alternative way to solve the problem of crossfunctional coordination (Fouraker and Stopford, 1968; Galbraith, 1973; Davis and Lawrence, 1977). The matrix form achieves crossfunctional coordination at lower levels of the organization than in a traditional hierarchy, through project teams, in areas of the organization that are thought to require a high degree of responsiveness to the environment. "Its multiple information channels were designed to model the complexity of the business environment and overlapping authority and accountability were designed to combat parochialism and encourage collaboration" (Applegate,
Matrices typically did not involve frontline employees, however, but rather were confined to professionals and middle managers.

There was also increasing attention to informal organizational charts or "emergent networks" in the 1960s and 70s. The key characteristic of networks was that they emerged spontaneously to solve information problems that were not addressed by the vertical structure (Tichy, 1981). Emergent networks are not confined to professionals and middle managers, but they have other weaknesses. Emergent networks may largely be driven by personal agendas and characteristics rather than by work processes. They may also be distorted by the formal incentives and accountability structure of the functional bureaucracies within which they exist.

In the 1980s and 90s a wide range of organizational designs have been proposed to solve the problem of crossfunctional coordination -- many of them placing an emphasis on achieving crossfunctional coordination among frontline employees as well as at higher levels of the organization. Since frontline employees are now considered to be an interface with the environment rather than simply operatives, coordination across functions at this interface is now valued. These designs include network (Powell, 1990; Perrow, 1992; Sabel, 1992; Ibarra, 1992; Nohria and Eccles, 1992), where formal and emergent structures approach complete overlap. They also include flexible specialization (Piore and Sabel, 1984); horizontal or process-based (Ostroff and Smith, 1992; Hammer and Champy, 1993; Albers Mohrman, 1993); organizational learning (Fine, 1986; Senge, 1990; Cole, 1991; Koike,
1991; Garvin, 1993); lean production (Womack, Jones and Roos, 1990); team production (MacDuffie, 1993; Applebaum and Batt, 1994; Meyer, 1994); and total quality management (Deming, 1988; Grant, Shani and Krishnan, 1994). These literatures have in common an attempt to formulate horizontal integration across functional boundaries as an alternative to bureaucracy.

This new literature on alternatives to hierarchy offers insights into practices that support or undermine horizontal coordination. In particular, there is specific guidance on effective coordination mechanisms. Nohria and Eccles (1992) find that since feelings and emotions are exchanged in work processes in addition to information, there is a limit on the effective automation of coordination, particularly in the interface between groups. Crossfunctional coordination works best, they suggest, with a human face, as in a person who serves as a bridge between groups. Davenport and Nohria (1994) find additional support for this idea. Through observation of best practices they find that a case manager role offers a way to coordinate work processes that span multiple functional groups. They consider the case manager role to be a "radical new work design" that "counters a century of conventional wisdom about how jobs and organizations should be structured." The key is that an individual or team follows a process from beginning to end. It is particularly well-suited, they find, for work that is performed along process lines rather than in business functions...Case managers are typically located at the intersection of several organizational interfaces. Not only are they liaisons between these different functions and customers, but they actually perform work previously done by the functions" (p. 13).
These insights are supported by the findings of this thesis.

This literature also offers specific guidance on systems of accountability that are appropriate for horizontally coordinated organizations. The total quality management literature, following Deming, suggests that because you need to use mistakes as a basis for learning, you should not rely on individual performance evaluation or negative incentives. These mechanisms will cause people to hide problems rather than learn from them (Deming, 1988). In a Taylorist approach,

"since problems or defects are seen as resulting from individual error -- that is, from a failure of an individual to respond correctly to a particular stimulus -- 'problem solving' is geared toward identifying the individuals responsible and accounting and incentive systems are designed to assign blame and rewards accordingly" (Jenkins, 1994).

Alternatively, under a learning intensive approach,

"learning is seen as a social process rather than an individual activity, [so] problems are viewed as artifacts of failures in the social system. In the context of the workplace, because problems or defects are believed to result from weaknesses in the way the system of production is organized, they are treated as opportunities for improving the performance of the system. Accounting and reward systems are designed to diffuse blame for problems and thus to encourage collective efforts to identify and rectify their sources" (ibid).

In other words, a punitive system of accountability is dysfunctional for learning, particularly when it focuses on narrow functional outcomes. Counter to traditional economic theory, accountability is best diffused rather than precisely pinned on particular departments or particular individuals.
A second way that accountability can either support or undermine horizontal coordination is in the type of information provided by the system of accountability. Traditional measurement systems are flawed, argues Meyer (1994), both because they orient employee attention toward functional rather than crossfunctional outcomes, as argued in the TQM literature, and also because they provide insufficient information for learning.

"As many companies that have moved from control-oriented, functional hierarchies to a faster and flatter team-based approach, traditional performance measurement systems not only fail to support the new teams but also undermine them. Indeed, traditional systems often heighten the conflicts between multifunctional teams and functions that are vexing many organizations today." In traditional systems, "each relatively independent function has its own set of measures, whose main purpose is to inform top managers about its activities...Such results measures tell an organization where it stands in its effort to achieve goals but not how it got there or, even more important, what it should do differently. Most results measures track what goes on within a function, not what happens across them."

Both to orient employees toward crossfunctional outcomes, and to provide more useful feedback about what to do, Meyer proposes that process measures, defined as measures that "monitor the tasks and activities throughout an organization that produce a given result," be used by teams in place of the traditional measurement systems. These insights on accountability also are supported by the findings of this thesis.

But there is a separate set of issues that this literature on alternatives to hierarchy does not address. How in horizontally coordinated organizations is control -- understood as the alignment of employee
and organizational goals -- best achieved? For example, Meyer proposes that teams should replace functional measures with process measures. But he does not suggest that upper management, for whose purposes the process measures were originally designed, need to change to their measurement system as well. Yet it seems obvious that the managers overseeing the team’s progress also use a measurement system based on processes. For one, managers assessing team progress using the old measurement system would tend to encourage employees to work on functional goals, to the neglect of crossfunctional goals. And second, managers using the old system would only have access to the results or ’the numbers,’ not to the process that generated the results, rendering them relatively useless for meaningful feedback and advice. In the language of this thesis, if the system of vertical accountability is not changed to support the new system of horizontal accountability, the former will tend to undermine the latter.

A system of vertical accountability based on qualitative assessment and feedback, however, may run counter to the trend toward decreasing management and increasing the span of control. After all, this trend toward wider spans of control has depended to a great extent on the use of arms-length, results-oriented performance measures. The literature on alternatives to hierarchy tends to focus on coordination and shy away from issues involving control, perhaps based on the tacit assumption that, given sufficient coordination, control is not needed. To explore the relationship between coordination and control, we turn to a different literature.
3. Relationship between Coordination and Control

The neo-Weberian and neo-Marxist literatures have addressed the problems of bureaucracy from a different angle -- seeing bureaucracy primarily as a mechanism for control rather than for coordination (Selznick, 1949; Gouldner, 1954; Merton, 1957; Stone, 1974; Edwards, 1979; Bowles, 1985). In this view, bureaucracy was designed to "divide and conquer" a hostile workforce which, if allowed to collaborate, would collaborate against the interests of the firm's owners, perhaps by sabotaging production and demanding a greater share of the proceeds. This organizational form, the argument goes, sacrifices the gains from collaboration to keep employees in a relatively weakened position.

This analysis of organizational control tends to give insufficient consideration to the coordination problem, as argued by Rebitzer (1993). The job of supervisors and managers is not only to control, but to coordinate. Even if control were not an issue -- even if the interests of all organizational members converged -- the problem of coordination would still remain. Organizational economists have also fallen into this trap by reducing coordination problems to problems of control through incentives, as with those mentioned above who argue for the efficiency of hierarchy (Alchian and Demsetz, 1972; Jensen and Meckling, 1976; Williamson, 1985).

More recently, organizational economists have been addressing coordination problems as distinct from control (Aoki, 1986; Leibenstein, 1988; Aoki, 1990; Cremer, 1990; Milgrom and Roberts, 1992; Becker and Murphy, 1992; Athey and Schmutzler, 1994; Rotemberg,
1995). Aoki in particular made classic contributions to the theory of organization design by addressing the relationship between coordination and control. A 1986 paper by Aoki argued that horizontal coordination is a substitute for hierarchical control. But Leibenstein (1987) pointed out that Aoki's own characterization of Japanese firms -- specifically that they rely more heavily on vertical controls of the certain type as well as greater horizontal coordination -- suggested otherwise.

"We are likely to find that a high degree of mutual vertical commitment creates a sense of common objectives and a concern for the results beyond one's own job, which in turn is likely to support horizontal coordination on production goals...Thus while I agree with Aoki on the importance of horizontal cooperation I would argue that where horizontal cooperation on production goals flourishes it is likely to be a consequence of a high degree of mutual vertical commitments" (p. 170).

Aoki (1990) agreed with Leibenstein, revised his theoretical framework and set out a principle of complementarity between horizontal coordination and vertical control. In an organization design characteristic of some Japanese firms, "the hierarchical nature of the incentive scheme...complements the nonhierarchical tendency of operational coordination and so helps maintain organizational effectiveness and integrity" (p. 2). "Comparatively speaking, Japanese firms tend to be less hierarchical in the coordination mode, while they rely upon rank hierarchies in their incentive system" (p. 14).

"In the Japanese firm, management may feel secure in delegating tasks of coordination to lower levels where relevant on-site information is available, because employees are aware that they are being evaluated by their own long term contribution to organizational goals. Thus they are induced to comply with management
authority without explicitly hierarchical direction over daily operation."

Besides rank hierarchy, which serves to evaluate and reward employees for long term contribution to management goals, vertical control that is conducive to horizontal coordination has other specific qualities. "The internal selection of management through promotional ranking may serve as an effective mechanism by which such knowledge sharing and interest identification are nurtured on the basis of the sharing of experiences. Rank hierarchy as an incentive device becomes fully operative only if the internal promotion ladder for employees extends to as high as the top executive position."

"Organizational goals themselves may need to be adjusted in response to employees' voice. In this way, a sense of joint effort is created so that employee's active cooperation in horizontal coordination may be elicited. This amounts to a set of mutual vertical commitments in which management recognizes the interests of employees and, in return, employees exert greater effort."

Internal promotion and the representation of employee interests in top management decisions, are important aspects of a system of vertical control which does not undermine horizontal coordination. This thesis supports these insights.

In studies of product development, management researchers found evidence of other complementarities between coordination and control. Crossfunctional teams with strong project managers, that is with decisionmaking authority and a higher level in the organizational hierarchy, were more successful than those with weak project managers (Ancona and Caldwell, 1992). Other studies have also shown the effectiveness of strong project managers (Clark and Fujimoto, 1991; Katz and Allen, 1985). The rationale is that a project leader with a position in the hierarchy can both
support and monitor the coordination activities of team members (Brown and Eisenhardt, 1995). The role of management in supporting and monitoring coordination by frontline employees is critical, I will argue, to a system of coordination and control.

1.4 Summary of Thesis Findings

This thesis develops and tests a model of crossfunctional coordination and control, using field research and employee surveys at four airlines -- American, Continental, Southwest and United. The model is depicted graphically in Table 1.1.

To achieve crossfunctional coordination, a set of organizational practices is needed to orient employees toward interaction with their peers in other functional groups. Field research and comparative analysis are used to identify elements of this set in Chapter Six. A coordinating mechanism such as a case manager or crossfunctional team can be used to shift the flow of information from vertical to horizontal. Accountability that is based on competing goals for people involved in the same process leads to goal suboptimization, and to information coverup which in turn reduces learning. Shared accountability, by contrast, fosters teamwork and communication. Selection and training can be designed to develop generalists, or alternatively, specialists that can communicate across functional boundaries. Finally, the evidence suggests the importance of mechanisms for resolving conflicts and reducing status boundaries between functional groups.
Table 1.1: Coordination and Control of the Flight Departure Process

System of Coordination and Control

Coordination
- Crossfunctional Coordinating Mechanism
- Horizontal Accountability
- Selection for Team Players
- Training for Teamwork
- Conflict Resolution
- Egalitarian Culture
- Flexible Workrules

Control
- Supporting Role for Supervisors
- Qualitative Vertical Accountability
- Internal Promotion
- Shared Rewards
- Respect for Employee Representation
- Trust Building by Top Leaders

Cognitive Frame
- Shared Goals
- Shared Knowledge
- Shared Respect

Coordination Behavior
- Frequent Timely Interdepend
- Problem Solving
- Helping

Departure Process Outcomes
- Operating Efficiency
- Staffing
- Quality
- Customer Satisfaction
- Ontime Arrivals
- Baggage Handling

Product Complexity
- Cargo and Mail
- # Passengers
- Flight Length
- % Connections
These organizational practices affect crossfunctional coordination -- understood as frequent and timely communication, interdependence, helping and problem solving -- through their influence on the cognitive frames of participants -- particularly shared knowledge, shared goals and mutual respect. Engaging in crossfunctional coordination behaviors in turn affects the cognitive frames of participants. These behaviors and cognitive frames are identified using field research and measured using employee surveys (Chapter Four). The two-way interaction between cognitive frames and behavior, observed in the field and suggested by tests of interitem correlations, lends support to a key tenet of social cognition theory (Fiske and Taylor, 1984).

The cognitive frame and behaviors that make up crossfunctional coordination in turn have a positive effect on outcomes of the flight departure process, demonstrated using multiple regression analysis (Chapter Four). In particular, crossfunctional coordination allows airlines to reduce turnaround time and staffing levels without sacrificing quality outcomes. But coordination is found to affect outcomes more strongly in the presence of high supervisory ratios. Rather than coordination serving as a substitute for supervisory control, as is commonly believed, the analysis shows coordination and control to have complementary effects on operating outcomes.

How do high levels of supervision contribute to a system of coordination and control? Analysis of the qualitative data suggests that high supervision is part of a set of practices that achieves vertical control, understood as the alignment of employee behavior with
organizational goals, without undermining horizontal coordination (Chapter Six). Field research at the four airlines suggests that this set of practices includes a supporting, coaching role for managers and supervisors, and qualitative vertical accountability between top and middle management. Other key elements of a system of vertical control that supports rather than undermines horizontal coordination are shared rewards, representation of employee interests and trust building by top leadership.

Finally, one outcome of coordination and control — faster turnaround times -- in turn reinforces coordination behaviors. Excess turnaround time in the flight departure process is akin to buffers in any production process. In-process time or product inventories are commonly used as buffers between stages of work, to protect each functional area from the need to communicate with and resolve problems with other functional areas (Galbraith, 1973). Horizontal coordination leads to the reduction of buffers, which in turn reveals problems, forces communication and learning across functions, and is conducive to continuous improvement of product or service quality (MacDuffie and Krafcik, 1992). Reducing buffers has the secondary effect of reducing costs, so that organizations which do it successfully are able to offer customers products or services that are both lower cost and higher quality.

The link between buffers and crossfunctional coordination is aptly described in a recent paper by Piore (1992):

"The organizational principles involved in Taylorism
and Fordism have pushed us to...restrict communication among the people responsible for the way in which the different parts are performed...They have led us to divide the internal structure of large organizations into a series of functionally distinct divisions as well...But from the cognitive perspective, the problem is that it limits the hermeneutic process, the cycle back and forth between parts and wholes, through which cognitive structures evolve" (p. 20).

"If one looks at innovations in business practice and the critique of existing organizational structures within the management literature, the thrust is in precisely the opposite direction. The attempt is to break down barriers between different organizations and within organizations between divisions and departments, and encourage direct, rich and textured communication....There is a movement to eliminate the in-process inventories which insulate subcontractors from their customers and different operations from each other in the internal production process, forcing people who previously operated at arms length to confront coordination problems directly and resolve them cooperatively...Large corporations are being restructured in the form of networks and matrices which involve the continual repositioning of different components and a renegotiation of lines of authority and patterns of communication" (p. 21).

More broadly, this thesis contributes to the search for the systems that underly organizations, particulary the systems for organizing people and the flow of work. The predisposition of the author is to look for practices that complement each other -- practices that form a system in the sense of having joint effects that are greater than those of their individual components. Recent work along these lines includes Arthur (1994), Berg, Applebaum, Bailey and Kalleberg (1994), Cutcher-Gershenfeld (1991), Dunlop and Weil (1992), Ichniowski, Shaw and Prenushi (1993), MacDuffie and Krafcik (1992) and MacDuffie (1993).

Before developing the model of crossfunctional coordination and control, however, I give an overview
of the flight departure process and airline industry innovations designed to improve efficiency and quality outcomes of this process (Chapter Two). Then the relationship between efficiency and quality outcomes of the departure process is explored to find whether efficiency -- particularly in the form of reduced turnaround time -- has a positive or negative effect on quality outcomes, once differences in product complexity are accounted for (Chapter Three).
Chapter 2: Innovations in the Flight Departure Process

2.1 The Flight Departure Process

The departure process is one of the core processes of an airline's operations. Its success or failure, repeated hundreds of times daily in dozens of locations, can make or break an airline's reputation for safety and reliability. It is also perhaps the most complex process that an airline performs on a repeated basis. The complexity of the departure process varies according to the carrier's product mix and division of labor. At American Airlines, which has a typical product mix and division of labor for a major commercial air carrier, the departure process requires the direct or indirect input of twelve departments. At the point of departure, the process requires rapid coordination among nine groups of frontline employees - ramp workers, mechanics, ticket agents, gate agents, skycaps, caterers, operations agents, flight attendants and pilots -- most of which report to separate departments. For an outline of the typical departure process, see Table 2.1.

A departure is successful from the customer's point of view if it does not involve unnecessary hassles and if it results in a safe, ontime arrival of the customer and his or her baggage. Onime arrival is usually found to be passengers' number one criterion for the quality of air travel (Bowen, B.D., D.E. Headley and J.R. Luedtke, 1991; J.D. Power and Associates, 1993). A departure is successful from the airline's point of view if these customer outcomes are achieved in a cost effective way.
### Table 2.1: The Flight Departure Process

**Stage A: Prepare the plane for departure**

<table>
<thead>
<tr>
<th>Task</th>
<th>Who does it</th>
<th>Coordination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connect skybridge to aircraft, open door and help passengers disembark. Log in flight.</td>
<td>Gate agent.</td>
<td>Flight attendants, skycaps.</td>
</tr>
<tr>
<td>Assist passengers with special needs.</td>
<td>Gate agent.</td>
<td>Flight attendants, skycaps.</td>
</tr>
<tr>
<td>Clean the plane, check headsets and magazines.</td>
<td>Ramp workers.</td>
<td>With each other, gate agent, flight attendant.</td>
</tr>
<tr>
<td>Load food onto plane.</td>
<td>Caterers</td>
<td>With ramp workers, gate agents.</td>
</tr>
<tr>
<td>Empty bathrooms.</td>
<td>Ramp workers.</td>
<td>With each other.</td>
</tr>
<tr>
<td>Check weather, flight conditions, determine amount of fuel needed.</td>
<td>Operations agent.</td>
<td>With central dispatch.</td>
</tr>
<tr>
<td>Do maintenance check, determine whether problem exists, whether and how to correct it.</td>
<td>Mechanics.</td>
<td>With captain, upline and downline station mechanics, operations agent.</td>
</tr>
<tr>
<td>Check cockpit to determine whether all equipment is operable.</td>
<td>Captain, co-pilot.</td>
<td></td>
</tr>
</tbody>
</table>

31
## Stage B: Load the plane for departure

<table>
<thead>
<tr>
<th>Task</th>
<th>Who does it</th>
<th>Coordination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assist arriving passengers with their bags.</td>
<td>Skycaps.</td>
<td>With cab drivers, bus drivers, ticket agents.</td>
</tr>
<tr>
<td>Direct pssngers to ticket counter, gates.</td>
<td>Skycaps, ticket agents.</td>
<td>Between skycaps, ticket agents, gate agents.</td>
</tr>
<tr>
<td>Confirm reserv., sell tickets ask preferences, accept and enter baggage. Decide how to reroute passenger and baggage if problem occurs, how to compensate if problem occurs, whether to hold plane for late psgr.</td>
<td>Ticket agents.</td>
<td>With gate agents, baggage room.</td>
</tr>
<tr>
<td>Reorganize passenger lines to speed check-in, based on which flights are about to depart.</td>
<td>Ticket agents.</td>
<td>With gate agents.</td>
</tr>
<tr>
<td>Send baggage downstairs. Decide whether to request bags to be rushed for late psgrs, whether to hold plane.</td>
<td>Ticket agents.</td>
<td>With gate agents, baggage room.</td>
</tr>
<tr>
<td>Accept priority mail, send to baggage area.</td>
<td>Ticket agts, lead agts.</td>
<td>With baggage room.</td>
</tr>
<tr>
<td>Accept freight and mail from outside vendors, decide how soon it can be shipped.</td>
<td>Freight handlers,</td>
<td>With shippers, ramp area, operations agent.</td>
</tr>
<tr>
<td>Task</td>
<td>Who does it</td>
<td>Coordination</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Sort and load baggage, decide how to load for best fit, quick unload.</td>
<td>Baggage handlers</td>
<td>With freight agents, operations agents.</td>
</tr>
<tr>
<td>Sort and load freight and mail. Decide whether to send freight and mail on different route to optimize load factor.</td>
<td>Freight handlers</td>
<td>With baggage handlers, operations agents.</td>
</tr>
<tr>
<td>Compute weight and balance of baggage, mail and freight. Deliver to operations agent.</td>
<td>Ramp agents.</td>
<td>With freight and baggage handlers, operations agent.</td>
</tr>
<tr>
<td>Check tickets and people for entrance into gate area. Decide when to investigate something that looks suspicious.</td>
<td>Security workers.</td>
<td>With mgrs, police.</td>
</tr>
<tr>
<td>Check psgr seating, assure adequate seats, Decide whether to add freight or standby passengers.</td>
<td>Gate agents.</td>
<td>With ticket agents, freight and operations agent.</td>
</tr>
<tr>
<td>Check number of passengers boarded, call in to operations agent. Compute weight and balance of freight, mail, passengers and fuel.</td>
<td>Gate agents.</td>
<td>With flight attendants, operations agent.</td>
</tr>
<tr>
<td></td>
<td>Operations agent in station or central location</td>
<td>With gate, operations, freight, baggage and pilots.</td>
</tr>
<tr>
<td>Task</td>
<td>Who does it</td>
<td>Coordination</td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>---------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Answer passenger questions, assist passengers with special needs.</td>
<td>Gate agents.</td>
<td>With ticket agents in same station, ticket and gate agents at passenger destination.</td>
</tr>
<tr>
<td>Load passengers. Decide when to load and in what order. Decide whether carryon luggage is excessive.</td>
<td>Gate agents.</td>
<td>With flight attendants, captain.</td>
</tr>
<tr>
<td>Welcome passengers aboard, seat them, assist them, Adjust seating, help passengers to store luggage.</td>
<td>Flight attendants.</td>
<td></td>
</tr>
<tr>
<td>Serve refreshments to first class passengers.</td>
<td>Flight attendants.</td>
<td></td>
</tr>
<tr>
<td>Prepare passengers for takeoff. Assure that passengers are seated, buckled in and luggage is stored. Make destination announcement.</td>
<td>Flight attendants, gate agent, captain.</td>
<td></td>
</tr>
<tr>
<td>Give weather and load information to captain, including fueling information.</td>
<td>Gate agent.</td>
<td>With operations agent, captain.</td>
</tr>
<tr>
<td>Close doors to plane, make sure ladders and belt loaders are removed from plane, dispatch flight.</td>
<td>Gate agents.</td>
<td>With ramp agents, captain.</td>
</tr>
<tr>
<td>Task</td>
<td>Who does it</td>
<td>Coordination</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>Signal readiness to tower.</td>
<td>Captain.</td>
<td></td>
</tr>
<tr>
<td>Turn on full engines.</td>
<td>Captain, co-pilot.</td>
<td></td>
</tr>
<tr>
<td>Taxi to runway, takeoff.</td>
<td>Captain, co-pilot.</td>
<td>With control tower.</td>
</tr>
<tr>
<td>Determine whether there was a delay, whose fault it was.</td>
<td>Operations agent, or supervisor.</td>
<td>All departments.</td>
</tr>
</tbody>
</table>
A central problem faced by airlines is how to break these desired outcomes into measures of performance that will guide and coordinate activities across stations, departments and work groups. The problem posed by on-time arrival is particularly difficult. In any route system, for example, a departure delay from station A often results in arrival delay in station B, which often results in departure delay from station B, which may result in arrival delay at station C, and so on. Once a departure delay is assigned to a station, the more difficult task remains of identifying the source of the delay within the station. Airlines use different systems to identify and 'charge' the internal source of a delay, but the traditional one focuses on departmental accountability and jeopardizes crossfunctional coordination.

2.2 Costs of Turnaround Time

Airlines attempt to reduce departure delay without mishandling bags, without treating customers rudely, and without resorting to overstaffing. Often they do this by improving the management and coordination of employee effort. Alternatively, however, they reduce departure delay by expanding scheduled turnaround time -- adding buffers, as it were, into the schedule. From conversations with station managers and aircraft schedulers, this latter practice appears to be relatively common among the major carriers. When new schedules are produced and distributed by the central scheduling group, and distributed for review, station managers identify 'turns' that are tightly scheduled relative to station capabilities and that are likely to produce delays. A period of negotiation ensues during which some of those tightly scheduled turns are modified to increase station managers' likelihood of success.
These buffers are costly, however. First, extra turnaround time increases the overall length of a flight for passengers who are continuing through the hub, which makes a flight less attractive and makes it appear lower on travel agents’ screens, where identical flights are ordered by length of flight. In industry terms, longer scheduled turnaround times reduce "screen presence."

More importantly, the time that aircraft spend at the gate being loaded, unloaded and serviced, is time that this valuable equipment is essentially out of service, not earning passenger revenues. The opportunity cost of turnaround time is estimated on Tables 2.2 and 2.3. The relevant measure of revenue is operating revenue net of the costs that increase with increased flying time, i.e. labor, fuel, airport fees and maintenance. Dividing net operating revenues by aircraft hours, and transforming the result into net revenues per aircraft minute, yields a rough measure of the opportunity cost of aircraft time. This number represents a potential -- the revenue that could be earned from an additional minute of flying time, minus the costs of that additional minute of flying time.

The opportunity cost of turnaround time is greater, the better able an airline is to achieve a revenue premium from ticket sales, which depends in turn on the degree of competition in its markets. The opportunity cost of turnaround time is also greater, the longer the average flight length for that airline. An airline with longer flights earns more net revenue per aircraft minute, other things equal, because the fixed costs of a flight are distributed over a longer flight length. American Airlines has the highest
Table 2.2: Aircraft Opportunity Costs

<table>
<thead>
<tr>
<th></th>
<th>Operating Revenues (000,000)</th>
<th>Variable Costs (000,000)</th>
<th>Net Revenues (000,000)</th>
<th>Aircraft Minutes (000)</th>
<th>Net Rev/Aircraft Minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska</td>
<td>$997.5</td>
<td>$412.4</td>
<td>$585.1</td>
<td>14,226</td>
<td>$41.1</td>
</tr>
<tr>
<td>American</td>
<td>$10,630.6</td>
<td>$3,473.4</td>
<td>$7,157.2</td>
<td>111,780</td>
<td>$64.0</td>
</tr>
<tr>
<td>AmWest</td>
<td>$1,404.5</td>
<td>$505.3</td>
<td>$899.2</td>
<td>20,700</td>
<td>$43.4</td>
</tr>
<tr>
<td>Continental</td>
<td>$4,090.8</td>
<td>$1,763.5</td>
<td>$2,327.3</td>
<td>59,196</td>
<td>$39.3</td>
</tr>
<tr>
<td>Delta</td>
<td>$9,514.1</td>
<td>$3,542.1</td>
<td>$5,972.0</td>
<td>99,534</td>
<td>$60.0</td>
</tr>
<tr>
<td>Northwest</td>
<td>$5,325.1</td>
<td>$1,865.4</td>
<td>$3,459.7</td>
<td>61,836</td>
<td>$55.9</td>
</tr>
<tr>
<td>Southwest</td>
<td>$2,416.6</td>
<td>$885.1</td>
<td>$1,531.5</td>
<td>41,940</td>
<td>$36.5</td>
</tr>
<tr>
<td>TWA</td>
<td>$2,555.4</td>
<td>$1,016.7</td>
<td>$1,538.7</td>
<td>33,408</td>
<td>$46.1</td>
</tr>
<tr>
<td>United</td>
<td>$8,966.4</td>
<td>$3,571.9</td>
<td>$5,394.5</td>
<td>92,544</td>
<td>$58.3</td>
</tr>
<tr>
<td>USAir</td>
<td>$6,394.4</td>
<td>$2,744.2</td>
<td>$3,650.2</td>
<td>84,948</td>
<td>$43.0</td>
</tr>
<tr>
<td>Average</td>
<td>$5,229.5</td>
<td>$1,978.0</td>
<td>$3,251.5</td>
<td>62,011</td>
<td>$52.4</td>
</tr>
</tbody>
</table>

Note: All numbers are for 1994, domestic operations only. Variable costs include labor, fuel, airport fees and maintenance costs. Aircraft minutes are total minutes in operation minus turnaround time. Net revenues per aircraft minute represent aircraft opportunity costs, and are affected by an airline's revenue premium and average flight length.
opportunity cost of aircraft time for the industry, at $64 per minute, relative to an industry average of about $50. Southwest has the lowest opportunity cost of aircraft time, at about $37 per minute.

The potential gains from reducing turnaround times by one minute, systemwide, are computed for each of the major airlines on Table 2.3. For their domestic systems only, revenues per minute are multiplied times the number of annual departures to estimate the annual savings for a systemwide one minute reduction in turnaround time. Annual savings are greater, the greater an airline’s opportunity cost of aircraft time, and the more flights it offers. Annual savings range from about $5 million for Alaska Airlines to nearly $90 million for Delta Airlines.

To further understand the magnitude of the estimated annual savings for a one minute reduction systemwide in turnaround time, consider those savings on a per employee basis. The mean savings per employee for the industry are about $900. Savings per employee are higher for airlines with high labor productivity in the sense of departures per employee. For each one minute reduction in turnaround time systemwide, employees could earn an annual increase ranging from about $600 to $1,400, depending on the number of departures per employee. These savings are continuous, in the sense that they are achieved each year turnaround times are maintained at the new, faster pace. For an airline that succeeds in reducing its turnaround times by five minutes, the annual increase would range from $3,000 to $7,000.

This estimate of potential gains from reducing
<table>
<thead>
<tr>
<th></th>
<th>Net Rev/Aircraft Minute</th>
<th>Annual Departures</th>
<th>Minutes Saved Systemwide</th>
<th>Annual Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska</td>
<td>$41.1</td>
<td>125,686</td>
<td>125,686</td>
<td>$5,165,695</td>
</tr>
<tr>
<td>American</td>
<td>$64.0</td>
<td>763,115</td>
<td>763,115</td>
<td>$48,839,360</td>
</tr>
<tr>
<td>AmWest</td>
<td>$43.4</td>
<td>184,585</td>
<td>184,585</td>
<td>$8,010,989</td>
</tr>
<tr>
<td>Continental</td>
<td>$39.3</td>
<td>509,353</td>
<td>509,353</td>
<td>$20,017,573</td>
</tr>
<tr>
<td>Delta</td>
<td>$60.0</td>
<td>913,689</td>
<td>913,689</td>
<td>$54,821,340</td>
</tr>
<tr>
<td>Northwest</td>
<td>$55.9</td>
<td>516,978</td>
<td>516,978</td>
<td>$28,899,070</td>
</tr>
<tr>
<td>Southwest</td>
<td>$36.5</td>
<td>589,786</td>
<td>589,786</td>
<td>$21,527,189</td>
</tr>
<tr>
<td>TWA</td>
<td>$46.1</td>
<td>263,967</td>
<td>263,967</td>
<td>$12,168,879</td>
</tr>
<tr>
<td>United</td>
<td>$58.3</td>
<td>668,969</td>
<td>668,969</td>
<td>$39,000,893</td>
</tr>
<tr>
<td>USAir</td>
<td>$43.0</td>
<td>878,254</td>
<td>878,254</td>
<td>$37,764,922</td>
</tr>
<tr>
<td>Average</td>
<td>$48.8</td>
<td>541,438</td>
<td>541,438</td>
<td>$27,621,591</td>
</tr>
</tbody>
</table>

Note: All numbers are for 1994, domestic operations only. These results assume that a minute turnaround time becomes a minute of flying time, that fares are not reduced to sell additional seats, and that no costly organizational practices are required to make quicker turnarounds possible. These assumptions are challenged in the text.
<table>
<thead>
<tr>
<th></th>
<th>Annual Savings/ Minute Reduction</th>
<th>Total Employees</th>
<th>Departures/ Employee</th>
<th>Annual Savings/ Employee (one minute)</th>
<th>Annual Savings/ Employee (five minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska</td>
<td>$5,165,695</td>
<td>6,411</td>
<td>19.6</td>
<td>$806</td>
<td>$4,029</td>
</tr>
<tr>
<td>American</td>
<td>$48,839,360</td>
<td>65,390</td>
<td>11.7</td>
<td>$747</td>
<td>$3,734</td>
</tr>
<tr>
<td>AmWest</td>
<td>$8,010,989</td>
<td>10,694</td>
<td>17.3</td>
<td>$749</td>
<td>$3,746</td>
</tr>
<tr>
<td>Continental</td>
<td>$20,017,573</td>
<td>31,094</td>
<td>16.4</td>
<td>$644</td>
<td>$3,219</td>
</tr>
<tr>
<td>Delta</td>
<td>$54,821,340</td>
<td>63,339</td>
<td>14.4</td>
<td>$866</td>
<td>$4,328</td>
</tr>
<tr>
<td>Northwest</td>
<td>$28,899,070</td>
<td>29,872</td>
<td>17.3</td>
<td>$967</td>
<td>$4,837</td>
</tr>
<tr>
<td>Southwest</td>
<td>$21,527,189</td>
<td>15,052</td>
<td>39.2</td>
<td>$1,430</td>
<td>$7,151</td>
</tr>
<tr>
<td>TWA</td>
<td>$12,168,879</td>
<td>19,445</td>
<td>13.6</td>
<td>$626</td>
<td>$3,129</td>
</tr>
<tr>
<td>United</td>
<td>$39,000,893</td>
<td>50,900</td>
<td>13.1</td>
<td>$756</td>
<td>$3,831</td>
</tr>
<tr>
<td>USAir</td>
<td>$37,764,922</td>
<td>43,025</td>
<td>20.4</td>
<td>$878</td>
<td>$4,389</td>
</tr>
<tr>
<td>Average</td>
<td>$27,621,591</td>
<td>33,522</td>
<td>18.3</td>
<td>$848</td>
<td>$4,120</td>
</tr>
</tbody>
</table>

Note: All numbers are for 1994, domestic operations only. These results assume that a minute turnaround time becomes a minute of flying time, that fares are not reduced to sell additional seats, and that no costly organizational practices are required to make quicker turnarounds possible. These assumptions are challenged in the text.
turnaround time makes three important assumptions -- that minutes saved from turnaround time can be translated into flying time, that increased flying time can be sold without reducing fares, and that organizations can achieve faster turnarounds without making other expenditures. Each of these assumptions can be challenged. First, minutes saved in turnaround time do not automatically translate into revenue opportunities. Enough minutes must be saved in a given aircraft type to schedule an additional flight and, in a hub and spoke route structure, to schedule a return flight back to the hub as well. If we assume that the average flight time is two hours, and the average turnaround time is forty minutes, then the minutes that are saved must be used in increments of about 320 minutes. To reiterate, because of the discreteness of flights, every minute saved will not be captured as additional scheduled flying time. Some minutes will be 'left over' until enough additional time savings can be achieved to produce another flight.

The second assumption embedded in this analysis is that fares, which affect operating revenues, will not have to be reduced to sell the seats produced by the additional flying time. Unless industry demand is growing or industry supply is declining, fares would indeed have to be reduced to clear the market.

Third, certain costly organizational practices may be needed to achieve shorter turnaround times without suffering a reduction in on-time performance, customer satisfaction and baggage handling. Organizational practices that support shorter turnaround times by improving crossfunctional coordination and control are identified in chapters five and six. Some of them,
such as training for teamwork and higher supervisory ratios, are costly.

Still, there are clearly significant dollar gains to be achieved from reducing turnaround times. The challenge is to do so without incurring late arrivals, lost baggage and customer complaints. But research in other industries suggests that extra turnaround time may actually reduce rather than increase ontime departures and the quality of customer service. If extra turnaround time serves as a buffer in the system which reduces the pressure for learning and problem solving, airlines with higher turnaround times may experience lower rather than higher outcomes, just as manufacturing processes with more in-process inventories have been found to experience more frequent defects and lower productivity (MacDuffie and Krafck, 1991). The existence of a traditional quality/efficiency tradeoff is therefore open to question, and will be tested in the following chapter using a longitudinal, industry-wide data set.

2.3 Isolating the Components of Turnaround Time
The goal of this section is to identify the components of turnaround time and departure delay that are influenced by the coordination of the work process, those that are influenced by a carriers’ strategic choices about product complexity, and those that are beyond the control of any individual carrier.

Turnaround time and transit time together account for an aircraft’s total time in service. Turnaround time is the time from arrival at the gate until departure from the gate, and transit time is the time from gate departure to gate arrival at the downline
station. Reducing either one increases the number of flights an aircraft can make in a given day, and therefore increases the revenue generated by that aircraft. But reducing them below what the organization can reliably achieve risks late arrivals, which dissatisfies customers and causes further delays throughout the system.

Turnaround time can be usefully thought of as having four components, outlined in Table 2.5. Every carrier has a system wide minimum scheduled turnaround time (TURN1) -- the minimum period of time in which stations are expected to prepare an aircraft for departure. TURN1 varies for each plane type -- larger planes have a longer TURN1 -- and differs for international flights, where more meals have to be loaded and so forth. Often the total scheduled turnaround time is greater than the minimum, for reasons discussed below, but TURN1 is the period of time in which a station is expected to turn a plane around whenever a flight arrives into the station already off-schedule and needs to be turned around as soon as possible. If a flight comes in late, the station is charged with a late departure only if they take longer than the TURN1 for that plane and flight type to turn it around.

TURN1 also varies across carriers, even for the same plane and flight type, due to considerations like whether the carrier carries freight and mail. For example, Southwest increased its TURN1 from 10 minutes to 15 minutes in the late 1980s in large part because they began to carry freight and mail. It also varies across carriers depending on the speed at which the organization is geared up to turn the plane around.
### Table 2.5: Components of Turn Time, Transit Time and Delays

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TURN1</td>
<td>Minimum scheduled turnaround time. The turnaround time an airline reverts to when the incoming plane arrives late, based on the minimum feasible time to turn the aircraft.</td>
</tr>
<tr>
<td>TURN2</td>
<td>Scheduled buffers. Extra time scheduled beyond the minimum scheduled turnaround time, to increase the likelihood of staying on schedule.</td>
</tr>
<tr>
<td>TURN3</td>
<td>Scheduled connect time. Extra time scheduled beyond the minimum scheduled turnaround time, to allow passengers to connect.</td>
</tr>
<tr>
<td>TRANS1</td>
<td>Taxi time at originating station.</td>
</tr>
<tr>
<td>TRANS2</td>
<td>Flight time.</td>
</tr>
<tr>
<td>TRANS3</td>
<td>Taxi time at destination station.</td>
</tr>
<tr>
<td>DELAY1</td>
<td>Delay caused by coordination problems among station personnel or between station personnel and flight crew.</td>
</tr>
<tr>
<td>DELAY2</td>
<td>Delay caused by weather or airport congestion.</td>
</tr>
<tr>
<td>DELAY3</td>
<td>Delay caused by passenger accommodation.</td>
</tr>
</tbody>
</table>
For example, TURN1 is 15 minutes at Southwest and 35 minutes at American for comparable aircraft (the Boeing 737 and the MD80). This depends in part on differences in product complexity. It also depends on the efficiency of the work process, I argue, particularly the quality of crossfunctional coordination.

There is a second component of scheduled turnaround time -- call it buffer time (TURN2). It is added selectively onto a schedule when a particular flight is always late in departing due to various problems incurred in preparing the plane for departure, and when it is considered less costly to add buffer time than to risk the late departures or to fix the problems. But when a flight is late in arriving from the upline station, the scheduled turnaround time reverts to TURN1, and the station must do without the buffer time to avoid departure delay.

There is a third component of scheduled turnaround time -- call it transfer time (TURN3) -- that depends a great deal on the route structure. In a hub and spoke system, where flights are scheduled to converge at a central location, transfer passengers and continue to final destinations, additional ground time is scheduled at hub cities to allow passengers to transfer planes and at spoke cities to time flights to converge back at the hub at the same time. Point to point route systems may schedule in some transfer time at cities where passengers often transfer, but they minimize the need for TURN3 by scheduling more frequent flights so that transfers do not require convergence, and by designing the route structure so that there are numerous ways for continuing passengers to reach the same destination.
There are three primary kinds of nonscheduled turnaround time, or delays. The first is due to lack of coordination of some kind (DELAY1). The second is due to weather or airport congestion that prohibits the aircraft from pushing back from the gate (DELAY2). The third is a discretionary delay made to accommodate passengers from another flight when the transfer time was not sufficient, or passenger delay in embarking or disembarking due to other problems (DELAY3).

Transit time has three components. The first -- taxi time (TRANS1) begins as soon as the aircraft pushes back from the gate, and continues until takeoff. The other components of transit time are flight time (TRANS2) and taxi time at the downline station (TRANS3). Delays can occur in any of the three components due to airport congestion or weather but are relatively uncontrollable. Some carriers try to reduce TRANS1 by choosing airports that are less congested. This component of turnaround time is somewhat related to a carrier’s route structure since a hub and spoke carrier does the kind of peak scheduling that contributes to airport congestion. But even point to point carriers may be affected by the congestion caused by hub and spoke carriers if they use hub airports. Other than changing airports or decreasing the peaking of one’s schedule, increasing the scheduled transit time is often the only viable response to transit delays.

Increasing the efficiency of the work process through crossfunctional coordination allows a carrier to reduce minimum scheduled turnaround time (TURN1) and buffer time (TURN2), and to reduce delays that result from a lack of coordination (DELAY1). But improved
coordination does not reduce transfer time (TURN3) or transit time, or to reduce delays due to congestion (DELAY3) since these are driven largely by the scheduling required to support the hub and spoke route structure and the airport congestion that results from it. These other kinds of turnaround and transit time are also costly to carriers, but because they are not affected by organizational skills like crossfunctional coordination they are not the primary focus of this research. They are built in costs of the hub and spoke system -- presumably costs that are outweighed by the benefits of hubbing. The larger debate about hub and spoke versus point to point is a heated and complex debate (Morrison and Winston, 1986; Aviation Systems Research Corporation, 1993; Simat, Hellieson and Eichner, 1993; PRC Aviation, 1993) that will not be engaged here.

2.4 Strategies for Improving the Flight Departure Process

Traditionally in the airline industry, departures were treated as a set of tasks undertaken by different departments, each of which was held accountable for its own piece of the overall process. In the 1980s, experimentation with employee participation was common, to increase cost efficiency and customer satisfaction, particularly as related to airport processes. But with the exceptions of Pacific Southwest Air, People Express and America West, participation was extended within functional boundaries only. The importance of crossfunctional coordination to operating outcomes was not well understood.

In the early 1990s, led by the example of an increasingly visible Southwest Airlines, airlines began
to focus on improving the efficiency and quality of departure process outcomes, in addition to pursuing other competitive strategies. The focus on quality, in the sense of product reliability, was encouraged by the Department of Transportation's collection and monthly publication of measures of ontime performance, baggage handling accuracy and customer complaints. The focus on efficiency, already stimulated in the 1980s by the pressures of post-deregulation competition, was strengthened by a shift in consumer behavior in the 1990s.

The shift in customer demand in the 1990s was toward greater price sensitivity. The shift appeared to affect business travelers as well as leisure travellers, partly through corporate directives to cut down on travel costs. For example, the president of the West Coast division of Circuit City said, "My directive to all my people is to fly Southwest whenever possible. We don't need the frills -- just good service, a good fare and to be there on time" (McDowell, 11/5/93). Another example, potentially with far reaching consequences, was the recent IBM effort to renegotiate the terms of its corporate account with American and United Airlines. IBM asked the two airlines "for deeper discounts on tickets if the company bans employee frequent-flier miles the lower fares with the major carriers in exchange" (Schmit, 3/3/94), a request that both airlines denied presumably because frequent flier mileage is an inexpensive way for them to build loyalty. It apparently is not inexpensive for the companies that pay for the travel, however, leading some industry analysts to predict "a stampede of companies trying to do the same thing if the airlines agree" (Schmit, 3/3/94). This suggests
increasing competition on price rather than on the factors that traditional carriers have relied upon.

"A lot of airlines were very service-oriented before," said United's Boston ramp manager. "Pricing wasn't that different between carriers especially under regulation. People would decide on United versus American based on service features like meals. Nowadays with the discount airlines out there, it's been proven over the years that amenities don't make as much difference as everyone thought they did. Now it's price and ontime. A lot of airlines are going toward mirroring Southwest Airlines." Change has not come easily however, he said. "United was one of the most outspoken carriers for deregulation. Eastern and Pan Am were against it. It hasn't been ideal for us though. We became more of an entrepreneur. Before it didn't take a lot of brains. Now it's like being a small businessman. That's what the older airlines are going through."

The new competition "has forced carriers to look at processes, to rethink everything we do," said United's Los Angeles station manager. "It used to be so simple, but in the 70s with deregulation, we got more complex. We could do more things. We got more sophisticated. Now we say let's streamline. We've done all these things but we're not sure we've asked the customer what they wanted."

"We have to play with the price enough so that it's still a benefit," he continued. "After awhile, I'll drive or not go as much. It's also built around business going well. Companies have furloughed all those employees. Those folks are now starting their
own businesses or are joining small businesses. Even the big companies can only write off 80 percent of business travel, where it was 100 percent."

Demand conditions changed, but the Southwest strategy was not entirely new. "It’s a cyclical industry," said United’s Los Angeles station manager. "It used to be every ten years there was a new best practice. What Southwest is doing today and forcing other to do is what Pacific Southwest Air, Air Cal and Piedmont were doing since the 60s. So many mega carriers at the time, but no one looked at these smaller carriers as their competitors." It is a combination of the Southwest strategy and changes in demand that enlarged the effective niche for that strategy.

Other major carriers -- American, Northwest and Delta -- as well as United’s mainline operations and Continental Classic -- have relinquished short haul routes to regional partners, rather than remaining in these markets and competing with Southwest and its imitators. Their strategy was to shrink back to their strongest hubs, compete in the longer haul markets, and to protect their hubs from price competition. But the Southwest strategy has provided learning opportunities for these hub and spoke operators as well, especially in the area of aircraft utilization and staffing levels.

1. Southwest Airlines

Southwest was founded in 1971 but initially served only the Texas intrastate market and thus did not pose a competitive threat to the major carriers. Initially an idiosyncratic regional carrier, Southwest began
flying into California in the late 1980s. Southwest reached a turning point in 1991 when it moved into the California intrastate market by taking over the San Jose/Los Angeles market as American Airlines was pulling out of its unprofitable San Jose nub. By the end of 1994, Southwest had established a presence in the midwest and south and a first site on the east coast. It was the sixth largest carrier in the U.S. measured in terms of passenger enplanements and had exceeded all other major carriers in ontime departures, baggage handling and customer satisfaction for three consecutive years. Southwest also has consistently exceeded all other major carriers in safety performance (measured as pilot deviations per departure) and profitability.

Southwest grew by offering low fares designed to compete with the automobile and bus, rather than other airlines. A Department of Transportation study shows that with its low fares, Southwest has increased air travel by at least 30 percent in every market it has entered (Department of Transportation, 1993). From the point of view of employee welfare, what matters is how low costs are achieved. Southwest’s low costs are not based on low wages -- more of its employee groups are unionized than at any airline other than Northwest, and they are paid at a level comparable to other major airlines. Rather it is able to offer lower prices and greater convenience due in large part to its quick turnarounds -- 15 minutes rather than 35 minutes for a comparable flight by American Airlines -- and high employee productivity. When a plane spends less time on the ground, it is able to earn more revenue per day. Given the high value of aircraft, the gains from reducing turnaround times by just one minute per
departure system-wide are substantial, as illustrated in section 2.2.

Southwest built its strategy around quick turnarounds and low staffing levels, based on several distinct elements -- a simplified product, a point-to-point route structure, and a single aircraft type. But even with a simplified product, it is organizationally challenging to achieve dependable and safe service while scheduling short periods of time for turnaround and relatively few employees to carry out the work. Southwest achieves efficiency and quality outcomes, later chapters will show, using a high degree of crossfunctional coordination among frontline employees.

Due to its effect on other airlines in the early 1990s -- "the Southwest effect" -- the Department of Transportation labeled Southwest the dominant U.S. airline (Department of Transportation, 1993). The success of Southwest has increased the pressure on other airlines to streamline operations for cost efficiency and customer satisfaction. Some, including several new entrants, have sought to imitate the Southwest strategy, complete with changes in product mix. Others have attempted to reinforce their hub positions and maintain a traditional product mix, while still achieving efficiencies in turnaround time and airport staffing relative to that product mix.

Southwest grew tremendously from the mid 1980s to the mid 1990s, particularly in 1993 with the acquisition of one of its imitators -- Morris Air. Morris Air was acquired for its strong, complementary route structure in the Northwest United States and for the expected ease of its integration into Southwest,
given the careful attention by its founder June Morris to imitating the Southwest formula. But the costs associated with the 1994 integration of Morris Air into Southwest’s employment and route system were great, taking a toll on Southwest’s 1994 profitability.

Even moreso, fare competition from other carriers that adopted the Southwest quick turnaround strategy took a toll on Southwest’s profitability, which dropped 48 percent in the fourth quarter of 1994. The United Shuttle forced fare wars in several of Southwest’s West Coast markets, while Continental Lite and USAir forced fare wars on the East Coast, particularly on Baltimore, Cleveland and Chicago routes. In announcing a major fare cut in December, Southwest’s director of revenue management said that "The fare sales in and of themselves are meant to reestablish ourselves as the low-fare leader" (O’Brian, 12/1/94). Lower profits and the fear that Southwest would lose its distinctive basis for continued profitability as others learn to imitate it fueled a 54 percent decline in Southwest’s stock price from February to December of 1994.

Field research conducted at Southwest over this period suggested that the competition Southwest faced in its niche market generated considerable anguish throughout the organization. "There is so much competition out there that people are really pulling together," said a customer service supervisor. "The Shuttle is all that’s on our minds right now," said the Los Angeles station manager. "We just watched a feature on 48 Hours about us and the Shuttle. They say the United system is far too rigid to provide good customer service. But our stock started at 30 this year and it’s down to 17."
The threat to Southwest posed by competitors like Continental Lite and the United Shuttle was the theme of the CEO’s 1995 Message to the Field, even though Continental had just given up the Lite concept in defeat. All carriers are now competing on costs, he told employees, in response to the challenge posed by Southwest. Southwest has shown a lot of discipline with its costs, even during good times, he emphasized. This is what enabled Southwest to continue making money during the 1990-94 depression in the airline industry. In fact, Southwest had reduced its costs further between the fourth quarter of 1993 and 1994, from 7.11 to 6.94 cents per average seat mile. Given the billions of seat miles flown by Southwest, this cost difference adds up to millions of dollars in profits. Without this improvement in costs, Southwest profits in the fourth quarter would have fallen 84 percent instead of 48 percent. "We want to reduce all of our costs, except our wages and benefits and our profit sharing," said the CEO. "This is Southwest’s way of competing, unlike others who lower their wages and benefits."

The fear, in particular, was that a hub and spoke carrier like United would achieve lower fares on short haul flights by successfully imitating the Southwest strategy, then have the additional advantage of a second, hub and spoke product with longer haul flights and a more extensive route network. Southwest was excluded from two major computerized reservations systems in 1994 -- Continental’s System One and United’s APOLLO -- further fueling Southwest’s fears that its competitors were trying to put it out of business. In 1995, Southwest would concentrate on consolidation after its year of intense growth. Only one new city would be opened -- Omaha -- though routes
would be added between existing cities which were not yet directly connected. Kelleher predicted that Southwest would continue to do poorly in the first and second quarters of 1995, but that by the third quarter Southwest would be back to its usual level of profitability.

2. Morris, ValuJet, Reno and Midway Airlines

New entrants in the 1990s -- like Morris, ValuJet, Reno and the new Midway -- imitated the Southwest formula in an effort to take short haul routes from the hub and spoke carriers and their regional partners. "The effect on the major carrier is a further erosion of revenues," observed one industry journal. "Not only have these upstarts dictated the fare structure for majors and -- to some extent -- their regional partners through a lowering of the prorate arrangement, but they have forced the majors to cut back service on several routes where they cannot compete directly. American Airlines Chairman and President Robert Crandall estimated that his airline competes against low-fare jet carriers in nearly 40 percent of its domestic markets" (Nelms, 12/94).

Morris Air challenged Delta Airlines in its Salt Lake City hub by charging up to 70 percent less for unrestricted fares on its 34 routes. Delta matched Morris on many flights and offered double frequent flier miles to its passengers (Schmit, 5/5/93). Southwest bought Morris Air in 1994 to increase Southwest’s presence in the Northwestern U.S. and added five new cities in that region, presenting an additional challenge to Delta and also to Alaska Air (Carey, 7/20/94). Morris Air was a low cost carrier modelled closely after Southwest, but after the
acquisition Southwest was able to reduce Morris Air costs by an additional $10 million per year, said Southwest’s CEO Herb Kelleher (Air Transport World, 1/95).

On the East Coast, ValuJet competed directly with Delta Airlines in its Atlanta hub starting in October 1993, with round trip fares as low as $78. Delta matched ValuJet’s fares on some flights, but only with a few seats (Schmit, 9/1/94). As of May 1995, ValuJet served 24 cities and had the lowest industry costs per seat mile. ValuJet’s low costs were based in part on low pay to its nonunion workforce, half of which are contract employees.

Reno Air, based in Reno, Nevada, first flew to Seattle and Los Angeles in 1992, then added five other west coast cities in quick succession. Some carriers, like United Express, have given up routes when confronted by Reno’s low fares (Schmit, 2/16/93). But when Reno challenged Northwest by adding three round trips to Minneapolis, Northwest matched the fare and was accused by the Department of Transportation of anti-competitive behavior. Reno has a secondary hub at San Jose, “where it essentially replaced American and American Eagle” in 1993 (Business and Commerical Aviation, 1/94). By taking over American’s routes to seven West Coast cities and establishing a frequent flier partnership with American, Reno became a direct competitor of Southwest, which had just established itself in San Jose (New York Times, 5/13/93). In effect, American established a partnership with Reno Air when it was not able to compete on its own, or through its regional turboprop partner, against Southwest.
Midway Airlines, based in Chicago, was another new entrant in a partnership with American Airlines. It came back into business two years after shutting down, initially flying only between Chicago and LaGuardia. But in March 1995 Midway formed a partnership with American as American withdrew from its Raleigh/Durham hub, and began flying routes that American abandoned. In return, Midway gets American frequent flier miles for its passengers. Southwest, having also established itself in Raleigh/Durham, faced competition from a Midway/American partnership, just as it faced competition two years earlier in San Jose from a Reno/American partnership.

The answer to Southwest and these new entrants was innovation by the major carriers. Some of them -- TWA, Continental, USAir and United -- attempted to imitate Southwest in parts of their operations. Various factors have affected their success -- from the presence of human resource practices to support crossfunctional coordination, to a correct reading of the demand for low cost short haul service, to a reorganization of maintenance and other assets to fit the new route structure.

3. Trans World Airlines

TWA's was the shortest lived of the quick turnaround experiments. TWA acquired a fleet of DC-9's in the early 1990s under Carl Icahn "with the idea of doing the Southwest quick turn strategy" centered around the Atlanta hub. "No meals, just a few sandwiches and the flight attendants would pick up after the passengers," explained TWA's Boston station manager, interviewed near the end of this experiment. The goal was to turn the DC-9 in thirty minutes. "To
do the DC-9 in 30 minutes is impossible," he said. "We never do it. It's foolish to compete on quick turns unless you have a specific in house unit to do this. You need specific people and it's labor intensive. You have to clean it, cater it and fuel it in 30 minutes. And the DC-9 had no galley access at the back. It was not designed to do this. We had a problem with the cleaning. Initially the flight attendants were doing it. But some weren't doing it or were less than enthusiastic. It was a vague idea. It was talked around by labor relations and never was resolved. If flight attendants don't clean it, you can't do it in 30 minutes." The schedulers would not increase the ground time, but "now we have an understanding that we won't be persecuted for lateness on these flights."

The Atlanta hub was the center of this TWA quick turn experiment. "It doesn't work," said TWA's Boston manager. "The yield is atrocious. ValuJet is the problem there. They are big and getting bigger." TWA's quick turn experiment ended June 1, 1994 when TWA reduced its flights out of Atlanta from 56 to 11. "The big issue in the industry is whether to compete with Southwest or not. Whether to go full service or go to a lower level of service. Southwest is enormously successful and it has a big name. But we're not going to do it. We will match fares where we have to. But we are not going to dilute our service. We'll take the losses."

4. USAir

After losing most of the intra-California market to Southwest Airlines in 1992, USAir countered Southwest's invasion of its Baltimore hub in 1993 and prepared itself for competition from Continental's
quick turnaround operation, CALite, by setting up its own quick turnaround operation under the name Project High Ground in February 1994. Project High Ground, in planning since January 1993, is designed to "speed the way [USAir] services and turns around planes at airports. Borrowing a page from Southwest, USAir is trying to halve the time its planes spend on the ground" (McCarthy and O'Brien, 2/28/94). According to USAir's Boston station manager, "On our regular flights, we get 40 to 45 minutes to turn the plane around. Under High Ground, we do it in 20 to 25 minutes for some and 30 to 35 minutes for others, depending on the routing."

USAir planned to match Southwest's low fares and CALite's expected low fares, despite having the highest per seat mile costs in the industry, by reducing turnaround time with 22 of its jets and increasing the potential seats to be sold by 21 percent due to increased flying time (Jones, 2/18/94). In anticipation of Continental Lite's effect, USAir cut fares preemptively by up to 70 percent on some of its East Coast routes. "Boston is one of the first cities in USAir to try out Project High Ground" even though "the new low cost carriers affect Boston less, so far," explained the Boston station manager in the spring of 1994. "The yield here is still high. We still have our premium customers. CALite [Continental's own quick turnaround operation] will fly out of Boston, however, so we are responding with Project High Ground...We've been planning it for quite a long time. We have to do it -- there's not much choice."

Interestingly, the model for Project High Ground was not the more visible Southwest Airlines, but one of
USAir's own acquisitions from the late 1980s -- Pacific Southwest Airlines (PSA). "PSA did things quite differently," said the Boston station manager, formally of PSA. "In fact it was a carrier that Southwest learned a lot from when they first entered the California market. PSA emphasized quick turns. The turnaround times were as low as 12 to 13 minutes and 20 to 25 minutes on the bigger planes. There were no seat assignments, no interlining and they sold their own tickets."

When it acquired PSA in the late 1980s, USAir brought in some of the PSA managers. "But at first there was no effort by USAir to learn from PSA," explained the former PSA manager. "I remember USAir sending a strong signal that it would take over PSA and just make it into USAir. PSA aircraft had smiles painted on each one, and USAir painted out the smiles." USAir subsequently lost most of the intra-California market to Southwest Airlines (Schmit, 7/14/93). Once USAir decided it was necessary to reduce turnaround times to counter low fare competition in its East Coast stronghold, they sought out former PSA managers for advice.

Some of PSA's practices were adapted to Project High Ground. "At first we assigned seats -- now we have no advance seating, like PSA. Also, cleaning the aircraft takes forever. We can not clean it, or we can clean it while people are deplaning like we did at PSA. We are doing the latter, but here the ramp crew does the cleaning, not the flight attendants." They also tried to limit carryons. "In Project High Ground we are very explicit. Carryons were not intended to be used to avoid check in. Passengers have to check them
or it slows the process down. There is a process of making people aware. We use sizers at the gates to encourage people to check bags prior to the boarding process. We announce on board, asking them to put it under the seat." But other than boarding procedures, "there is no differentiation to the customers yet, unlike CALite. We haven’t changed the amenities, like the meals. Our customers have different expectations. We can’t offer them a lack of amenities."

**USAir** announced in spring 1994 that it would expand its quick turnaround operation from 22 to 100 aircraft in July and would increase longer haul flying to reduce costs per seat mile. But in the meantime they were initiating "permanent" fare cuts in nearly all their East Coast markets, incurring large operating losses. Some industry observers expected USAir to fail unless labor contracts could be made more flexible. "The kind of flexibility USAir needs isn’t in existing labor contracts," an industry analyst told the Wall Street Journal. "If you’ve got to remodel the house, you need the cooperation of all the residents" (McCarthy and O’Brien, 2/28/94). Concessions had been achieved in 1992, but for one year only. Strong pressures from investors for pay cuts and strong stands from union leaders against them put top management in a difficult position. Moody’s lowered USAir bond ratings in February, citing "concern that the company’s recent operating changes designed to reduce its cost structure will not be sufficient to offset the anticipated revenue losses from price competition" (Feldman, 6/94). The pilots’ union took the position that the airline’s costs were too high, not because of labor, but because it was not deploying its assets wisely. Still, CEO Seth Schofield told the New York Times, "I have a great
deal of faith in the employees of USAir" (Bryant, 3/24/94).

A June proposal to the union to save $175 million through management and staff reductions and by subcontracting mail and freight operations was met by a pilot counterproposal for an employee buyout with board representation. A year later, after stalled negotiations, the airline’s fifth crash in five years, a perceived threat of bankruptcy, another new entrant forcing fare reductions and threats by management to shrink the airline, the parties reached agreement.

In the meantime, Project High Ground evolved from a separate operation into a company-wide strategy for gaining efficiencies in ground time. "There were certain procedures put into use in Project High Ground, that were initially kept separate," said the Boston station manager. "There was also a set of routes -- a quick turn network -- that was kept separate. Then High Ground expanded, and expanded again, to include more plane types. It became so large, we couldn’t separate the two. We couldn’t keep designating specific gates to be used for quick turn versus the others. So we rolled the best practices from quick turn into the regular operation. We rethought turn times throughout the company so that, in the end, it’s not a distinct product."

Quick turn practices at USAir were not combined with a simplification of the product as at Continental or United, as we will see. Instead, at USAir, quick turn was combined with additional amenities for passengers in a new product called Business Select, introduced in the summer of 1994. "We used the quick
turn practices for the Business Select service. High Ground and Business Select were done in the same aircraft. Now we use the High Ground technology even to turn Business Select flights."

Although Project High Ground initially involved a move away from hub and spoke toward more point to point routes, ultimately USAir dropped many of these routes and resumed its hub and spoke strategy. There were two primary reasons for this shift -- first, that "there are limited markets that are dense enough for point to point" and second, that there is a revenue premium associated with flying through one's own hubs because competition is effectively limited.

Through its evolution over time, USAir's Project High Ground demonstrated that turnaround time can be meaningfully reduced even with a traditional product and a traditional route structure. The key is not the absolute reduction of turnaround time, but its reduction relative to the product being offered. "Quick turn and regular operations are different operating paradigms -- you look at the plane differently." But they do not necessarily entail different products.

5. Continental Airlines

Continental's "airline within an airline" called Continental Lite began to fly in October 1993 offering no frills, high frequency point to point service at low fares. In March 1994, Continental Lite expanded to include 25 percent of Continental's passenger emplanements, and 62 percent of its departures. The low fares were supported by a turnaround time of 20 minutes, down from Continental's usual 50 minute
turnaround. The faster turnarounds were achieved in part by more efficient work practices, and the stated goal was to use those work practices to speed turnarounds throughout Continental's operations. "It's supposed to infect the whole bloody company," said one of Continental Lite's leaders (Zellner, 12/6/93).

This strategy was adopted after abandoning a very different strategy that had been tried earlier in 1993, called Service Evolution. "Service Evolution was a totally different concept," said the Cleveland station manager. "The idea was increasing headcount and adding services. A lot of effort to get the bags out quicker and reduce line waiting. We left it behind because of a difference in philosophy between John Nelson, vice president of marketing, and [then-CEO] Ferguson. Nelson's idea was to increase service amenities. Ferguson's was the opposite, to offer a no-frills product." According to a Boston ramp supervisor, "it didn't work. Passengers wanted service but the revelation was on short haul they don't want to pay for it."

Led by Ferguson, Continental explored the establishment of a quick turnaround strategy. "Bob Ferguson wanted to buy Southwest -- it was a serious plan," said the Boston supervisor. "But they weren't interested. So why not just emulate them? You have to give all the credit to Southwest. Our industrial engineers went there to visit. Southwest invited our people into their little world. Mr. Kelleher said, 'Come on in, ask anything you want.' I don't understand why." According to a former board member, Continental also drew on the experience of its managers brought in from New York Air, a small carrier once
owned by Texas International, for operating ideas. Continental had employees from its acquisition of People Express who could have provided some input as well. "People Express did some quick turns," said a Continental manager. "They had a quick turn philosophy. It was very much on and off... We have quite a few people here from People Express, but they weren’t asked to help design Lite. All the management people from People Express had already been gotten rid of." In the design of Lite, the Southwest influence predominated.

With help from two Southwest Airlines marketing veterans, Don Valentine and Sam Coates, and low labor costs and flexible workrules achieved in the 1980s when Frank Lorenzo busted Continental unions, Continental Lite was expected to have the best chance of any of the major carriers to achieve a quick turnaround strategy. Kelleher, Southwest Airlines’ CEO, said that relative to other major carriers, "Continental has alot more latitude to attempt it" (USA Today, 9/10/93). By fall 1994, Continental Lite managed to get its employee productivity and aircraft utilization to target levels in most cities. The implementation in some sites appeared to be successful based on the teamwork measured across employee groups in getting the planes turned in less than 20 minutes. But quality suffered seriously. "Ontime performance dropped precipitously and customer complaints -- the old and persistant Continental bugaboo -- rose" (Flint, 9/94). These performance problems, along with inability to raise revenues to a sustainable level, inspired doubt by some industry observers that the experiment could work.

The problems identified under the new leadership
of CEO Gordon Bethune in fall 1994 included the lack of a suitable fleet and a failure to obtain buy-in on turnaround times. "One criticism of ourselves is that we don’t have a fleet that’s well designed for this kind of operation," said Bethune. "We developed operations mainly in Greensboro and Cleveland. But we had all kinds of planes in both places. A bunch of bankers and bankruptcy attorneys made that decision. Also, we’re an amalgamation of different companies, due to our history. One of our other problems is to get buy in across departments. If you’re late, is it the guy who carries out the schedule or the guy who writes the schedule? We can’t write a schedule that we can’t meet. It’s called buy-in. You can’t operate without it."

Third, the company’s maintenance assets were still fundamentally configured for a hub and spoke operation, in which aircraft depart from and return to hubs, allowing maintenance to be centralized in the hubs. In Lite’s point to point operation, aircraft were scheduled to go from small city to small city in a linear fashion, creating severe logistical problems when breakdowns occurred. This was construed alternatively as a failure of the maintenance department, and as a failure at the strategic level to put resources where they were needed to operate a non-hubbed route structure. A fourth problem was the choice of markets. Many of the point to point routes that were not linked to Continental’s hubs on either end were doing poorly. "The difficulty on the marketing side is that we took ten years of Southwest data and did regressions," said a station manager. "We said if we do x we’ll get y. We figured if we drop fares this much, we’d get this much traffic. But we
didn’t factor in the traffic potential of the individual city pairs."

The fifth key problem was resistance to Lite by Continental’s business customers, members of the Elite and OnePass programs, due to loss of the amenities they had come to expect. Station employees noticed this problem early on in the experiment. "If you take something away, it takes a little getting used to," said the Boston customer service manager. "Marketing monitors this very carefully. We board first class last in Lite, not first. There is no preboarding drink. There is not the wonderful little amenity of watching everyone board while you have a drink. We have a brochure to explain these policies. We put it in a positive light, saying that you will have more time in the station to make those last minute calls. We say you won’t have to sit there and have everyone crowd past you. There will be no first class meal, but there is a complimentary drink."

To meet customer expectations, station personnel bent the rules of Lite. The quick turns were "very unrealistic," according to a Boston customer service supervisor. "You can’t throw a person into a seat. You can cajole, announce, suggest. We are not supposed to, but we do a courtesy boarding for our OnePass members any time they want. We can’t stop that. It’s part of our culture. One thing I couldn’t understand, couldn’t express. With short haul strategy, you need a short haul culture. There should be no courtesy boarding. But we still did it. We wouldn’t hurry. Business First people loved it. But it didn’t jive with Lite." For the most part, however, employees did follow Lite procedures and business travel on
Continental declined (O’Brian, 1/10/95). The OnePass frequent flier program fell from number one in the industry to number five.

Throughout the fall of 1994, Bethune and his new leadership worked to solve these problems. "We have recovered significantly operationally," said Bethune. "We’re learning how to run a different kind of system. We’ve put pilots where they need to be. We’ve put mechanics and parts where the airplanes are. We have recovered from the lack of organization in the implementation of the strategic plan" (Flint, 9/94). Bethune estimated that 20 percent of Continental Lite’s routes did not work, primarily the routes that were designed to avoid the hubs, and began to cut service on them. Bethune set up a crossfunctional scheduling team to achieve improved integration between scheduling and operations (O’Brian, 10/27/94). And to adjust to declining numbers of business passengers, a plan was announced to reduce the number of BusinessFirst seats from 19 to 10 percent by May 1995 and increase the number of coach seats (USA Today, 10/26/94).

In January 1995, the changes accelerated as Continental began to reposition itself as a hub and spoke carrier. Bethune estimated that it was 32 percent of Lite’s routes that didn’t work, rather than just 20 percent, and started to cut all non-hub routes. The role of Continental Lite was reconceived as "the short-haul anchor to Continental’s hub operations, providing substantial feed to long haul operations" (CO Times, 1/95), rather than an innovative new standalone product. Fares were increased $20 to $40 on most Lite routes, setting off a round of fare increases throughout the industry. Bethune reversed the strategy
on Elite and OnePass travelers by restoring many of their privileges and meeting personally with them at his home to make amends. Don Valentine left the company at the end of the month still calling the Lite strategy a success.

In the March 1995 schedule, the strategy reverted completely back to hub and spoke. "We went back to the old way March 1," said the Cleveland station manager. "The load factor changed six percentage points right away. Better connects. Reliability is way up. It's very simple to explain -- it's the linear flying pattern we implemented with CALite versus the hub and spoke which is out and back. Very simple."

Continental had learned, as had USAir, that Southwest's quick turnaround strategy "is a completely different way of running an airline" (Schmit, 7/26/94). But the skills in frontline crossfunctional coordination that were gained during the CALite experiment should be relevant to Continental's hub and spoke strategy. As USAir found with Project High Ground, the key was to reduce turnaround times relative to the complexity of a given product, not necessarily to change the product to achieve a given turnaround time, irrespective of fixed assets or market demand.

6. United Airlines

United Airlines did with its Shuttle what Continental did with CALite -- imitate Southwest's quickturnaround strategy on short haul routes. The establishment of this quick turn operation was a key part of United's July 1994 employee buyout agreement. The agreement called for the Shuttle to operate short haul routes with reduced fares based on paying its
employees less than their counterparts in the larger company, though the pay scales are intended to merge eventually. The plan also called for cost savings through a quick turnaround strategy, modeled after Southwest. In October 1994, United began Shuttle operations in four California markets where it had steadily been losing market share to Southwest (Flint, 10/94). Like Continental Lite, the new strategy is modeled after Southwest in some important respects. Practices to support crossfunctional teamwork have been implemented and are intended over time to affect the whole company. Soon after the Shuttle began operation, CEO Gerald Greenwald said in a speech, "Shuttle by United will be a catalyst for change. ...We'll take the best of United and put it to work with our Shuttle -- and what we learn from the Shuttle, we'll channel back, to change the way the rest of the company does business" (Flint, 10/94).

The employee buyout, though attempted several times before in United’s history, was precipitated this time by the management’s proposal to create this short haul, low cost carrier. [After having proposed to abandon unprofitable short routes, much as American did in Spring 1993. "Mr. Wolf made clear that unless the unions come around, United would farm out the short haul routes. 'It’s not a management decision,' he said. 'It’s a marketplace decision'" (Salpukas, 5/10/93). United would contract out its short haul routes to a lower cost carrier, said Wolf, and that carrier would feed United’s long haul routes, unless the three major unions would produce productivity increases of about 10 percent. United management started discussions with Southwest about such a partnership.
"At the time, United's pilots asserted that their contract barred the airline from such a move [spinning off a smaller airline to compete with SWA on short flights], and suggested that they might stage a strike if it pursued such a venture. Subsequently, United's largest unions decided to try to gain control of the company" (Bryant, 9/10/93) and in the final agreement was the provision for up to 125 of United's fleet to be dedicated to the Shuttle by 1998 (Labor Relations Advisor, 4/91). "The timing was terrific," said the Los Angeles station manager. "With the industry changing, employees wanted a voice. The ESOP gave us an opportunity."

Operationally, the challenge was to figure out how to reduce turn times to 20 minutes while still retaining some of United's traditional amenities. "If we could get to the goal and still have seat assignments [for passengers], it would be win/win. Five or six of us worked on this. We went through countless variations of how to board quickly. The solution was to board window seats, then middle, then the aisle. The solution for assigned seats was to give assigned seats at the gate, after checking in."

From here, the innovations were made by "max mix" teams -- teams made of up employees and managers from diverse functional groups. "This is the cornerstone of the Shuttle," said Jim Hardigan, regional vice president of ground handling for the West Coast and leader of Shuttle development in the early stages. "From that point, I acted as the facilitator. We got 150 people together and said, write the playbook. We wanted it done by people who do the job level of detail. We really let them get into it. Because they
were crossfunctional, they came up with a playbook that was working right from the get go."

There was some learning from Southwest, though more selectively than at Continental. "We like a lot of what Southwest does," said the Los Angeles station manager. "Our goal is not to be Southwest. We started by asking, what is our customer base? What would they like?" "We took what we thought worked best for Southwest and best for United and made the Shuttle," said an operations coordinator who was involved on the design team. "People from across the system were involved. It was amazing to me that [Southwest] was so open." Even beyond the design phase, there is active learning from Southwest, especially where the Shuttle and Southwest operate in the same airports. "We're curious," said a Shuttle supervisor. "We've been mostly evaluating their boarding process and uniforms. Timing their turns."

Aside from its Shuttle operation, which imitates the Southwest strategy on United's short haul routes on the West Coast, United maintains the traditional hub and spoke strategy of gaining a revenue advantage through the domination of key hubs, and contracting out the uneconomical short haul routes to regional partners. Heavy investments in its Denver hub from 1992 through 1995 suggest that this strategy is alive and well at United. Like the other hub and spoke carriers, United is trying to reduce costs in its hub operations by reducing turnaround times and staffing levels where possible. Like Continental, United is doing this by leveraging the lessons learned from its quick turn operation into the rest of the organization, despite the strong cultural barriers that exist.
United is trying to build an employee ownership culture that will improve airline operations throughout -- from the Shuttle to the hub and spoke operation. As Greenwald said in an interview with Air Transport World, "We're banking on ownership to be our edge in a competition we've simply got to win" (Flint, 10/94). It was helpful that nonunion groups were included in the buyout, along with unionized groups, but hurtful that the flight attendants' union ultimately did not join the buyout and that the ramp and maintenance union supported the buyout by only a narrow margin. United also adopted an innovative system of accountability in April 1994, months before the Shuttle began operation, based on ontime arrivals rather than departures, to improve airline operations throughout.

United's Shuttle differs from Continental Lite in that it goes head to head against Southwest rather than choosing markets where Southwest is not present. It also differs importantly by choosing existing high density routes, between city pairs where at least one city has maintenance capabilities. Further, it started with a shuttle-type route structure -- out and back -- rather than the linear point-to-point route structure that CALite imitated from Southwest, causing a lack of fit with the layout of its maintenance facilities. But this out and back structure is evolving into the more operationally challenging linear point-to-point structure as the Shuttle expands the number of cities it serves.

Presumably because investors anticipate the success of United's Shuttle, Southwest's stock has been losing ground since the beginning of the summer of 1994 after strong growth throughout the late 1980s and early
90s. Through videos sent to their homes and through his annual Message to the Field, Kelleher emphasized to Southwest employees that they must take the challenge from the United Shuttle very seriously and strengthen their teamwork, because the Shuttle is challenging Southwest’s existence. These exhortations quickly were picked up by Shuttle employees and became part of the inspiration to compete harder against Southwest. "Herb threatened them," said a United Shuttle manager. "He sent a video to every employee. The video said that 'United has trained its employees in quick turns and customer service. They have put alot of money, alot of thought and planning into this. It's not a fly by night operation.' If you could get over the anger and threats, it was a good advertisement for the Shuttle."

Southwest also began to respond to the Shuttle with a more highly differentiated pricing structure. According to a Shuttle manager, "Southwest used to have a set pricing structure, never changed. It didn't take part in pricing actions. But it did about eight in the last two months [January and February 1995]. We've had to respond."

Besides exhorting employees to greater teamwork and competing through differentiated fares, Southwest also threatened to retaliate by entering into some of United's long haul markets. Accordingly, Southwest ordered its first jets in 1994 with coast to coast flying capabilities. Two hundred 737-700s were ordered and would be delivered over a period of time starting in 1997. This aircraft was the third Boeing aircraft for which Southwest was the launch customer, and it would enable Southwest to fly longer legs, at higher altitudes, including a coast to coast segment.
Following through on this threat would provide an additional test for the hypothesis tested in Chapter Three, that efficiency in turnarounds and staffing have payoffs outside of the classic Southwest "quick turn" strategy which has been confined to short haul flights with few onboard amenities.

7. American Airlines

American management in the 1990s made several efforts to improve crossfunctional coordination of the departure process. An IBM study done for American in 1991 found that at American "the departure process was a set of parallel lines that didn’t intersect," said a human resource manager. Following that study, station level experimentation, high level task forces and process advisory teams all were attempted to fix the awkward handoffs between functional areas and to streamline the departure process. In one station, the core functional groups involved in departures were placed under common management in an attempt to reduce the handoffs. Managers used training sessions and job trading to increase understanding across employee groups. Flight attendants agreed to "tidy" the aircraft on through flights.

These efforts were geared toward improving ontime performance and customer service as well as trying to shorten turnaround times, but not toward imitating the Southwest product. Ever since discussions at American in the early 1990s about launching a Southwest-like product, which faltered on a disagreement between management and the pilots union about workrules, American management was relatively united in the decision not to imitate the Southwest product. But Southwest's practices were still seen as relevant in
certain respects. "We view Southwest as a different product," said the vice president of field services. "I'm not sure how relevant it is to us. But teamwork is essential in either area. Teamwork is just as essential to us."

In short haul markets where American faced the most competition from quick turnaround carriers, it chose to withdraw rather than compete, citing high labor costs as the primary reason for its inability to compete. "American is not competing with Southwest," according to someone who works on strategic issues at American. "We are getting out of shorthaul. Crandall is saying to the unions, reduce my costs and we'll grow again. We'll go back into shorthaul. The labor contracts are key to getting back those markets. But we are pretty set on that strategy now anyway, even if the contracts did change."

But American abandoned some of its short haul markets in a way that allowed the carrier to maintain control over them. When American withdrew from its San Jose hub in the face of lowcost competition from Southwest, the company leased its gates to low cost, new entrant Reno Air and set up a frequent flier partnership with that carrier. Reno became a direct competitor of Southwest, in effect acting as a proxy for American Airlines. Midway Airlines, based in Chicago, is another new entrant that formed a partnership with American Airlines. It came back into business two years after shutting down, initially flying only between Chicago and LaGuardia. In March 1995 Midway formed a partnership with American as American withdrew from its Raleigh/Durham hub, and began flying routes that American abandoned. In
return, Midway gets American frequent flier miles for its passengers. Southwest has also begun flying those routes. Again, American appeared to be using a low cost, new entrant to compete as a proxy in short haul markets. "Midway was started by a former American manager," said a person familiar with American's strategy. "American helped put him into business. The pilots are upset about this. But we'll keep having these partnerships unless we get lower costs from the unions." According to this same source, it was likely that American would continue on the same path even if the unions made concession. "That's the direction we're going." [The best way for American to serve short haul markets effectively, according to this source, would be to use the American Eagles, the short haul subsidiary of AMR Corporation which currently is restricted by the pilot contract to flying only 70 seat aircraft or smaller.]

As the senior vice president of planning pointed out recently, a hub generates up to 20 percent more revenue per plane than a comparable point to point flight (Banks, 5/9/94), and American appears to be betting on its ability to maintain that revenue advantage in at least some markets. This 20 percent revenue advantage, however, is being lost through high labor costs and low productivity, said a company spokesperson (ibid). So even within the hub and spoke strategy, American needs to improve efficiency without undermining ontime performance and customer satisfaction. Improvements to the departure process are clearly one way to accomplish this, as is argued throughout this thesis.

Yet the many experiments and efforts to improve
the departure process at American have not lead to the implementation of lasting solutions. "Many efforts have been made, but parallel rather than building on each other," said a human resource manager. "Studies are done, with findings and recommendations, but nothing happens. Operational issues don't become strategic issues, unlike at Southwest. Everybody has concerns about the departure process, but it never gets anywhere." Instead, there is more attention at the strategic level to negotiating changes in labor contracts.

Perhaps this time will be different however. A new set of leaders appear to have a clear strategy for operational improvements. "We want an environment that would foster improved communication and more productivity," said an executive vice president. "Maybe crossfunctional coordination is the way to get that productivity. We're not thinking so much about reducing turnaround time, but we do want to know how to use fewer people and still get good results. We are interested in process-related productivity benefits."

"Speeding turnaround time isn't one of our main objectives," he continued. "Until we change the scheduling philosophy, we are constrained in reducing ground time. With our long haul route system, we need the hub and spoke so there are limits to how much we can reduce turnaround time... But don't get me wrong, speed is important. Say our average time is 40 minutes. If we could work on getting all turns down to our shortest -- say 30 to 35 minutes -- just taking off that five minutes could tighten up the entire complex, and give expedited service for the customer. And it would even improve aircraft utilization. But we get
the real revenue advantage from the hubs, not from utilization."

In addition to its efforts to improve the departure process through improved coordination, as described in Chapter Six, American tried to reduce wage costs through negotiations with its unions and through outsourcing airport functions to lower paid employees. In early 1995, American contracted out non-core customer service functions in the 30 largest stations, and all customer service functions in the other stations. The non-core functions included "baggage service, parcel service, and the customer service reps out in front of the counter," said the Los Angeles customer service manager. "We will outsource this work, and we won’t hire new ones. The company doesn’t want to hire full time permanent employees."

In sum, American’s strategy with regard to Southwest was threefold -- to cut labor costs through contract renegotiation and through aggressive outsourcing, to withdraw from short haul markets and compete through partnerships with smaller, low cost carriers, and to improve the departure process through crossfunctional coordination. It was not clear whether this three pronged strategy was a product of conscious design, or whether it was, like the departure process, "a set of parallel lines that didn’t intersect."

8. Delta Airlines

In 1993, Delta Airlines faced growing competition from low cost carriers in its Atlanta, Dallas and Salt Lake City hubs. There were months of apparent indecision, during which Delta considered starting a quick turnaround operations (Jones, 2/18/94), turned
over some routes to its regional partner Atlantic Southeast Airlines and lowered fares selectively to counter low fare competition. CEO Ronald Allen responded to investor impatience, reassuring them that "we have no intention of remaining complacent to changing public tastes and attitudes" (McKenna, 11/22/93). Finally in the spring of 1994, Delta announced its strategic response to the new competition (Bryant, 4/29/94). Delta would reduce costs on all of its routes, not only on the short haul routes where it faces increasing competition, and would not change its product substantially. Industry analysts were reportedly surprised, having expected Delta to create "a separate division offering inexpensive, no frills, high frequency service to a limited number of cities" (ibid). Delta made some reductions in food service, and said "it would likely set up a high frequency, low fare service in parts of its system, but that strategy would be small part of the overall plan" (ibid). In large part, the full service product and the hub and spoke route structure was to be retained due to its revenue advantages.

"Instead of addressing costs in just one market," said CEO Allen, "we are attacking the root cause of the issue directly by reducing costs everywhere...We need to do this in light of the marketplace today. Customers more and more are demanding low fares" (Bryant, 4/29/94). The stated goal was to reduce costs by $2 billion per year, to 7.5 cents per available seat mile, a level approaching Southwest's costs. To do this they would reduce employment by 15,000 by 1997 (ibid), requiring outsourcing of certain functions and up to 4,000 layoffs, after a policy of employment security for much of the company's history. These
layoffs were achieved without requiring negotiations except with the pilots, Delta's only union workgroup. Delta attempted to retain the loyalty of its employees, for which it is well known in the industry and from which it has benefited over the years, by offering attractive early out and time out packages.

Within this framework, the rest of the cost savings -- 17 percent by 1997 -- would be determined by employees. Delta formed eleven joint employee/manager leadership teams to generate cost reduction ideas. The proposals for cost savings, which included a cut in travel agent commissions and a redesign of its maintenance operations, resulted in a cost reduction of nine percent in the first year. The only major obstacle toward meeting its 1997 goal was expected to be negotiations with the pilots, which had reached a standstill.

During the same period, Delta worked on improving its departure process. Without moving to a quick turnaround operation, Delta like American Airlines still felt the need to improve the coordination and dependability of its system. "Historically we have one of the worst ontime records," said Delta's Boston station manager. "We made a strong effort in 1993 to improve the ontime, and in January 1994 we were the fifth out of the ten majors -- right in the middle. We're not looking to be number one in ontime -- we're happy to be right in the middle."

"Sometimes we were a little too relaxed," he continued. "Some of our passengers had come to expect Delta to be late. Then six months ago we decided to get everyone to work together. We started a flight
manager program where one person is in charge of the flight. It works, it makes a difference. When I was flying in January, I could really see the emphasis on ontime performance with the gate agents. I could see the emphasis and the urge to get the plane out." This adoption of a new coordination mechanism for departures, along with other supporting innovations, helped Delta to improve ontime performance, and to win the 1995 J.D. Powers awards for both the best domestic short flight and the best domestic long flight.

9. **Northwest Airlines**

Like American and Delta, Northwest also chose to stay with the traditional hub and spoke route structure, based on the revenue advantages it offers. Northwest managers shrunk the airline to a profitable core in the early 1990s by closing a number of unprofitable small hubs, and putting additional resources into hubs in Minneapolis, Detroit and Memphis where it faced little competition (Chandler, 10/17/94). Most of its routes under 750 miles were contracted out to regional carriers like Mesaba and Northeast Express. In 1993, top management agreed to an employee-proposed buyout which reduced costs through wage reductions from all major employee groups.

Managers confirmed in early 1994 that they did not intend to change their short haul strategy toward a Southwest-type strategy (Henderson, 1/94). In spring 1995, vice president Michael Levine elaborated Northwest's strategy. "Northwest got to be profitable by focusing on a very pure version of the network [hub and spoke] strategy. We focused on our sources of competitive advantage and built a network around them. It is important to have this kind of focus. We
eliminated our routes up and down the west coast. We eliminated some flying from Boston. We eliminated hubs at Washington, D.C. and elsewhere that couldn't reach critical mass." Though he "considers Southwest to be quite a formidable competitor," a hub and spoke carrier like Northwest would have trouble starting up a point to point carrier.

Still, there have been efforts at Northwest throughout the 1990s to increase productivity, to conserve on turnaround time and to earn a reputation for being number one in the industry in ontime performance. Employee productivity was increased through the workrule changes that employees offered in return for company equity. As regards aircraft scheduling, "we are always trying to reduce ground time," said Northwest's Boston station manager. "But we make sure we have time to load and unload. We make sure there is time for the cleaning people -- we have a separate cleaning crew. The flight attendants might pick up newspaper and magazines and do a quick clean but that's it. We have been consistent in ontime," he continued. "We are the only airline [other than Southwest] to win the triple crown twice, two months. Delta is very high on customer satisfaction, and we're just ahead of Delta now. All airlines are very aware of these things now. We have been consistent in ontime. If a flight is always late, the station manager gets to review the schedule -- check out the turn times -- to make sure we have enough time. We might review it and ask for more time. But it's difficult to get."

On the quality side, Northwest did quite well in the early 1990s with ontime performance, baggage
handling and customer satisfaction. Aside from Southwest, Northwest was the top U.S. airline in ontime performance from 1990 through 1994. In 1994, Southwest achieved for the third straight year the best performance in the industry in ontime, baggage handling and customer satisfaction. [For several years, Northwest consistently overstated its ontime performance in its advertising. In spring 1995, Northwest was fined by the Department of Transportation and ordered to stop false advertising claims that it was number one in ontime performance.] On the efficiency side, Northwest did not do as well. Over the period from 1987 to 1994, Northwest had the highest average turnaround time in the industry. Its ontime performance had come at a high cost. But having achieved major employee concessions, and having retreated to its hubs that faced little low cost competition, Northwest was not as hard pressed to cut costs further.

Still, Northwest managers worked to improve the quality and efficiency of the departure process. The Boston station adopted a new coordination mechanism in 1994 -- a crossfunctional team that coordinated all flights in the afternoons and evenings. "It makes for a good sane operation," said the station manager. "They are held accountable and there’s not alot of second guessing." Top leadership has advocated a continuous improvement philosophy company-wide which, at the station level, involves analyzing the root cause of each delay. "We operate on the premise that to get to the root cause, it’s not necessary to point fingers. Otherwise we can be burying delays. We really drill down to what is the problem. You can always to something about everything. There’s any number of
things we have to investigate. Too many people say there's nothing you can do." The company also appeared to have benefited from the employee buyout, not only in cost reductions and workrule changes, but also in employee motivation. "It gives employees a little more thought with how they conduct themselves...It's their investment, if they want it to grow."

Northwest's hubs went unchallenged through 1994, the company earned record profits, and was considered one of the "more remarkable turnarounds of 1994" (Air Transport World, 1/95). Northwest faced two major challenges in the near future, however -- the return to pre-employee buyout wages in August 1996, and the possibility of a challenge to its hubs by a low cost carrier. Both challenges would bring the same cost pressures to Northwest that the rest of the industry has experienced, and require Northwest to confront some of the hard decisions faced by other airlines in the first half of the 1990s.

2.5 Strategy, Product Complexity and Crossfunctional Coordination

In summary, there are two distinct strategies in the airline industry, both of which can benefit from crossfunctional coordination. The quick turnaround strategy relies on coordination and speed of employee communication, and allows for a highly efficient use of aircraft. This is the strategy Southwest Airlines has used to offer low cost air travel to consumers, and to dominate every market they have entered. This is also the strategy that Continental tried with its CALLite operations, that USAir adopted with its "Project High Ground," and that United adopted with the Shuttle by United. But it also requires a simple product and a
configuration of assets -- aircraft, routes and maintenance facilities -- that is very different from that of a hub and spoke operation. The other strategy gains market power through hubs and frequent flier programs to counterbalance higher costs and longer flying times. This is the strategy most U.S. majors have used in the deregulatory period, led by American Airlines. Still, even those with the traditional strategy can benefit from improvements in coordination of the departure process.

The hypothesis on strategy and crossfunctional coordination is the following. Traditional hub and spoke carriers will benefit from using crossfunctional coordination to improve personnel and aircraft productivity, and simultaneously to improve dependability and customer satisfaction. Other carriers -- those with a quick turnaround strategy -- will benefit from using crossfunctional coordination in conjunction with their simpler product, to achieve the same outcomes in addition to very low fares. Crossfunctional coordination will reduce departure delays, improve productivity and product delivery for both kinds of carriers.

The key, contrary to current industry belief, is not whether or not one has adopted Southwest’s quick turnaround strategy, complete with its simple product and a particular arrangement of its physical assets. The key is reducing turnaround time and staffing levels not absolutely, but relative to the complexity of the product that is offered. A forty minute turn for a longer flight, with a larger aircraft, more freight and mail and more connecting passengers, may require just as much discipline as a 20 minute turn with a simpler
product.

In place of the classic tradeoff between efficiency and quality, we should see that improved efficiency outcomes are compatible with improved quality outcomes, to the extent that reduced scheduling and staffing buffers stimulate crossfunctional learning. The compatibility of efficiency and quality outcomes is demonstrated in Chapter Three using a longitudinal industry data set. Evidence that crossfunctional coordination underlies the compatibility of efficiency and quality is found in Chapter Four.
3.1 Efficiency/Quality Tradeoffs

Each industry traditionally operates within some tradeoff between efficiency and quality in the production of its products or services. Part of an individual company’s strategy is the choice of where to operate along that boundary. But organizational learning fostered by total quality management, process redesign and the reduction of buffers have been used by companies in some industries to mitigate this tradeoff. When these practices are used in a key process, they can become an important source of competitive advantage and alter the competitive dynamics of that industry. For example, in the auto industry Toyota was the innovator in the 1980s and set a new standard for achieving higher quality (in the sense of product reliability) at a lower cost, a goal that other Japanese and U.S. producers have since adopted (Womack, Jones and Roos, 1990). This chapter presents evidence that Southwest Airlines has set a new standard in the airline industry for higher quality at lower cost, potentially changing the competitive dynamics of the industry.

Learning intensive practices in the auto and airline industries include two mutually supportive elements -- horizontal coordination based on teamwork and communication among frontline workers who perform different functions, and the reduction of time or inventory buffers.

In the airline industry, innovation has centered around the departure process. Carriers that use less
scheduled turnaround time should have better outcomes on ontime arrivals, customer satisfaction, baggage handling and safety, without resorting to excess staffing, particularly if they have instituted practices that support horizontal coordination. This would lend support to my argument that longer turnaround times are a form of organizational slack that detract from crossfunctional learning, and that quick turn strategies have an organizational learning spillover effect on other departure outcomes.

The old logic suggests a tradeoff between efficiency and quality, such that turnaround time and staffing must be increased to improve ontime performance, baggage handling, customer satisfaction and safety. The new logic suggests that low levels of resource utilization can lead to better outcomes, with the support of organizational practices conducive to learning. Toyota introduced this logic into the auto industry with its just-in-time inventory system -- Southwest, I argue, has introduced it into the airline industry. This chapter explores a portion of the departure process model introduced in Chapter One -- the relationship between efficiency and quality outcomes, controlling for differences in product complexity (Table 3.1).

3.2 Data

The following sections describe findings on product complexity, efficiency and quality outcomes for the ten major U.S. carriers, using longitudinal data from September 1987 through May 1994. The starting date was chosen based on data availability. The three
Table 3.1: Coordination and Control of the Flight Departure Process

System of Coordination and Control

### Coordination
- Crossfunctional Coordination Mechanism
- Horizontal Accountability
- Selection for Team Players
- Training for Teamwork
- Conflict Resolution
- Egalitarian Culture
- Flexible Workrules

### Control
- Supporting Role for Supervisors
- Qualitative Vertical Accountability
- Internal Promotion
- Shared Rewards
- Respect for Employee Representation
- Trust Building by Top Leaders

Cognitive Frame
- Shared Goals
- Shared Knowledge
- Shared Respect

Coordination Behavior
- Frequent Timely Interdepend
- Problem Solving
- Helping

Departure Process Outcomes
- Operating Efficiency
  - Turn Time
    - Staffing
    - Quality
      - Customer Satisfaction
      - On Time Arrivals
      - Baggage Handling

Product Complexity
- Cargo and Mail
- # Passengers
- Flight Length
- % Connections
measures of quality used in this analysis -- late arrivals, customer complaints and lost baggage -- have been collected and published by the Department of Transportation since September 1987. All variables used in this chapter re analysis are listed in Table 3.2. Their sources are described in Table 3.3.

The two key measures of efficiency are turnaround time and per passenger staffing levels. Although our primary focus is on turnaround time, there is little value in reducing turnaround time if staffing is increased to excessive levels to compensate for the shorter service period. To isolate true efficiency gains, both of these key inputs must be considered. To further isolate efficiency gains, it is critical to adjust turnaround time and staffing levels for differences in product complexity. The measures of product complexity used in this analysis are number of passengers per flight, length of flight, freight and mail carried, and percent of passengers who connect.

3.3 Product Complexity

Before we can compare efficiency or quality outcomes for the ten major U.S. carriers, it is necessary to understand and adjust for differences in their products. Clearly there is a demand for both a more and a less complex product, and we do not want to assume that either one is superior, nor bias our measure of outcomes in favor of a less complex product. Ultimately we want to compare apples and apples -- not apples and oranges. Number of passengers per departure, length of flight, cargo carried and percent connections all reflect types of product complexity.
<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EFFICIENCY</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Turn time = Minutes of scheduled aircraft time at the gate, per departure, excluding originating flights.</td>
<td>43.1</td>
<td>11.4</td>
</tr>
<tr>
<td>Staffing</td>
<td>Airport staffing = Airline employees excluding flight crews and maintenance, per 1,000 daily passengers enplaned.</td>
<td>125.9</td>
<td>37.8</td>
</tr>
<tr>
<td>Efficiency</td>
<td>(Time/ mean(Time) + Staff/mean(Staff))/2</td>
<td>50.0</td>
<td>15.1</td>
</tr>
<tr>
<td><strong>QUALITY</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complaints</td>
<td>Complaints = Customer complaints per 100,000 passengers enplaned.</td>
<td>1.55</td>
<td>2.44</td>
</tr>
<tr>
<td>LateArrivals</td>
<td>Late arrivals = Percent of nights that fail to arrive at the downline airport within 15 minutes of schedule.</td>
<td>19.3</td>
<td>6.7</td>
</tr>
<tr>
<td>LostBags</td>
<td>Lost bags = Bags mislanded per 1,000 passengers enplaned.</td>
<td>6.4</td>
<td>2.2</td>
</tr>
<tr>
<td>Quality</td>
<td>3/(Comp/mean(Comp) + Late/mean(Late) + Lost Bags/mean(Lost Bags))</td>
<td>124.7</td>
<td>52.6</td>
</tr>
<tr>
<td><strong>PRODUCT COMPLEXITY</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passenger</td>
<td>Passengers enplaned per departure.</td>
<td>72.0</td>
<td>12.2</td>
</tr>
<tr>
<td>Length</td>
<td>Miles flown per departure.</td>
<td>634.2</td>
<td>136.3</td>
</tr>
<tr>
<td>Cargo</td>
<td>Ton miles of freight and mail flown per departure.</td>
<td>724.4</td>
<td>450.8</td>
</tr>
<tr>
<td>Connects</td>
<td>Percent of passengers who connect.</td>
<td>38.2</td>
<td>12.0</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td>Turn time is computed by the author using Official Airline Guide scheduling data, archived and provided by the Office of Aviation Policy, Plans and Management Analysis of the Federal Aviation Administration. Flight sequences are established for flights with matching flight numbers, then scheduled arrival times are subtracted from scheduled departure times.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Staffing</strong></td>
<td>Staffing is computed by the author using Form 41, Schedule P10 from the U.S. Department of Transportation. This form includes annual full-time equivalent personnel data for all airline employees. The goal was to approximate airport staffing by using the following categories — Aircraft and Traffic Handling Personnel, Aircraft Control Personnel, Passenger Handling Personnel, Cargo Handling Personnel. These categories include some non-airport personnel, resulting in an overestimate of airport staffing levels.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Complaints</strong></td>
<td>Customer complaints are taken from Table 3 of the monthly Air Travel Consumer Report, U.S. Department of Transportation. The report is based on customer complaints made to the Department of Transportation Office of Consumer Affairs and published monthly. Complaints are attributed to the previous month to reflect the likely date of the incident. The measure used here aggregates four categories that include departure-related complaints, even though each category includes some non-departure-related complaints. They are —cancellations, delays or any other deviations from schedule —reservations, ticketing or boarding problems —lost, damaged or delayed baggage, carry-on problems —rude or unhelpful employees, treatment of delayed passengers, or inadequate meals or cabin service.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Arrivals</strong></td>
<td>On-time arrivals are measured by the U.S. Department of Transportation and reported monthly in the Air Travel Consumer Report.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Baggage</strong></td>
<td>Baggage mishandlings are reported by the airlines to the Department of Transportation, and published monthly in the Air Travel Consumer Report.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Passengers</strong></td>
<td>The number of passengers per departure is computed by the author using the Traffic Digest of Statistics: Commercial Air Carriers, published by the International Civil Aviation Organization for number of revenue passengers enplaned monthly, and the number of departures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>Flight length is computed by the author using the Traffic Digest of Statistics: Commercial Air Carriers, published by the International Civil Aviation Organization for total aircraft miles flown, and number of departures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cargo</strong></td>
<td>Ton miles of cargo and mail carried per departure is computed by the author using the Traffic Digest of Statistics: Commercial Air Carriers, published by the International Civil Aviation Organization.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Connects</strong></td>
<td>Percent of incoming passengers who connect is calculated by the author using Origin and Destination Survey Data, Average Coupons, collected by the U.S. Department of Transportation. The measure is average enplanements per passenger minus one.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
that affect the relative ease of the departure process. Airlines that offer a more complex product are therefore expected to require more scheduled turn time and more airport staffing per passenger.

Important differences are evident on Table 3.4. The average number of passengers per departure ranges from Alaska and Southwest Airlines at about 50 passengers per departure, to United and American at about 86 passengers per departure. These differences are not due mainly to load factors, which vary little across carriers, but rather to difference in average aircraft size.

Average leg length varies according to whether a carrier offers primarily a short or long haul product. Southwest and USAir are at the bottom of the distribution with 376 and 482 miles per flight, respectively. American and United lead the group with 785 and 810 miles per flight, respectively.

Cargo carried varies substantially across the major carriers in this period, with Southwest again at the low end, carrying only 7 percent of the industry average mail and freight. Northwest and United are at the high end with each carrying twice the industry average.

Percent of passengers who connect is especially low for Southwest, with only 12 percent connections relative to an industry average of 38 percent. Southwest is the least hubbed of all the carriers, with a linear or point to point route structure. America West and Alaska Air approximate this structure most closely at 24 percent and 32 percent connections.
<table>
<thead>
<tr>
<th>Airline</th>
<th>Passenger mean(SD)</th>
<th>Length mean(SD)</th>
<th>Cargo mean(SD)</th>
<th>Connects mean(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska</td>
<td>50.8 (6.5)</td>
<td>586.1 (37.6)</td>
<td>679.7 (75.6)</td>
<td>24.1% (2.1)</td>
</tr>
<tr>
<td>American</td>
<td>86.1 (7.5)</td>
<td>784.5 (51.8)</td>
<td>779.0 (201.5)</td>
<td>46.4% (1.6)</td>
</tr>
<tr>
<td>AmWest</td>
<td>72.8 (7.5)</td>
<td>557.7 (77.8)</td>
<td>348.8 (145.9)</td>
<td>31.6% (2.3)</td>
</tr>
<tr>
<td>Continental</td>
<td>72.4 (6.6)</td>
<td>749.0 (29.8)</td>
<td>700.0 (82.2)</td>
<td>40.2% (3.5)</td>
</tr>
<tr>
<td>Delta</td>
<td>79.4 (7.1)</td>
<td>622.5 (7.7)</td>
<td>704.1 (63.7)</td>
<td>52.7% (3.0)</td>
</tr>
<tr>
<td>Northwest</td>
<td>71.3 (7.3)</td>
<td>670.2 (39.3)</td>
<td>1501.0 (194.6)</td>
<td>48.8% (2.1)</td>
</tr>
<tr>
<td>Southwest</td>
<td>51.0 (34.3)</td>
<td>375.9 (4.6)</td>
<td>51.0 (34.3)</td>
<td>12.1% (1.1)</td>
</tr>
<tr>
<td>TWA</td>
<td>72.9 (6.3)</td>
<td>704.2 (18.2)</td>
<td>976.9 (87.3)</td>
<td>43.9% (2.0)</td>
</tr>
<tr>
<td>United</td>
<td>85.8 (7.6)</td>
<td>810.0 (24.2)</td>
<td>1310.6 (100.2)</td>
<td>40.5% (1.4)</td>
</tr>
<tr>
<td>USAir</td>
<td>61.5 (4.9)</td>
<td>481.7 (30.1)</td>
<td>192.6 (48.1)</td>
<td>41.7% (5.4)</td>
</tr>
<tr>
<td>Total</td>
<td>72.0 (12.2)</td>
<td>634.2 (136.3)</td>
<td>724.4 (450.8)</td>
<td>38.2% (12.0)</td>
</tr>
<tr>
<td>Obs</td>
<td>810</td>
<td>810</td>
<td>810</td>
<td>810</td>
</tr>
</tbody>
</table>
Delta is the most hubbed carrier, connecting over 50 percent of its passengers, with American and Northwest close behind at 46 percent and 48 percent, respectively.

A trend analysis of these variables (Table 3.5) reveals that for the major carriers as a whole, each dimension of product complexity has been increasing over the period. But there are interesting exceptions among individual carriers. Although passengers per flight has been increasing for the major airlines as a whole, American, TWA and USAir show no distinct trend over this period and Northwest shows a significant decline in passengers per flight.

Flight lengths have increased significantly over this period for all carriers except Continental, Southwest and TWA. No carriers experienced a decline in this measure of product complexity.

Freight and mail carried increased significantly for all carriers except United and TWA over this period, and rose quite sharply for American, America West and Northwest.

Finally, percent of passengers who connect increased for the major carriers as a whole, but for only four of the individual carriers -- American, America West, Delta and USAir. USAir experienced a particularly striking increase in connections, as it went from being a regional carrier to operating a hub and spoke system during this period. The rest of the carriers show no trend in connections, except Southwest, which decreased the percent of passengers who connect, from an already low level to an even
Table 3.5: Time Trends in Product Complexity

<table>
<thead>
<tr>
<th></th>
<th>Passenger</th>
<th>Length</th>
<th>Cargo</th>
<th>Connects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>coeff(t-stat)</td>
<td>coeff(t-stat)</td>
<td>coeff(t-stat)</td>
<td>coeff(t-stat)</td>
</tr>
<tr>
<td>Alaska</td>
<td>0.143</td>
<td>1.40</td>
<td>0.91</td>
<td>0.013</td>
</tr>
<tr>
<td></td>
<td>(5.41)***</td>
<td>(15.97)***</td>
<td>(2.63)*</td>
<td>(1.36)</td>
</tr>
<tr>
<td>American</td>
<td>0.054</td>
<td>2.12</td>
<td>7.74</td>
<td>0.027</td>
</tr>
<tr>
<td></td>
<td>(1.55)</td>
<td>(32.32)***</td>
<td>(18.72)***</td>
<td>(3.70)***</td>
</tr>
<tr>
<td>AmWest</td>
<td>0.240</td>
<td>3.16</td>
<td>5.48</td>
<td>0.076</td>
</tr>
<tr>
<td></td>
<td>(10.13)***</td>
<td>(28.93)***</td>
<td>(16.80)***</td>
<td>(10.51)***</td>
</tr>
<tr>
<td>Continental</td>
<td>0.137</td>
<td>0.19</td>
<td>1.96</td>
<td>0.017</td>
</tr>
<tr>
<td></td>
<td>(4.95)***</td>
<td>(1.35)</td>
<td>(6.03)***</td>
<td>(1.04)</td>
</tr>
<tr>
<td>Delta</td>
<td>0.155</td>
<td>0.26</td>
<td>1.98</td>
<td>0.099</td>
</tr>
<tr>
<td></td>
<td>(5.31)***</td>
<td>(12.00)***</td>
<td>(9.57)***</td>
<td>(11.21)***</td>
</tr>
<tr>
<td>Northwest</td>
<td>-0.132</td>
<td>1.48</td>
<td>5.95</td>
<td>0.017</td>
</tr>
<tr>
<td></td>
<td>(4.17)</td>
<td>(17.47)***</td>
<td>(9.19)***</td>
<td>(1.65)</td>
</tr>
<tr>
<td>Southwest</td>
<td>0.201</td>
<td>0.003</td>
<td>1.34</td>
<td>-0.029</td>
</tr>
<tr>
<td></td>
<td>(10.06)***</td>
<td>(0.15)</td>
<td>(20.78)***</td>
<td>(6.85)***</td>
</tr>
<tr>
<td>TWA</td>
<td>-0.016</td>
<td>0.14</td>
<td>-1.54</td>
<td>0.014</td>
</tr>
<tr>
<td></td>
<td>(0.53)</td>
<td>(1.60)</td>
<td>(4.05)***</td>
<td>(1.48)</td>
</tr>
<tr>
<td>United</td>
<td>0.069</td>
<td>0.65</td>
<td>-1.73</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(1.89)+</td>
<td>(7.29)***</td>
<td>(3.94)***</td>
<td>(0.08)</td>
</tr>
<tr>
<td>USAir</td>
<td>-0.002</td>
<td>1.23</td>
<td>1.93</td>
<td>0.178</td>
</tr>
<tr>
<td></td>
<td>(0.11)</td>
<td>(29.91)***</td>
<td>(26.15)***</td>
<td>(10.76)***</td>
</tr>
<tr>
<td>Total</td>
<td>0.111</td>
<td>1.06</td>
<td>2.40</td>
<td>0.041</td>
</tr>
<tr>
<td></td>
<td>(6.20)***</td>
<td>(5.28)***</td>
<td>(3.57)***</td>
<td>(2.30)*</td>
</tr>
<tr>
<td>Obs</td>
<td>810</td>
<td>810</td>
<td>810</td>
<td>810</td>
</tr>
</tbody>
</table>

+ Significant at p<.100  
* Significant at p<.050  
** Significant at p<.010  
*** Significant at p<.001
lower level.

3.4 Efficiency

These carriers also differ significantly in the levels of turn time and airport staffing used over this period (Table 3.6). Southwest Airlines has the lowest turnaround time by far -- at 17 minutes it uses only 40 percent of the industry average. Southwest is followed by Alaska Air at 33 minutes and America West at 41. At the high end is Northwest, which turns planes in 55 minutes -- 28 percent above the industry average. It is followed closely by TWA, American and United.

Turn time increased over this period for the major carriers as a whole (Table 3.7). Continental and TWA are the only airlines that did not experience an upward trend in turn time over this period -- Continental remained stable while TWA actually decreased its turn time. American Airlines experienced the largest gains in turn time.

In staffing, Southwest is at the low end again, employing an average of 63 airport personnel per thousand passengers enplaned daily, relative to an industry average of 97 (Table 3.6). America West follows closely with 64 airport employees per thousand passengers daily. TWA, Northwest, Delta and Alaska lead in staffing levels with over 100 airport employees per thousand passengers enplaned daily.

Staffing per passenger did not trend upward or downward for the carriers as a whole over this period (Table 3.7). American, TWA and United held staffing levels constant, while Delta and Southwest reduced staffing levels. For the remainder, staffing
<table>
<thead>
<tr>
<th></th>
<th>Efficiency</th>
<th></th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time</td>
<td>Staffing</td>
<td>Complain</td>
</tr>
<tr>
<td></td>
<td>mean(SD)</td>
<td>mean(SD)</td>
<td>mean(SD)</td>
</tr>
<tr>
<td>Alaska</td>
<td>33.0</td>
<td>110.5</td>
<td>0.31</td>
</tr>
<tr>
<td></td>
<td>(5.0)</td>
<td>(26.4)</td>
<td>(0.71)</td>
</tr>
<tr>
<td>American</td>
<td>50.8</td>
<td>93.6</td>
<td>1.15</td>
</tr>
<tr>
<td></td>
<td>(5.7)</td>
<td>(13.9)</td>
<td>(0.65)</td>
</tr>
<tr>
<td>AmWest</td>
<td>41.1</td>
<td>64.0</td>
<td>1.17</td>
</tr>
<tr>
<td></td>
<td>(4.0)</td>
<td>(9.7)</td>
<td>(0.73)</td>
</tr>
<tr>
<td>Continental</td>
<td>46.4</td>
<td>89.3</td>
<td>3.19</td>
</tr>
<tr>
<td></td>
<td>(2.8)</td>
<td>(15.8)</td>
<td>(4.42)</td>
</tr>
<tr>
<td>Delta</td>
<td>46.7</td>
<td>110.3</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td>(4.5)</td>
<td>(13.9)</td>
<td>(0.41)</td>
</tr>
<tr>
<td>Northwest</td>
<td>55.1</td>
<td>127.6</td>
<td>2.40</td>
</tr>
<tr>
<td></td>
<td>(3.4)</td>
<td>(15.7)</td>
<td>(4.17)</td>
</tr>
<tr>
<td>Southwest</td>
<td>17.3</td>
<td>63.2</td>
<td>0.44</td>
</tr>
<tr>
<td></td>
<td>(2.0)</td>
<td>(7.4)</td>
<td>(0.42)</td>
</tr>
<tr>
<td>TWA</td>
<td>51.2</td>
<td>135.0</td>
<td>3.92</td>
</tr>
<tr>
<td></td>
<td>(4.7)</td>
<td>(17.0)</td>
<td>(2.44)</td>
</tr>
<tr>
<td>United</td>
<td>50.0</td>
<td>94.9</td>
<td>1.36</td>
</tr>
<tr>
<td></td>
<td>(4.7)</td>
<td>(11.1)</td>
<td>(1.02)</td>
</tr>
<tr>
<td>USAir</td>
<td>41.6</td>
<td>78.8</td>
<td>1.05</td>
</tr>
<tr>
<td></td>
<td>(2.5)</td>
<td>(12.5)</td>
<td>(0.85)</td>
</tr>
<tr>
<td>Total</td>
<td>43.1</td>
<td>96.7</td>
<td>1.55</td>
</tr>
<tr>
<td></td>
<td>(11.4)</td>
<td>(27.7)</td>
<td>(2.44)</td>
</tr>
<tr>
<td>Obs</td>
<td>737</td>
<td>810</td>
<td>810</td>
</tr>
</tbody>
</table>
Table 3.7: Time Trends in Efficiency and Quality of the Departure Process

<table>
<thead>
<tr>
<th></th>
<th>Time coef(t-stat)</th>
<th>Staffing coef(t-stat)</th>
<th>Complain coef(t-stat)</th>
<th>LateArrv coef(t-stat)</th>
<th>LostBags coef(t-stat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska</td>
<td>0.165 (10.65)**</td>
<td>0.89 (3.85)**</td>
<td>-0.014 (4.71)**</td>
<td>-0.105 (1.69)**</td>
<td>-0.026 (3.84)**</td>
</tr>
<tr>
<td>American</td>
<td>0.212 (16.50)**</td>
<td>0.061 (0.53)</td>
<td>-0.014 (5.52)**</td>
<td>0.005 (0.19)</td>
<td>-0.044 (5.56)**</td>
</tr>
<tr>
<td>AmWest</td>
<td>0.141 (12.36)**</td>
<td>0.213 (4.55)**</td>
<td>-0.015 (4.80)**</td>
<td>-0.018 (0.63)</td>
<td>-0.061 (5.80)**</td>
</tr>
<tr>
<td>Continental</td>
<td>-0.005 (0.35)</td>
<td>0.321 (5.30)**</td>
<td>-0.121 (7.44)**</td>
<td>-0.002 (0.08)</td>
<td>-0.019 (2.83)**</td>
</tr>
<tr>
<td>Delta</td>
<td>0.169 (14.97)**</td>
<td>-0.386 (4.79)**</td>
<td>-0.011 (7.10)**</td>
<td>-0.003 (0.12)</td>
<td>-0.037 (5.29)**</td>
</tr>
<tr>
<td>Northwest</td>
<td>0.041 (2.37)*</td>
<td>0.247 (3.42)**</td>
<td>-0.108 (6.85)**</td>
<td>-0.171 (6.79)**</td>
<td>-0.038 (4.45)**</td>
</tr>
<tr>
<td>Southwest</td>
<td>0.078 (19.58)**</td>
<td>-0.076 (2.72)**</td>
<td>-0.013 (13.68)**</td>
<td>-0.115 (4.05)**</td>
<td>-0.001 (0.47)</td>
</tr>
<tr>
<td>TWA</td>
<td>-0.061 (2.45)*</td>
<td>-0.056 (0.60)</td>
<td>-0.087 (13.68)**</td>
<td>-0.097 (3.39)**</td>
<td>-0.081 (8.94)**</td>
</tr>
<tr>
<td>United</td>
<td>0.112 (5.83)**</td>
<td>0.024 (0.33)</td>
<td>-0.032 (9.75)**</td>
<td>-0.075 (2.57)*</td>
<td>-0.039 (4.28)**</td>
</tr>
<tr>
<td>USAir</td>
<td>0.064 (6.55)**</td>
<td>0.343 (3.85)**</td>
<td>-0.024 (7.85)**</td>
<td>-0.101 (3.58)**</td>
<td>-0.024 (2.40)*</td>
</tr>
<tr>
<td>Total</td>
<td>0.085 (4.82)**</td>
<td>0.074 (1.30)</td>
<td>-0.044 (13.21)**</td>
<td>-0.068 (6.98)**</td>
<td>-0.037 (12.50)**</td>
</tr>
<tr>
<td>Obs</td>
<td>810</td>
<td>810</td>
<td>810</td>
<td>810</td>
<td>810</td>
</tr>
</tbody>
</table>

+ Significant at p < .100
* Significant at p < .050
** Significant at p < .010
*** Significant at p < .001
levels climbed.

But neither turnaround time nor staffing, alone or in combination, themselves suggest organizational effectiveness. They must be judged in relation to quality outcomes. The following section offers a brief review of the quality outcomes that are most closely tied to the departure process -- ontime performance, customer complaints related to the departure process and baggage handling accuracy. In the final sections turnaround time and staffing are adjusted for differences in product complexity, then their relationship to quality outcomes is explored.

3.5 Quality

There is some variation in late arrivals across the ten major carriers (Table 3.6). United has the poorest record of ontime performance for the period as a whole, with 23 percent of its flights arriving more than 15 minutes later than the scheduled time of arrival. TWA, Continental, Delta and USAir belong to the same performance group, with 21 percent of their flights arriving late. Southwest and America West lead the group with late arrival rates of about 15 percent. Six of the ten carriers improved ontime performance for the period as a whole -- Northwest, Southwest and Alaska had the greatest rates of improvement for the industry (Table 3.7). Both Northwest and Southwest, notably, have competed for the distinction of being number one in ontime performance in the 1990s and have used the distinction as a marketing tool.

The variation across airlines in customer complaints, measured as the departure-related complaints made to the Department of Transportation per
100,000 passengers, is greater than the variation in ontime performance (Table 3.6). Alaska Air, Southwest and Delta received only 0.31, 0.44 and 0.54 departure-related complaints per 100,000 passengers, respectively, over this period. On the high end, TWA, Continental and Northwest received 3.9, 3.2 and 2.4 complaints per 100,000 passengers for the same period. Every airline experienced significant declines in customer complaints over the period, particularly the three with the most complaints (Table 3.7).

Lost baggage rates for the period as a whole range from 3.9 mishandled bags per thousand passengers at Southwest to 7.6 for TWA (Table 3.6). Every airline except Southwest experienced significant improvement in this area over the period (Table 3.7).

3.6 Effects of Product Complexity on Efficiency

Differences in product complexity are expected to account for some of the differences in carrier levels of turn time and airport staffing. Length of trip influences the length of the fueling process and the number of bags to be loaded. The number of passengers boarded increases the staff and time required for check-in, baggage handling and boarding. The amount of cargo loaded affects the time and staff required for handling. Connecting passengers require staff for transferring baggage, checking them in and rerouting them in case of missed connections. Connections also require additional scheduled turn time to allow a group of flights to meet up.

Table 3.8 shows the effects of these four elements of product complexity on turn time and airport staffing. As expected, flight length, cargo and
Table 3.8: Effects of Product Complexity on Efficiency of the Departure Process

<table>
<thead>
<tr>
<th></th>
<th>Time coefficient (t-stat)</th>
<th>Staffing coefficient (t-stat)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Trend</td>
<td>0.036 (5.17)**</td>
<td>0.045 (6.28)**</td>
</tr>
<tr>
<td>Passenger</td>
<td>-0.030 (1.887)†</td>
<td>0.009 (0.046)</td>
</tr>
<tr>
<td>Length</td>
<td>0.023 (10.59)**</td>
<td>0.025 (4.98)**</td>
</tr>
<tr>
<td>Cargo</td>
<td>0.005 (8.17)**</td>
<td>0.005 (3.78)**</td>
</tr>
<tr>
<td>Connects</td>
<td>0.567 (32.46)**</td>
<td>0.175 (3.55)**</td>
</tr>
<tr>
<td>Alaska</td>
<td>8.56 (3.40)**</td>
<td>179.66 (20.1)**</td>
</tr>
<tr>
<td>American</td>
<td>16.84 (4.50)**</td>
<td>221.45 (16.7)**</td>
</tr>
<tr>
<td>AmWest</td>
<td>17.61 (6.45)**</td>
<td>166.30 (17.1)**</td>
</tr>
<tr>
<td>Continental</td>
<td>14.88 (4.31)**</td>
<td>194.77 (15.8)**</td>
</tr>
<tr>
<td>Delta</td>
<td>15.95 (4.72)**</td>
<td>235.79 (19.7)**</td>
</tr>
<tr>
<td>Northwest</td>
<td>19.98 (5.94)**</td>
<td>244.00 (20.6)**</td>
</tr>
<tr>
<td>Southwest</td>
<td>3.19 (1.63)</td>
<td>147.44 (21.2)**</td>
</tr>
<tr>
<td>TWA</td>
<td>18.63 (5.60)**</td>
<td>246.30 (20.9)**</td>
</tr>
<tr>
<td>United</td>
<td>13.64 (3.73)**</td>
<td>221.90 (17.1)**</td>
</tr>
<tr>
<td>USAir</td>
<td>19.13 (7.02)**</td>
<td>172.50 (17.8)**</td>
</tr>
<tr>
<td>Constant</td>
<td>4.77 (4.51)**</td>
<td>121.00 (28.49)**</td>
</tr>
<tr>
<td>Adj Req</td>
<td>85.6% 91.3%</td>
<td>57.6% 80.3%</td>
</tr>
<tr>
<td>Obs</td>
<td>737 737</td>
<td>810 810</td>
</tr>
</tbody>
</table>

† Significant at p<.100
* Significant at p<.050
** Significant at p<.010
*** Significant at p<.001

Coefficients are retained from equations 2 and 4 to compute adjusted turn time and staffing.
connections increase the amount of scheduled turn time (column 1). Once individual carrier effects are accounted for, the number of passengers per flight does not influence turn time, while flight length, cargo and connections continue to increase the required amount of turn time (column 2).

Leg length, cargo and connects all have significant positive effects on airport staffing levels per passenger (column 3), but the number of passengers per departure actually reduces rather than increases per passenger staffing needs. This is likely due to the tendency for carriers to conserve on staffing by using the same number of gate agents, ticket agents and baggage handlers to staff a larger flight -- it just takes longer. Once individual carrier effects are accounted for, cargo and connections have no systematic effects on staffing requirements (column 4).

From the coefficients on trend, it is clear that both turn time and staffing requirements have increased significantly over this period, after accounting for product complexity. This trend may result from competition among the airlines to achieve high rankings on the quality outcomes measured by the Department of Transportation over this period.

3.7 Efficiency Adjusted for Product Complexity

Coefficients from equations 2 and 4 on Table 3.8 were used to adjust turn time and staffing levels for these key aspects of product complexity, accounting for individual carrier differences. For example, adjusted turn time for Southwest equals the coefficient on the Southwest dummy variable, plus the coefficient for each product characteristic evaluated at the sample mean.
This adjusted measure of turn time tells us how long an individual carrier's turn time would be if it had the average industry product mix. Likewise, the adjusted measure of airport staffing tells us how many airport personnel would be employed per passenger by a particular carrier if that carrier had the typical industry product mix.

Comparing the adjusted measures to the original measures (Table 3.9), we get a more accurate portrayal of the between-carrier differences in turnaround times and staffing. Southwest still has the lowest turnaround time, even adjusting for the simplicity of its product, but at 30 minutes its turn time is 70 percent of the industry average rather than only 40 percent before adjustment. Some of difference in Southwest's actual turn time is clearly due to its very simple product. Adjusted turn times are also higher than the actual turn times for the other airlines with relatively simple products -- Alaska Air, America West and USAir -- particularly for USAir. Considering the relative simplicity of its product, USAir has the one of the longest turn times in the industry. The airlines with relatively complex products -- United, Delta, Northwest, American, Continental and TWA -- have adjusted turn times that are lower than their actual turn times. United's adjusted turn time is particularly low, at 40 minutes, showing that, relative to its product, it has the speediest turnaround after Southwest and Alaska Air.

Product complexity has the opposite effect on airport staffing. Longer flights and more passengers per departure are actually conducive to staffing efficiencies. Note the negative and significant
### Table 3.9: Efficiency of the Departure Process, Adjusted for Product Complexity

<table>
<thead>
<tr>
<th></th>
<th>Time mean(SD)</th>
<th>Time Adj mean(SD)</th>
<th>Staffing mean(SD)</th>
<th>Staff Adj mean(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska</td>
<td>33.0 (5.0)</td>
<td>35.0 (1.4)</td>
<td>110.5 (26.4)</td>
<td>65.7 (7.8)</td>
</tr>
<tr>
<td>American</td>
<td>50.8 (5.7)</td>
<td>43.5 (1.2)</td>
<td>93.6 (13.9)</td>
<td>107.5 (7.8)</td>
</tr>
<tr>
<td>AmWest</td>
<td>41.1 (4.0)</td>
<td>44.0 (1.3)</td>
<td>64.0 (9.7)</td>
<td>52.4 (7.8)</td>
</tr>
<tr>
<td>Continental</td>
<td>46.4 (2.8)</td>
<td>41.5 (1.2)</td>
<td>89.3 (15.8)</td>
<td>80.8 (7.8)</td>
</tr>
<tr>
<td>Delta</td>
<td>46.7 (4.5)</td>
<td>42.5 (1.2)</td>
<td>110.3 (13.9)</td>
<td>121.8 (7.8)</td>
</tr>
<tr>
<td>Northwest</td>
<td>55.1 (3.4)</td>
<td>46.5 (1.3)</td>
<td>127.6 (15.7)</td>
<td>130.1 (7.8)</td>
</tr>
<tr>
<td>Southwest</td>
<td>17.3 (2.0)</td>
<td>29.4 (2.1)</td>
<td>63.2 (7.4)</td>
<td>52.3 (7.8)</td>
</tr>
<tr>
<td>TWA</td>
<td>51.2 (4.7)</td>
<td>45.2 (1.3)</td>
<td>135.0 (17.0)</td>
<td>132.3 (7.8)</td>
</tr>
<tr>
<td>United</td>
<td>50.0 (4.7)</td>
<td>40.3 (1.2)</td>
<td>94.9 (11.1)</td>
<td>107.9 (7.8)</td>
</tr>
<tr>
<td>USAir</td>
<td>41.6 (2.5)</td>
<td>45.5 (1.3)</td>
<td>78.8 (12.5)</td>
<td>58.6 (7.8)</td>
</tr>
<tr>
<td>Total</td>
<td>43.1 (11.4)</td>
<td>41.3 (5.3)</td>
<td>96.7 (27.7)</td>
<td>90.9 (31.8)</td>
</tr>
<tr>
<td>Obs</td>
<td>737</td>
<td>737</td>
<td>810</td>
<td>810</td>
</tr>
</tbody>
</table>
coefficients on these variables in Table 3.8, column 4. On Table 3.9, it is clear that adjusted staffing levels for carriers with more complex products are higher than their actual staffing levels. American, United and Delta have even higher staffing levels once their products are accounted for. Northwest and TWA change only moderately once product complexity is taken into account, while the rest have even lower staffing levels than without the adjustment.

From the coefficients on the trend variable in Table 3.8, it is clear that turnaround time is increasing significantly, even accounting for increases in product complexity. Staffing, however, is more mixed and does not show a significant trend once product complexity is accounted for.

3.8 Efficiency/Quality Breakthrough?

Neither efficiency nor quality outcomes by themselves tell us much about the efficiency/quality tradeoff that this chapter aims to explore. We need to look at the relationship between quality outcomes and efficiency outcomes, controlling for product complexity. For airlines as a whole over this period, do ontime performance, customer satisfaction and baggage handling accuracy require higher levels of turn time and airport staffing? This question leads us to the central hypothesis of the chapter.

Instead of the tradeoff traditionally expected between efficiency and quality -- where efficiency is achieved at the expense of quality -- we find that instead efficiencies were achieved without sacrificing quality (Table 3.10, column 1). Instead of a tradeoff, we find a complementarity between efficiency and
Table 3.10: Efficiency/Quality Tradeoff

<table>
<thead>
<tr>
<th></th>
<th>Time coefficient (t-stat)</th>
<th>Staffing coefficient (t-stat)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Trend</td>
<td>0.199***</td>
<td>0.068***</td>
</tr>
<tr>
<td></td>
<td>(10.89)***</td>
<td>(8.87)***</td>
</tr>
<tr>
<td>Complaints</td>
<td>1.383***</td>
<td>0.449***</td>
</tr>
<tr>
<td></td>
<td>(7.44)***</td>
<td>(6.80)***</td>
</tr>
<tr>
<td>LateArrival</td>
<td>0.095***</td>
<td>-0.102***</td>
</tr>
<tr>
<td></td>
<td>(1.32)***</td>
<td>(3.39)***</td>
</tr>
<tr>
<td>LostBags</td>
<td>1.293***</td>
<td>0.494***</td>
</tr>
<tr>
<td></td>
<td>(5.21)***</td>
<td>(4.77)***</td>
</tr>
<tr>
<td>Passengers</td>
<td>-0.008</td>
<td>-1.182</td>
</tr>
<tr>
<td></td>
<td>(0.491)</td>
<td>(17.87)***</td>
</tr>
<tr>
<td>Length</td>
<td>0.021</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>(10.28)***</td>
<td>(0.55)</td>
</tr>
<tr>
<td>Cargo</td>
<td>0.004</td>
<td>0.035</td>
</tr>
<tr>
<td></td>
<td>(7.60)***</td>
<td>(15.62)***</td>
</tr>
<tr>
<td>Connects</td>
<td>0.544</td>
<td>0.760</td>
</tr>
<tr>
<td></td>
<td>(31.79)***</td>
<td>(10.62)***</td>
</tr>
<tr>
<td>Constant</td>
<td>59.22</td>
<td>1.34</td>
</tr>
<tr>
<td></td>
<td>(10.82)***</td>
<td>(0.52)</td>
</tr>
<tr>
<td>Adj Rsq</td>
<td>20.6%</td>
<td>86.9%</td>
</tr>
<tr>
<td></td>
<td>9.7%</td>
<td>58.1%</td>
</tr>
<tr>
<td>Obs</td>
<td>737</td>
<td>737</td>
</tr>
<tr>
<td></td>
<td>810</td>
<td>810</td>
</tr>
</tbody>
</table>

+ Significant at p<.100
* Significant at p<.050
** Significant at p<.010
*** Significant at p<.001

Note: Ordinary least squares regression, with Huber correction of the standard errors for heteroskedasticity and within cluster correlation, due to panel structure of data. Positive signs on complaints, late arrivals and lost bags indicate that quality problems are fewer with shorter turn times and leaner staffing.
quality. Though some of the traditional tradeoffs reappear after adjusting for differences in product complexity (column 2), most of the complementarities remain. For the industry as a whole, the logic of efficiency and quality appears to have shifted.

3.9 Discussion

Is there an efficiency/quality tradeoff in the departure process? Yes, on some dimensions, but on more dimensions, there are complementarities between efficiency and quality. Higher quality is associated with higher, not lower, efficiency on several key dimensions. For some airlines, quality was achieved at a low expenditure of turnaround time and staffing relative to product complexity. For others, the expenditure was substantially higher.

The role of product complexity has been carefully accounted for. The product offered by the airlines became substantially more complex over this period in ways that increased the complexity of the departure process, and consequently the need for turnaround time and staffing. But the use of these resources in many cases increased out of proportion to the complexity of the product.

These findings lend support to the paper's central hypothesis -- that excess resources can serve as organizational slack that lead to less efficient resource utilization, and vice versa, perhaps because they tend to be used as substitutes for organizational learning. Both turnaround time and staffing have the potential to play this role in the departure process. Over the period observed, among the U.S. major carriers, both turnaround time and per passenger
airport staffing served as organizational slack.

These findings raise additional questions to be answered with a smaller, more focused sample of organizations and employees. Does horizontal coordination account for the complementarities found between efficiency and quality? Yes, as I report below in Chapter Four, but in conjunction with elements of vertical control. What are the organizational practices that allow lean resources to be used effectively? Lean resources in the form of less ground time and leaner staffing could inspire teamwork across functional groups to "get the job done," or the added stress could simply engender unproductive conflict and a deterioration of service.

Findings reported in Chapter Six suggest that Southwest, and to some extent Continental and the United Shuttle, have developed a set of organizational practices that build cohesion and common goals across groups, allowing the stress to be used in a productive way. These practices include horizontal coordination based on communication and teamwork across functional groups, as well as elements of vertical control designed to align employee behavior with organizational goals. As more organizations in the airline and other industries press toward the limit in dropping excess resources, these kinds of practices may be the critical determinant of whether expected outcomes are achieved.
Chapter 4: Coordination, Control and Operating Outcomes

4.1 Efficiency Breakthrough Due to Coordination?

To the extent that an airline can achieve quick turns and lean staffing without a corresponding decline in ontime performance, customer satisfaction or baggage handling, that airline has achieved an efficiency breakthrough. This chapter explores whether crossfunctional coordination among frontline employees is a key factor in achieving such an efficiency breakthrough. The second major issue for this chapter is whether horizontal coordination by frontline employees is an alternative to vertical control, or whether instead coordination and control act as complements.

This chapter begins to test the model of coordination and control introduced in Chapter One. The shaded portions on Table 4.1 represent the portions of the model to be explored in this chapter -- the relationships among employee cognition, coordination behavior, control and departure process outcomes, accounting for differences in product complexity.

4.2 Data and Methodology

Two airport sites were selected for each of four major U.S. airlines -- American, Southwest, Continental and United. Sites were chosen for comparability. Airlines were chosen to include one traditional carrier -- American; one carrier recognized as an innovator in the departure process -- Southwest; and two traditional carriers -- Continental and United -- who attempted during the period of study to imitate the Southwest strategy with their Continental Lite and United Shuttle operations. United set up a separate Shuttle operation
Table 4.1: Coordination and Control of the Flight Departure Process

<table>
<thead>
<tr>
<th>System of Coordination and Control</th>
<th>Cognitive Frame</th>
<th>Coordination Behavior</th>
<th>Departure Process Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coordination</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crossfunctional Coordinating Mechanism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horizontal Accountability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selection for Team Players</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training for Teamwork</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conflict Resolution</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Egalitarian Culture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexible Workrules</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supporting Role for Supervisors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualitative Vertical Accountability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Promotion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shared Rewards</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respect for Employee Representation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trust Building by Top Leaders</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Shared Goals
- Shared Knowledge
- Shared Respect
- Frequent Timely Interdepend
- Problem Solving
- Helping

- Operating Efficiency
  - Staffing
  - Quality
    - Customer Satisfaction
  - On-time Arrivals
  - Baggage Handling

- Product Complexity
  - Cargo and Mail
  - # Passengers
  - Flight Length
  - % Connections
in one of the sites studied, which is treated in the analysis as a ninth site. The sites are identified in Table 4.2.

Twelve months of performance and product mix measures were computed for each site, based on company archival data, with the exception of the ninth site which was operating for only three months of the twelve, and therefore has just three monthly observations. The critical measures of efficiency are turnaround time and staffing levels. The critical measures of quality are customer complaints, late arrivals and baggage mishandling. Measures of product complexity include length of flight, number of passengers carried per flight, tons of cargo carried, and the percent of passengers who connect. In subsequent analyses, these measures are pooled by site across the monthly observations. See Table 4.4 for definitions of efficiency, quality and product complexity variables, and Table 4.3 for data sources.

In each of these nine sites, supervisory and frontline employees from five major functional groups were surveyed (one time only) about their coordination with employees in their own function, in the other four functions sampled, and in seven other functions central to the departure process. Table 4.2 identifies by level and function the employee groups surveyed by level and function. All survey responses were weighted by the percent of the site's workforce constituted by the respondent's job type, distinguished by level and function, since the survey oversampled supervisors and some functions.
<table>
<thead>
<tr>
<th>Sites Studied</th>
<th>Employee Groups Surveyed</th>
</tr>
</thead>
<tbody>
<tr>
<td>American: Boston</td>
<td>Functions</td>
</tr>
<tr>
<td>American: Los Angeles</td>
<td>Levels</td>
</tr>
<tr>
<td>Continental: Boston</td>
<td>Supervisors</td>
</tr>
<tr>
<td>Continental: Cleveland</td>
<td>Leads</td>
</tr>
<tr>
<td>Southwest: Chicago</td>
<td>Frontline</td>
</tr>
<tr>
<td>Southwest: Los Angeles</td>
<td></td>
</tr>
<tr>
<td>United: Boston</td>
<td>Gate</td>
</tr>
<tr>
<td>United: Los Angeles</td>
<td>Supervisors</td>
</tr>
<tr>
<td>United Shuttle: Los Angeles</td>
<td>Leads</td>
</tr>
<tr>
<td></td>
<td>Frontline</td>
</tr>
<tr>
<td></td>
<td>Ticketing</td>
</tr>
<tr>
<td></td>
<td>Supervisors</td>
</tr>
<tr>
<td></td>
<td>Leads</td>
</tr>
<tr>
<td></td>
<td>Frontline</td>
</tr>
<tr>
<td></td>
<td>Operations</td>
</tr>
<tr>
<td></td>
<td>Supervisors</td>
</tr>
<tr>
<td></td>
<td>Frontline</td>
</tr>
</tbody>
</table>

**Data**

- Efficiency Outcomes of the Departure Process
- Quality Outcomes of the Departure Process
- Product Complexity
- Crossfunctional Coordination
- Within Function Coordination
- Frontline Crossfunctional Coordination
- Supervisory Crossfunctional Coordination
- Supervisory Ratio

**Level of Measurement**

- Site level, 12 monthly observations
- Employee level, one time measure
- Site level, 12 monthly observations
- Site level, 12 monthly observations
- Employee level, one time measure
- Employee level, one time measure
- Employee level, one time measure
- Site level, 12 monthly observations
<table>
<thead>
<tr>
<th>Table 4.3: Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Turn Time</strong></td>
</tr>
<tr>
<td>Turn time is computed by the author from monthly gate schedules provided by management, by subtracting scheduled arrival time for an aircraft from its scheduled departure time, excluding originating flights.</td>
</tr>
<tr>
<td><strong>Staffing</strong></td>
</tr>
<tr>
<td>Airport staffing is computed by the author from staffing reports provided by management, adding fulltime equivalent personnel who perform the ticketing function, the gate function, the operations functions, the ramp functions (aircraft cleaning and loading) and the bag room functions. If any of these functions were contracted out, an estimate of contractual staffing levels was provided by management. Excluded are the skycap functions, aircraft maintenance, building maintenance, and fueling. In the case of the United Shuttle, some of the core functions are performed by the regular United operation. The staffing levels for these functions are based on staffing levels in the regular United operations.</td>
</tr>
<tr>
<td><strong>Complaint</strong></td>
</tr>
<tr>
<td>Customer complaints are those made to company headquarters, related to problems experienced at the sites in the ticketing and boarding process, as reported by headquarters management.</td>
</tr>
<tr>
<td><strong>LateArrival</strong></td>
</tr>
<tr>
<td>Late arrivals are estimated by the author from the percent of flights that fail to depart the gate within 15 minutes of scheduled time, provided by station management. This figure is multiplied by the ratio of ontime arrivals to departures for the company as a whole, to estimate the percent of flights that arrived on time at the downline airport.</td>
</tr>
<tr>
<td><strong>LostBags</strong></td>
</tr>
<tr>
<td>Baggage mishandling is reported by management, based on the number of baggage claims filed by passengers that are traceable to the site sampled.</td>
</tr>
<tr>
<td><strong>Passengers</strong></td>
</tr>
<tr>
<td>The number of passengers per departure is computed by the author using documentation provided by management of the number of revenue passengers enplaned monthly, and the number of departures.</td>
</tr>
<tr>
<td><strong>Length</strong></td>
</tr>
<tr>
<td>Flight length is computed by the author from monthly gate schedules provided by management for destination information, and city pair flight distances provided by the U.S. Department of Transportation.</td>
</tr>
<tr>
<td><strong>Cargo</strong></td>
</tr>
<tr>
<td>Tonnes of cargo and mail carried per departure is computed by the author using documentation provided by management.</td>
</tr>
<tr>
<td><strong>Connects</strong></td>
</tr>
<tr>
<td>Percent of incoming passengers who connect is either documented or estimated by management – sites with few connecting passengers do not measure it systematically.</td>
</tr>
<tr>
<td><strong>Coordination Measures</strong></td>
</tr>
<tr>
<td>Coordination measures are computed by the author, using employee survey responses, weighted by the percent of the workforce represented by the position of the respondent. Coordination is measured across eight dimensions, both cognitive and behavioral, and with respect to twelve functional groups involved in the departure process.</td>
</tr>
<tr>
<td><strong>Supervisory Ratio</strong></td>
</tr>
<tr>
<td>The number of supervisors per 100 frontline employees is computed by the author based on documentation of fulltime equivalent staffing levels, provided by management.</td>
</tr>
</tbody>
</table>
Table 4.4: Efficiency, Quality and Product Complexity

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Mean</th>
<th>SD</th>
<th>Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EFFICIENCY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn Time</td>
<td>Turn time = Minutes of scheduled aircraft time at the gate, per departure, excluding originating flights.</td>
<td>50.7</td>
<td>22.1</td>
<td>99</td>
</tr>
<tr>
<td>Staffing</td>
<td>Airport staffing = Airport employees (excluding skycaps, maintenance and fueling) per 1,000 daily passengers enplaned.</td>
<td>77.1</td>
<td>32.5</td>
<td>99</td>
</tr>
<tr>
<td><strong>QUALITY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complaints</td>
<td>Complaints = Customer complaints per 100,000 passengers enplaned.</td>
<td>24.7</td>
<td>18.9</td>
<td>99</td>
</tr>
<tr>
<td>LateArrivals</td>
<td>Late arrivals = Percent of flights that fail to arrive at the downline station within 15 minutes of schedule.</td>
<td>20.9</td>
<td>8.0</td>
<td>99</td>
</tr>
<tr>
<td>LostBags</td>
<td>Lost bags = Bags mishandled per 1,000 passengers enplaned.</td>
<td>5.4</td>
<td>1.6</td>
<td>99</td>
</tr>
<tr>
<td><strong>PRODUCT COMPLEXITY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passengers</td>
<td>Passengers enplaned per departure.</td>
<td>93.3</td>
<td>23.7</td>
<td>99</td>
</tr>
<tr>
<td>Length</td>
<td>Miles flown per departure.</td>
<td>967.4</td>
<td>606.4</td>
<td>99</td>
</tr>
<tr>
<td>Cargo</td>
<td>Tons of freight and mail flown per departure.</td>
<td>2.29</td>
<td>2.04</td>
<td>99</td>
</tr>
<tr>
<td>Connects</td>
<td>Percent of passengers who connect.</td>
<td>6.76</td>
<td>9.58</td>
<td>99</td>
</tr>
</tbody>
</table>
### Table 4.5: Coordination and Supervisory Control

<table>
<thead>
<tr>
<th>Name</th>
<th>Survey Question*</th>
<th>Mean**</th>
<th>SD</th>
<th>Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COGNITIVE FRAME</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goals</td>
<td>Do the people in these groups have the same work goals as you?</td>
<td>3.35</td>
<td>1.20</td>
<td>348</td>
</tr>
<tr>
<td>Know</td>
<td>How much do people in these groups know about your job?</td>
<td>2.68</td>
<td>0.84</td>
<td>352</td>
</tr>
<tr>
<td>Respect</td>
<td>How much respect do you get from people in these groups?</td>
<td>3.30</td>
<td>0.88</td>
<td>351</td>
</tr>
<tr>
<td><strong>COORDINATION BEHAVIOR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequent</td>
<td>When you are working, how often do you communicate with people in these groups?</td>
<td>2.76</td>
<td>0.69</td>
<td>352</td>
</tr>
<tr>
<td>Timely</td>
<td>Do people in these groups communicate with you in a timely way?</td>
<td>2.73</td>
<td>1.00</td>
<td>352</td>
</tr>
<tr>
<td>Depend</td>
<td>Do people in these groups affect how well you can do your job?</td>
<td>3.14</td>
<td>0.88</td>
<td>352</td>
</tr>
<tr>
<td>Solve</td>
<td>If there's a problem with a flight, do people in these groups work with you to solve it or do they try to avoid getting blamed?</td>
<td>3.20</td>
<td>1.01</td>
<td>348</td>
</tr>
<tr>
<td>Help</td>
<td>How much help do you get from people in these groups?</td>
<td>2.73</td>
<td>0.91</td>
<td>344</td>
</tr>
<tr>
<td><strong>COORDINATION INDICES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CrossCoord</td>
<td>Crossfunctional coordination = Average of above measures with respect to other functions only.</td>
<td>2.94</td>
<td>0.64</td>
<td>352</td>
</tr>
<tr>
<td>InternalCoord</td>
<td>Within function coordination = Average of above measures with respect to respondent's function only.</td>
<td>4.54</td>
<td>0.66</td>
<td>352</td>
</tr>
<tr>
<td>Frontline CrossCoord Supervisor CrossCoord</td>
<td>Crossfunctional coordination, using frontline responses only.</td>
<td>2.93</td>
<td>0.64</td>
<td>315</td>
</tr>
<tr>
<td></td>
<td>Crossfunctional coordination, using supervisor responses only.</td>
<td>3.40</td>
<td>0.50</td>
<td>37</td>
</tr>
<tr>
<td><strong>SUPERVISORY CONTROL</strong></td>
<td>Supervisors per 100 frontline employees.</td>
<td>6.8</td>
<td>3.40</td>
<td>99</td>
</tr>
</tbody>
</table>

*Questions are asked with respect to 12 functional groups involved in the departure process: pilots, flight attendants, gate agents, ticketing agents, operations agents, ramp agents, baggage agents, freight agents, aircraft cleaners, caterers, mechanics and fuelers.

**Responses range from 1 to 5, where 5 indicates the most positive response. Responses are weighted by the percent of the workforce that works in the respondent's jobtype.
Crossfunctional coordination behavior is measured as having five dimensions -- frequency, timeliness, interdependence, helpfulness and problem solving. The attitudes that give rise to crossfunctional coordination have three key dimensions -- shared goals, knowledge and respect (Table 4.5). Qualitative data from interviews with supervisors and frontline employees about coordination are used to illustrate the concepts.

An analysis of interitem covariance suggests that coordination attitudes and behavior cannot be empirically distinguished, so the two are collapsed into a single measure for this analysis. To isolate the concept of theoretical interest to this research, the coordination index is separated into coordination within one's own functional group, and coordination with other functional groups (Table 4.5). To test the relationship between coordination at different levels of the organization, coordination is also separated into coordination by supervisors, and coordination by frontline employees. To test the relationship between coordination and control, supervisory control is measured as the number of supervisors per 100 employees, measured from site-level archival data monthly throughout the period.

The analysis identifies site differences in efficiency, quality, product complexity, coordination and supervisory ratios. Individual relationships are explored using Spearman's rank correlations before testing the overall model. Then, using ordinary least squares regression, the effects of coordination and supervisory ratios on efficiency and quality outcomes are tested, controlling for product mix and
coordination within functions. Finally, it is shown that the observed effects of crossfunctional coordination and control on efficiency outcomes holds for airlines whether or not they have adopted the quick turnaround strategy described in Chapter Three. [Note: Due to the panel structure of the data, a Huber correction is done on all regressions to correct the standard errors for heteroskedasticity and within-site correlation.]

4.3 Coordination and Control

Early observations of the departure process at two of the four airlines revealed differences in crossfunctional coordination that might plausibly account for differences in operating outcomes, even accounting for differences in product complexity. At Southwest, it was commonly remarked that "everybody knows what to do," and everybody also seemed to know what everybody else was supposed to be doing as well. When a plane landed at Southwest, everything appeared to be ready for servicing that plane due to the extensive communication and the preflight analysis conducted before the plane arrived. Visually, it looked like the plane was being attacked when it arrived at the gate. The equipment was all in place at the gate, in a configuration that was neat and uniform. When employees and managers talked about coordinating the turnaround, they used the term 'orchestrate.' They expressed pride in its speed and predictability. According to a pilot, "When you come in and see everybody there ready to go to work, it makes you feel great."

At American, people also knew what to do, but
their work did not appear to be as well-coordinated with the work of others. The ground workers often did not appear to be ready when the plane arrived. Looking at the ground equipment, it was not immediately apparent at which gates the next flights were expected. According to an American pilot, "No one is there when you are ready to go. They don't come out of the ready room until they hear the bell. They won't talk to you until the bell rings. They are highly trained to wait until the last minute. It's a mind set." "What's amazing is that it works as often as it does," said a ramp supervisor for American.

Differences in the number and role of supervisors were also apparent between the two airlines and appeared to influence crossfunctional coordination in an unexpected way. At American, where supervisors were few, their role was constrained to monitoring and initiating action against the 'bad apples.' At Southwest, where supervisors were far more numerous, their role was defined to include helping and mentoring, in addition to monitoring. Their position was also one that frontline employees could reasonably aspire to, providing a more active flow of people and information across the management/nonmanagement boundary. This seemed to help produce a stronger identification between frontline employees and their managers. The hypothesis was developed that supervision as a form of control might contribute to crossfunctional coordination, rather than serve as an alternative to it.

4.4 Crossfunctional Coordination

Based on this initial field research at American and Southwest, differences in crossfunctional
coordination were decomposed into a set of coordination behaviors -- problem solving versus blaming, helping out, interdependence, timeliness and frequency of communication. Each one is illustrated below using field research at American and Southwest. The same constructs were measured subsequently at multiple sites for United and Continental.

1. Interdependence, Frequency and Timeliness of Communication

The departure process involves a high degree of interdependence among work groups, so that frequency and timeliness of communication is critical. It was often said by airline employees, particularly managers, that turning a plane around requires teamwork.

"It's really acting as a team," said a flight attendant base manager. "When to board is jointly decided between the gate agent and the flight crew. The team includes the gate agent, flight attendant, cabin cleaning, maintenance. It requires concerted effort, like an orchestra."

To make the teamwork happen, people at every site espoused the importance of timely and frequent communication. A customer service manager, for example, explained that

"communication is critical. If everyone were trying to do their own thing it's not going to work. Even on a good day you still have to communicate to know who's doing what. It can change in a second. You are always going to have problems. It's not like working nine to five. It's erratic, sporadic, spontaneous."

But while everyone interviewed espoused the importance of frequent and timely communication, they reported different degrees of success in achieving it. At American, reports of inadequate communication were common.
"Here you don't communicate," said an American customer service supervisor in Los Angeles. "And sometimes you end up not knowing things. For people to have little meetings, you lose productivity. Everyone says: We need effective communication. But it's a low priority in action. On the gates I can't tell you the number of times you get the wrong information from ops. They tend to be optimistic. We call it the creeping delay. The hardest thing at the gates with offschedule operations is to get information. They are leery to say the magnitude of the problem."

"Maintenance communicates with the ops center as best they can," said an American manager of customer service in Los Angeles. "In every airline, mechanics are similar -- they are just not communicators. The manager of maintenance is responsive. But he doesn't come to meetings. The company's message about communication hasn't seemed to filter down to the maintenance group."

In American's Boston station, the reports were more mixed.

"We have to rely on the maintenance group," said an Boston manager of customer service. "If there's a delay, a problem with the operation, we have to be in touch with them. Through operations usually, but sometimes directly. It doesn't go especially well. Unfortunately those departments that don't deal directly with the public don't feel that sense of urgency. We get the brunt when other departments fail to load a bag, clean the cabin, not tell us when there's going to be a mechanical delay. Ops will tell us if a flight inbound will be late. Timely communication is very, very important."

Some groups in particular sought to improve their communication with others.

"Folks here in the morning have really figured out the importance of the skycaps," said the customer service supervisor of the ticketing agents. "They have a respect for each other, because they know they might need it."

"Our best interface is with the gates," said a ramp crew chief. "The gate wants to talk about delays, or about repositioning an aircraft, gate changes, late bags brought to the gate. Those are on a normal day."
At Southwest's Chicago station, high levels of communication were reported.

"When there are irregular operations, bags have to be moved," said a customer service manager. "There is constant communication between customer service and the ramp. Customer service will advise ramp directly or through ops."

"Ticketing calls the gate about late runners," said a customer service training coordinator. "If the flight is full, or you're running close to full, ticketing asks the gate if there's room before sending the customer up. That's part of our training."

A great deal of communication about the departure process occurred through the operations function, due in part to the design of the operations function at Southwest, described below in Chapter Six.

"Ops is normally the way you communicate at Southwest," said a manager of ramp and operations. "It's not a blockage of communication -- it's the way it's designed. Pilots also communicate through ops."

"The ops agent is responsible for every bit of information going into the computer," said a gate agent. "We can tell the customer everything they need to know, because it's right there. Communication is ultimately the key."

At Southwest, operations agents served as the communication link among all functions involved in the departure process, and came into face to face contact with each one.

"Communication between the ramp and pilots is through hand signals or the headset," said the same manager. "Also, the pilots come down and say hi. But fast turns limit that. Ops is the key there. They go into the cockpit and deliver the paper work."

Through operations, good communication was achieved even with functions that tend to be 'out of the loop' at other airlines.
"The pilot says the plane is broke when he calls in range to ops," said a Los Angeles station manager. "The mechanic is usually here to meet the plane. If something is seriously wrong, we move to an off terminal location and cancel the flight. If it's just two hours, we do an aircraft swap. Ops keeps everyone informed... It happens smoothly."

But despite some strong areas, Southwest’s Los Angeles station struggled somewhat with the frequency and timeliness of communication across functional groups, relative to other Southwest stations.

"Gate to ops is a place we have to work on," said the Los Angeles station manager. "We don’t have phones in all the jetways. Say a plane is late. And there are allot of carry-on bags. And there’s a gate change at the last minute. Then the ticket counter sends more people standby. Ninety five percent of that communication is between the customer service agent at the gate and the ops agent. Without the phone on the jetway, ops calls the customer service supervisor who calls the gate agent who tells the customers. We could certainly communicate better," said the station manager. "Everything that happens around here could be made better by communication."

"Sometimes there’s a miscommunication between the departments," said an operations supervisor. "One department can’t function without the other. You have to let the others know what’s going on."

2. Problem Solving versus Blaming

The nature of communication between functional groups varied more across the sites studied than the timeliness and frequency of that communication. In particular, there was substantial variation in the degree of problem solving across functional groups. At American, there was a strong tendency to hide information to avoid blame for a delay.

"If you ask anyone here, what’s the last thing you think of when there’s a problem," said a shift manager at American. "I bet your bottom dollar it’s the
customer. And these are guys who bust their butts everyday. But they're thinking how do I keep my ass out of the sling."

"Around here when something goes wrong, everybody has to scramble," said a gate agent. "Unfortunately in this company when something goes wrong, they need to be able to pin it on someone. You should hear them fight over whose delay, which code. A lot of it has to do with which department gets charged. A delay is a big deal here."

At Southwest, there was a strong tendency away from blame avoidance and toward problems solving. At Southwest, said a pilot,

"we figure out the cause of the delay. We do not necessarily chastise, though sometimes that comes into play. It is a matter of working together. Figuring out what we can learn. No fingerpointing, especially here and I'm sure that's the case elsewhere at Southwest."

That did appear to be the case at Southwest, in general. At the Chicago station, for example, reports of fingerpointing were virtually nonexistent.

"I would be personally offended if their only drive was that if it didn't leave on time, they'd come in to my office to -- you know, the threats," said the Chicago station manager. "If there's a delay, we find out why it happened. We get ideas from them on how to do it better next time."

In Southwest's Los Angeles station, however, the reports were mixed.

"The whole company runs on teamwork, that's the philosophy," said an operations agent. "We'll get together and find the common problem."

There were also reports of blame avoidance at this site.

"I get some irregularity reports about taking a delay," said the customer service manager. "What happened,
stating their side of it. Obviously they think it wasn't their fault... Ops might give a delay code for the ramp, and the ramp says it came late out of the t-point."

"I talk to the ramp," said an ops agent, describing how he codes a delay. "I call it this or that. Then the captain calls in if he doesn't think it's right. Then I write up a report and he writes up a report."

3. Helping Out

At American, employees frequently pointed to the lack of helping out across lines as a problem.

"So often the one or two minutes that leads to a failure would be solved if more than one person took it upon themselves to help. I know a customer service agent can't load bags -- no one else can touch a bag. But a ramp person would go, close the aircraft door and move the jet bridge [because it is nonunion work]. A supervisor could do it too. But you have a lot of years of seniority. Change is just as difficult for management as for frontline employees."

There were some reports of helping out across employee lines, for example between skycaps and ticket counter agents in the Boston station. But these reports were rare, while reports of people not willing or able to help because of tradition or contractual workrules were relatively common.

At Southwest, by contrast, helping out was perceived to be a normal and regular occurrence.

"When it gets really busy around here, you'll have crossover [between customer service and the ramp]," said a customer service manager.

"Once the coordinator gets into trouble, a rush of people will come up and help," said a manager of ramp and operations. "It happens from time to time. In bad weather, it can get real crazy. People have to take a role, until the problems clear." "Each person has a specific job, but part of the job is to help the other
"person," said a chief pilot. "Then it's easier to work in a more efficient manner."

Even maintenance, a group that was traditionally off on its own, was reported to be helpful at Southwest.

"Maintenance has helped us load bags, push planes out. All we have to do is just call them. Not all of our rampers are technically inclined. We'll get help disassembling a wheelchair. It's not in their job description. What's really strange about the whole thing -- these guys are represented by Teamsters. Teamsters seem to me to be a national labor organization that's the most traditional kind. I've never seen one guy in maintenance hide behind a job responsibility issue. We've had cars break down and these guys will go help people out with their cars. This station is so much like a family."

Southwest flight attendants reportedly were both the givers and recipients of help during the departure process.

"Flight attendants at other carriers would never run a wheelchair, would never do the work of a ramp person, whereas we do," said a flight attendant base manager. "And here ops will get on board to help you clean. And so do pilots. Absolutely. The neat thing at Southwest is that the pilots are part of it. They are saying goodbye to passengers and helping to clean up the aircraft. It's important to them to get back out on time because they'll lose the slot. They have a certain amount of pride -- this flight is their baby for the day."

When I observed a flight attendant and pilot going to considerable trouble helping the operations agent to board a passenger in a wheelchair, I asked the ops agent if this was normal. "Yes, they do help alot," he said. "Everybody helps. You get certain personalities, but for the most part everybody helps."

Pilots helping in the departure process was common at Southwest, while virtually unheard of elsewhere. "I'm not saying we're pristine or anything, but I've
worked for other airlines and it's nothing like this," said a Southwest pilot. "We had a lady pilot throwing bags the other day. You'll never see it somewhere else." He did point out, however, that he had seen pilots helping out recently on the United Shuttle.

4.5 Cognitive Frame that Supports Coordination

These coordination behaviors, in turn, appeared from the initial field research to be motivated by a distinctive cognitive frame which includes shared goals, shared knowledge and mutual respect across functional lines. The idea that behavior is shaped by cognition is supported by the theory of social cognition and related empirical studies (Festinger, 1957; Fiske and Taylor, 1984). Cognition includes the familiar concept of attitudes but is more inclusive. Attitudes are understood in social cognition theory as the more affect laden elements of cognition (Fiske and Taylor, 1984, p. 340). The cognitive frame that shapes coordination goes beyond attitudes by including not only shared goals and mutual respect but also shared knowledge.

The relationship between cognition and behaviors is a complex one that is elaborated in the following section. In this section, the three elements of the cognitive frame that shape coordination are illustrated using field research from American and Southwest.

1. Shared Goals

At Southwest, managers, supervisors and frontline employees in each department said their primary goals were safety, keeping the schedule and satisfying the customer, including their internal customers. Each person had internal customers -- these are people in
other departments and stations whose needs they were expected to anticipate and meet. These goals seemed to be shared, in the sense that employees from each group could explain why they were important. When discussing the quick turnaround strategy, nearly everybody explained that "our aircraft are valuable and they don’t earn any money sitting on the ground." An operations agent explained to me that one of her internal customers was the downline station, and that one of her jobs was documenting the load accurately to make the job quicker at the next station. A ramp supervisor explained to me, "If we can’t keep you the customer coming back, we are not going to stay in business."

Shared goals seemed to boost employee morale.

"The main thing is that everybody cares," said a customer service supervisor. "We work in so many different areas but it doesn’t matter. It’s true from the top to the last one hired...Sometimes my friends ask me, why do you like to work at Southwest? I feel like a dork but it’s because everybody cares."

"There’s a desire to be part of the team," said a flight attendant supervisor. "Here it’s one goal -- 100 percent customer service. Whatever it takes. You can see it just walking through the terminal. Rampers help board a flight. Reese [the base manager], me and the other supers have a shared vision."

"The beauty of the system is that we all know what we’re supposed to do," said the flight attendant base manager. "When there’s a breakdown, we know we are able to work it out."

Others reported on the strength of shared goals around the departure process.

"From someone who drives the bus, as it were, if you don’t mind my language, people work their asses off," said a Southwest pilot. "I’ve never seen so many people work so hard to do one thing. You see people
checking their watches to get the ontime departure. People work real hard. Then it’s over and you’re back on time."

Even outside contractors working with Southwest pointed out Southwest’s uniqueness in this respect. "This airline is very different," said a contract fueler. "The level of motivation is different. Here, if there’s something to do people want to do it right away. At USAir, it was ‘we still have 15 minutes’." Goals did not appear to be shared at American Airlines to the same degree.

"Until the pendulum swings the whole way to the left, they won’t realize what they’ve lost," said a Boston ticket agent. "American was something to be proud of. Now if I sit back here for two hours [in the break room] I feel like nobody cares. I used to care. It used to be a company to be proud of."

"There’s no soul left. It’s like raising a family. If it’s only profit and loss, how are you going to have communication?"

On the ramp, similar problems were observed. "Ninety percent of the ramp employees don’t care what happens," said the ramp manager. "Even if the walls fall down, as long as they get their check."

2. Shared Knowledge

At American, there was a recognition that shared knowledge matters for coordination.

"In my operation, every person needs to know about every other person’s job," said a ramp supervisor. "My crew chiefs have to know what it’s like to board passengers up there. They need to know how much time it takes to clean a cabin and still give time to board. Freight needs to know what we go through to move their commodity. Don’t come to us ten minutes before departure."
At Southwest, the level of shared knowledge across functional groups was quite high relative to other airlines. But the Los Angeles station suffered an unusually high level of turnover in 1994, resulting in a deficit of shared knowledge. How do people understand how it all fits together? I asked.

"It seems like they don’t sometimes," said the Los Angeles manager of customer service. "It’s so specialized. We’re so specialized. We try to do exchanges but when it comes down to it customer service doesn’t know what ramp does."

"With the new people, there are alot of lost people running around," said an operations supervisor. "The new people don’t know as much as they should about other departments."

3. Mutual Respect

At American, status boundaries were perceived to be very real and an obstacle to crossfunctional coordination. The relationships between the pilots and other groups were particularly problematic. The relationship to ramp workers is one example. According to one station manager, ramp workers

"have a tremendous inferiority complex. They think everyone is looking down on them. The pilots don’t respect them. The pilots are insular."

Despite some efforts at American to put pilots on more of an equal footing with their coworkers, the culture of command remains.

"Pilots are fundamentally unsupervised workers but we rarely have discipline problems within the cockpit," said a vice president. "It is in the interface with other groups. Ninety percent of our pilots come from the military. In the military there is no participation. Put a captain in our environment and he doesn’t know what to do. He may be able to tell the copilot what to do, but he can’t tell other people what to do. Yet he will try."
This status barrier between the two groups has clear consequences for delays.

"We had a problem at the JFK station with parking airplanes when they arrived," explained a station manager. "Captains would have to wait for the crews to come out and direct them in. The crews wouldn’t necessarily be in any hurry to get out there."

There was also reportedly a lack of mutual respect between flight attendants and station employees.

"It all comes down to respect," said a Los Angeles cabin cleaner. "As long as the flight attendants think they’re better than ramp agents when they’re sleeping five to an apartment and they’re just waitresses in the sky."

These problems existed among station groups as well.

"There are employees working here who think they’re better than other employees," said a ramp supervisor in the Los Angeles station. "Gate and ticket agents think they’re better than the ramp. The ramp think they’re better than cabin services, think it’s a sissy, woman’s job. Then the cabin cleaners look down on the building cleaners. The mechanics think the ramp are a bunch of baggage handlers. And they’re in the same union. I don’t know how you break down that barrier, so that everyone says I am an employee of American Airlines, period."

"Cabin cleaning is like a stepchild," said a ramp crew chief. "All of us have that attitude. Get out of here and do your job. It’s a macho thing -- we call them pillow fluffers."

Relations between maintenance and predominately female work groups like gate agents and flight attendants were reportedly strained at American.

"Maintenance, they are highly specialized and won’t talk," said a customer service supervisor in the Boston station. "They don’t have a sense of urgency. You ask them what’s wrong with the plane and they look at you like you’re female and wouldn’t understand if they told you."
In the Los Angeles station, the customer service manager reported that maintenance communicates with the ops center and the pilots "but they just don't seem to take seriously the 'little girl' at the gate." "This airport in general is just a male dominated society," said a Boston ramp supervisor. His female colleague agrees. "It's not a friendly environment for women here."

Status consciousness, particularly between the flight crew and the airport agents, affected working relations at at Southwest as well. But there were clear expectations that employees would treat each other with respect.

"There's a code, a way you respond to every individual who works for Southwest," said a manager of ramp and operations. "The easiest way to get in trouble at Southwest is to offend another employee. We need people to respond favorably. It promotes good working relationships."

"No one takes the job of another person for granted," said a customer service agent. "The sky cap is just as critical as the pilot. You can always count on the next guy standing there. No one department is any more important than another."

According to the former vice president of the People Department, an unwritten rules at Southwest is that "you can't be an elitist" (Hallowell, 1993). One of Southwest's most distinctive practices, as described below in Chapter Six, was active managerial intervention in resolving disputes across employee groups.
4.6 Relationship Between Cognition and Coordination

Although cognition and the coordination activities described above are conceptually distinct, their interdependence is apparent from the qualitative evidence. Respect for gate agents, for example, motivates mechanics to take a problem solving rather than blaming approach when delays are imminent. Engaging in a problem solving approach, on the other hand, will further build respect between mechanics and gate agents. More broadly, successful crossfunctional coordination -- frequent and timely communication, interdependence, helping and problem solving -- depends on a cognitive frame that includes shared goals, shared knowledge and mutual respect. Engaging in crossfunctional coordination behaviors in turn reinforces the cognitive frames of participants.

The hypothesis of interdependence is also supported by social cognition theory and research. "Daily behaviors and interactions with others provide a constant source of information, some redundant and much new, that must be incorporated into cognitive representations. Hence behavior gives rise to cognitions. Behavior is also itself an outgrowth of cognition" (Fiske and Taylor, 1984). To the extent that cognition and behavior are mutually reinforcing, they would be difficult to distinguish statistically.

Indeed, statistical tests like factor analysis and analysis of interitem correlation cannot distinguish between the cognitive and behavioral factors. A Cronbach's alpha test of the two sets of variables (Table 4.6) shows that the scale reliability coefficient for the eight items together (0.8515) is higher than for either the cognitive or behavioral
Table 4.6: Distinguishing Cognitive from Behavioral Dimensions of Coordination

<table>
<thead>
<tr>
<th></th>
<th>Average Interitem Covariance</th>
<th>Scale Reliability Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COGNITIVE FRAME</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goals</td>
<td>Do the people in these groups have the same work goals as you?</td>
<td>0.5169</td>
</tr>
<tr>
<td>Know</td>
<td>How much do people in these groups know about your job?</td>
<td></td>
</tr>
<tr>
<td>Respect</td>
<td>How much respect do you get from people in these groups?</td>
<td></td>
</tr>
<tr>
<td><strong>COORDINATION BEHAVIOR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequent</td>
<td>When you are working, how often do you communicate with people in these groups?</td>
<td>0.3542</td>
</tr>
<tr>
<td>Timely</td>
<td>Do people in these groups communicate with you in a timely way?</td>
<td></td>
</tr>
<tr>
<td>Depend</td>
<td>Do people in these groups affect how well you can do your job?</td>
<td></td>
</tr>
<tr>
<td>Solve</td>
<td>If there's a problem with a flight, do people in these groups work with you to solve it or do they try to avoid getting blamed?</td>
<td></td>
</tr>
<tr>
<td>Help</td>
<td>How much help do you get from people in these groups?</td>
<td></td>
</tr>
<tr>
<td><strong>COMBINED MEASURE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.3859</td>
<td>0.8515</td>
</tr>
</tbody>
</table>

The scale reliability coefficient used here is Cronbach's alpha. Note that the scale reliability for the combined measure is greater than for either the cognitive or behavioral dimensions alone. This, in addition to qualitative evidence of interdependence between the two dimensions, supports use of the combined measure.
variables alone (0.7533 and 0.7769, respectively). This result lends further support to the hypothesis that the cognitive frame for cognition is highly interdependent with coordination behaviors. Based on this interpretation of their interdependence, the cognitive and behavioral dimensions of coordination are collapsed into a single index of coordination -- a simple average across the eight dimensions -- for subsequent analyses.

4.7 Coordination and Control, Measured Across Sites

Site differences in crossfunctional coordination, within function coordination, and supervisory ratios are shown on Table 4.7. Within function coordination is substantially greater than crossfunctional coordination, for the sample as a whole -- 4.54 on a 1 to 5 scale, compared to 2.94 -- and for each individual site. Crossfunctional coordination varies from 3.46 at Southwest's Chicago site, to 2.45 at American's Los Angeles site, while within function coordination ranges from 4.75 at Continental's Cleveland site to 4.20 at American's Los Angeles site.

Crossfunctional coordination is further disaggregated to distinguish between the crossfunctional coordination activities of supervisors and frontline employees. For the sample as a whole, and for nearly every site, supervisors do more crossfunctional coordination than their frontline employees -- 3.40 on a 1 to 5 scale relative to 2.93. Supervisory crossfunctional coordination ranges from 3.72 at Continental's Boston site to 2.92 at Southwest's Los Angeles site. Frontline crossfunctional coordination ranges from 3.45 at Southwest's Chicago site to 2.44 at American's Los
### Table 4.7: Site Differences in Coordination and Supervisory Control

<table>
<thead>
<tr>
<th></th>
<th>Frontline CrossCoord mean(SD)</th>
<th>Supervisor CrossCoord mean(SD)</th>
<th>Internal Coord mean(SD)</th>
<th>Supervisory Ratio mean(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>American:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston</td>
<td>2.69</td>
<td>3.49</td>
<td>4.42</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td>(0.66)</td>
<td>(0.23)</td>
<td>(0.57)</td>
<td>(0.08)</td>
</tr>
<tr>
<td>American:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Los Angeles</td>
<td>2.44</td>
<td>3.57</td>
<td>4.20</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>(0.67)</td>
<td>(0.45)</td>
<td>(0.69)</td>
<td>(0.08)</td>
</tr>
<tr>
<td>Continental:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston</td>
<td>3.13</td>
<td>3.72</td>
<td>4.71</td>
<td>6.3</td>
</tr>
<tr>
<td></td>
<td>(0.62)</td>
<td>(0.57)</td>
<td>(0.52)</td>
<td>(0.30)</td>
</tr>
<tr>
<td>Continental:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleveland</td>
<td>2.86</td>
<td>3.26</td>
<td>4.75</td>
<td>8.5</td>
</tr>
<tr>
<td></td>
<td>(0.40)</td>
<td>(0.16)</td>
<td>(0.41)</td>
<td>(0.60)</td>
</tr>
<tr>
<td>Southwest:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicago</td>
<td>3.45</td>
<td>3.70</td>
<td>4.69</td>
<td>11.5</td>
</tr>
<tr>
<td></td>
<td>(0.66)</td>
<td>(0.36)</td>
<td>(0.56)</td>
<td>(0.41)</td>
</tr>
<tr>
<td>Southwest:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Los Angeles</td>
<td>2.97</td>
<td>2.92</td>
<td>4.47</td>
<td>13.0</td>
</tr>
<tr>
<td></td>
<td>(0.54)</td>
<td>(0.53)</td>
<td>(0.74)</td>
<td>(1.20)</td>
</tr>
<tr>
<td>United:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston</td>
<td>2.92</td>
<td>3.42</td>
<td>4.59</td>
<td>4.9</td>
</tr>
<tr>
<td></td>
<td>(0.59)</td>
<td>(0.29)</td>
<td>(0.83)</td>
<td>(0.30)</td>
</tr>
<tr>
<td>United:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Los Angeles</td>
<td>2.80</td>
<td>3.29</td>
<td>4.49</td>
<td>6.8</td>
</tr>
<tr>
<td></td>
<td>(0.90)</td>
<td>(0.35)</td>
<td>(0.80)</td>
<td>(3.4)</td>
</tr>
<tr>
<td>Shuttle:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Los Angeles</td>
<td>3.38</td>
<td>3.60</td>
<td>4.68</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>(0.33)</td>
<td>(0.27)</td>
<td>(0.49)</td>
<td>(0.24)</td>
</tr>
<tr>
<td>Total</td>
<td>2.93</td>
<td>3.40</td>
<td>4.54</td>
<td>7.0</td>
</tr>
<tr>
<td></td>
<td>(0.64)</td>
<td>(0.50)</td>
<td>(0.66)</td>
<td>(3.7)</td>
</tr>
<tr>
<td>Obs</td>
<td>352</td>
<td>352</td>
<td>352</td>
<td>99</td>
</tr>
</tbody>
</table>
Angeles site. The supervisory ratio also varies greatly across sites, from over 10 supervisors per 100 employees at Southwest’s sites, to 3.0 and 2.4 at American’s sites.

4.8 Efficiency and Quality Outcomes

The range of variation across sites in the efficiency of the departure process is great (Table 4.8). The sample average for scheduled time at the gate is 50 minutes, with a minimum value of 23 minutes for Southwest’s Chicago and Los Angeles sites and a maximum of 88 minutes for American’s Los Angeles site. The average staffing level for the sample is 77 airport employees per passenger, with a sample low of 36 for Southwest’s Chicago site and a sample high of 131 for American’s Los Angeles site. Southwest’s Los Angeles site and United’s Shuttle in LA also use quite low levels of staffing per passenger.

The range of variation in quality is also great. Customer complaints range from 0.45 per 100,000 passengers for Southwest’s Chicago site, to 50.5 for American’s Boston site, with a sample mean of 24.7. Late arrivals range from 13.6 percent for the United Shuttle to 26 percent for Continental’s Cleveland site, with a sample mean of 20.9 percent. Mishandled bags range from 3.86 per 1,000 passengers for Southwest’s Chicago site, to 7.27 for the United Shuttle, with a sample mean of 5.36.

4.9 Product Complexity

In an analysis of the effect of coordination and control on performance outcomes, it is important to control for product complexity. Chapter Three reports findings that certain dimensions of product complexity
Table 4.8: Site Differences in Efficiency and Quality of the Departure Process

<table>
<thead>
<tr>
<th></th>
<th>Efficiency</th>
<th></th>
<th>Quality</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Turn Time</td>
<td>Staffing</td>
<td>Complaints</td>
<td>LateArriv</td>
<td>LostBags</td>
</tr>
<tr>
<td></td>
<td>mean(SD)</td>
<td>mean(SD)</td>
<td>mean(SD)</td>
<td>mean(SD)</td>
<td>mean(SD)</td>
</tr>
<tr>
<td>American:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston</td>
<td>65.5</td>
<td>99.2</td>
<td>50.5</td>
<td>22.5</td>
<td>5.38</td>
</tr>
<tr>
<td></td>
<td>(2.8)</td>
<td>(13.0)</td>
<td>(13.3)</td>
<td>(7.7)</td>
<td>(0.67)</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>88.5</td>
<td>131.3</td>
<td>47.1</td>
<td>17.8</td>
<td>6.06</td>
</tr>
<tr>
<td></td>
<td>(5.3)</td>
<td>(16.9)</td>
<td>(11.8)</td>
<td>(3.9)</td>
<td>(0.80)</td>
</tr>
<tr>
<td>Continental:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston</td>
<td>43.1</td>
<td>76.6</td>
<td>27.1</td>
<td>27.1</td>
<td>5.26</td>
</tr>
<tr>
<td></td>
<td>(3.2)</td>
<td>(12.2)</td>
<td>(11.1)</td>
<td>(9.9)</td>
<td>(1.61)</td>
</tr>
<tr>
<td>Cleveland</td>
<td>38.6</td>
<td>72.1</td>
<td>27.7</td>
<td>26.1</td>
<td>6.45</td>
</tr>
<tr>
<td></td>
<td>(3.0)</td>
<td>(10.3)</td>
<td>(10.4)</td>
<td>(8.4)</td>
<td>(1.75)</td>
</tr>
<tr>
<td>Southwest:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicago</td>
<td>22.9</td>
<td>35.9</td>
<td>0.45</td>
<td>15.1</td>
<td>3.86</td>
</tr>
<tr>
<td></td>
<td>(1.0)</td>
<td>(3.5)</td>
<td>(0.6)</td>
<td>(7.6)</td>
<td>(0.69)</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>22.7</td>
<td>37.4</td>
<td>0.55</td>
<td>19.9</td>
<td>4.09</td>
</tr>
<tr>
<td></td>
<td>(1.1)</td>
<td>(2.15)</td>
<td>(0.5)</td>
<td>(5.8)</td>
<td>(0.72)</td>
</tr>
<tr>
<td>United:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston</td>
<td>62.5</td>
<td>89.7</td>
<td>25.5</td>
<td>21.7</td>
<td>4.39</td>
</tr>
<tr>
<td></td>
<td>(5.4)</td>
<td>(22.3)</td>
<td>(6.9)</td>
<td>(8.3)</td>
<td>(1.82)</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>66.1</td>
<td>83.5</td>
<td>23.3</td>
<td>19.1</td>
<td>6.94</td>
</tr>
<tr>
<td></td>
<td>(5.1)</td>
<td>(16.8)</td>
<td>(4.1)</td>
<td>(5.0)</td>
<td>(1.42)</td>
</tr>
<tr>
<td>Shuttle:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Los Angeles</td>
<td>32.6</td>
<td>41.6</td>
<td>20.7</td>
<td>13.6</td>
<td>7.27</td>
</tr>
<tr>
<td></td>
<td>(5.3)</td>
<td>(4.3)</td>
<td>(0.6)</td>
<td>(8.7)</td>
<td>(1.16)</td>
</tr>
<tr>
<td>Total</td>
<td>50.7</td>
<td>77.1</td>
<td>24.7</td>
<td>20.9</td>
<td>5.36</td>
</tr>
<tr>
<td></td>
<td>(22.1)</td>
<td>(32.5)</td>
<td>(18.9)</td>
<td>(8.0)</td>
<td>(1.65)</td>
</tr>
<tr>
<td>Obs</td>
<td>99</td>
<td>99</td>
<td>99</td>
<td>99</td>
<td>99</td>
</tr>
</tbody>
</table>

Note: Efficiency is higher when turn time and staffing are lower. Quality is higher when complaints, late arrivals and lost bags are lower.
-- the number of passengers per departure, length of flight, amount of cargo carried and percent of passengers that connect -- affect departure outcomes, particularly the amount of turnaround time and per passenger staffing used.

Table 4.9 shows site differences in product complexity across the nine sites. United and American in Los Angeles carry more than 120 passengers per flight, while Continental, Southwest and the United Shuttle carry between 60 and 80 passengers per flight. American’s Los Angeles site flies the longest flights, averaging nearly 2,000 miles per flight, while American in Boston and United in Boston and LA follow at about 1,400 miles per flight. The shortest flights are flown by Southwest and the United Shuttle, at 300 to 400 miles per flight. Tons of freight and mail carried per departure vary tremendously from 0.09 by the United Shuttle to 6.17 by American’s Los Angeles operation. Percent connections vary greatly from about 1 percent at the Boston sites and the United Shuttle, to 10 percent at Southwest’s Chicago site and 31 percent at Continental’s Cleveland site. Table 4.10 shows turnaround time and staffing adjusted for product complexity.

Product complexity is accounted for in the analyses below by adding measures of product complexity to the equations that test the effects of coordination and control on efficiency and quality outcomes.
Table 4.9: Site Differences in Product Complexity

<table>
<thead>
<tr>
<th></th>
<th>Passengers mean(SD)</th>
<th>Length mean(SD)</th>
<th>Cargo mean(SD)</th>
<th>Connects mean(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>American:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston</td>
<td>110.1 (6.6)</td>
<td>1347.8 (93)</td>
<td>3.81 (0.52)</td>
<td>1.0 (0)</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>123 (6.4)</td>
<td>1993.8 (21.2)</td>
<td>6.17 (0.46)</td>
<td>3.9 (0.98)</td>
</tr>
<tr>
<td><strong>Continental:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston</td>
<td>72.9 (6.9)</td>
<td>446.8 (72.2)</td>
<td>0.94 (0.08)</td>
<td>1.0 (0)</td>
</tr>
<tr>
<td>Cleveland</td>
<td>61.5 (4.4)</td>
<td>523.4 (89.1)</td>
<td>0.66 (0.12)</td>
<td>31.2 (1.34)</td>
</tr>
<tr>
<td><strong>Southwest:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicago</td>
<td>73.4 (7.5)</td>
<td>318.9 (5.9)</td>
<td>0.15 (0.01)</td>
<td>10.3 (1.41)</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>81.1 (5.3)</td>
<td>386.9 (4.0)</td>
<td>0.49 (0.03)</td>
<td>3.3 (0.78)</td>
</tr>
<tr>
<td><strong>United:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston</td>
<td>110.5 (13.6)</td>
<td>1463 (130.6)</td>
<td>2.87 (0.39)</td>
<td>1.0 (0)</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>121.3 (5.9)</td>
<td>1459.2 (54.1)</td>
<td>4.57 (1.24)</td>
<td>3.9 (0.99)</td>
</tr>
<tr>
<td><strong>United Shuttle:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Los Angeles</td>
<td>79.7 (9.6)</td>
<td>330.3 (10.1)</td>
<td>0.09 (0.03)</td>
<td>1.0 (0)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>93.8 (24.0)</td>
<td>971.2 (608.4)</td>
<td>2.39 (2.17)</td>
<td>6.8 (9.6)</td>
</tr>
<tr>
<td><strong>Obs</strong></td>
<td>99</td>
<td>99</td>
<td>99</td>
<td>99</td>
</tr>
</tbody>
</table>
Table 4.10: Efficiency of the Departure Process, Adjusted for Product Complexity

<table>
<thead>
<tr>
<th></th>
<th>Turn Time</th>
<th></th>
<th>Staffing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual</td>
<td>Adjusted</td>
<td>Actual</td>
<td>Adjusted</td>
</tr>
<tr>
<td></td>
<td>mean(SD)</td>
<td>mean(SD)</td>
<td>mean(SD)</td>
<td>mean(SD)</td>
</tr>
<tr>
<td>American:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston</td>
<td>65.5</td>
<td>55.5</td>
<td>99.2</td>
<td>108.4</td>
</tr>
<tr>
<td></td>
<td>(2.8)</td>
<td>(0.42)</td>
<td>(13.0)</td>
<td>(7.1)</td>
</tr>
<tr>
<td>American:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Los Angeles</td>
<td>88.5</td>
<td>63.7</td>
<td>131.3</td>
<td>122.3</td>
</tr>
<tr>
<td></td>
<td>(5.3)</td>
<td>(0.42)</td>
<td>(16.9)</td>
<td>(7.1)</td>
</tr>
<tr>
<td>Continental:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston</td>
<td>43.1</td>
<td>52.9</td>
<td>76.6</td>
<td>79.0</td>
</tr>
<tr>
<td></td>
<td>(3.2)</td>
<td>(0.42)</td>
<td>(12.2)</td>
<td>(7.1)</td>
</tr>
<tr>
<td>Continental:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleveland</td>
<td>38.6</td>
<td>53.7</td>
<td>72.1</td>
<td>76.1</td>
</tr>
<tr>
<td></td>
<td>(3.0)</td>
<td>(0.42)</td>
<td>(10.3)</td>
<td>(7.1)</td>
</tr>
<tr>
<td>Southwest:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicago</td>
<td>22.9</td>
<td>38.5</td>
<td>35.9</td>
<td>35.1</td>
</tr>
<tr>
<td></td>
<td>(1.0)</td>
<td>(0.42)</td>
<td>(3.5)</td>
<td>(7.1)</td>
</tr>
<tr>
<td>Southwest:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Los Angeles</td>
<td>22.7</td>
<td>35.3</td>
<td>37.4</td>
<td>50.6</td>
</tr>
<tr>
<td></td>
<td>(1.1)</td>
<td>(0.42)</td>
<td>(2.15)</td>
<td>(7.1)</td>
</tr>
<tr>
<td>United:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston</td>
<td>62.5</td>
<td>54</td>
<td>90.8</td>
<td>110.2</td>
</tr>
<tr>
<td></td>
<td>(5.4)</td>
<td>(0.42)</td>
<td>(24.5)</td>
<td>(7.1)</td>
</tr>
<tr>
<td>United:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Los Angeles</td>
<td>66.1</td>
<td>52.9</td>
<td>83.5</td>
<td>91.7</td>
</tr>
<tr>
<td></td>
<td>(5.1)</td>
<td>(0.42)</td>
<td>(16.8)</td>
<td>(7.1)</td>
</tr>
<tr>
<td>Shuttle:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Los Angeles</td>
<td>32.6</td>
<td>46.4</td>
<td>41.6</td>
<td>63.3</td>
</tr>
<tr>
<td></td>
<td>(5.3)</td>
<td>(0.10)</td>
<td>(4.3)</td>
<td>(6.7)</td>
</tr>
<tr>
<td>Total</td>
<td>50.7</td>
<td>50.7</td>
<td>77.1</td>
<td>77.1</td>
</tr>
<tr>
<td></td>
<td>(22.1)</td>
<td>(8.66)</td>
<td>(32.5)</td>
<td>(35.2)</td>
</tr>
</tbody>
</table>

Note: Efficiency is higher when turn time and staffing are lower. Turn time and staffing are adjusted using coefficients from an equation that regresses measures of product complexity on turn time and staffing, parallel to Table 3.8.
4.10 Rank Correlations Between Coordination, Control and Outcomes

Before estimating the overall model, it is helpful to look at the underlying relationships to see what is driving the results. On Table 4.11, Spearman's rank correlation coefficients are used to assess the relationships between coordination, control, and individual outcomes. Crossfunctional coordination by frontline employees is related to lower turnaround times and leaner staffing levels, as well as to lower levels of customer complaints. High supervisory ratios are also related to lower turnaround times and leaner staffing levels, as well as to lower levels of customer complaints. Neither one is related to arrival or baggage outcomes.

Although it occurs at higher levels than crossfunctional coordination by frontline employees, crossfunctional coordination by supervisors on its own is not significantly related to any of the efficiency or quality outcomes. Coordination within functional groups, on its own, is not related to any of the outcomes either.

4.11 Effects of Coordination and Control on Efficiency and Quality

Crossfunctional coordination by frontline employees strongly and consistently supports short turnaround times and lean staffing, controlling for product complexity and within-function coordination (Table 4.12) A high ratio of supervisors to frontline employees also supports short turnaround times and lean staffing, even once frontline coordination is accounted for. One plausible explanation for the effect of supervision is that supervisors are playing a critical
Table 4.11 Rank Correlations Between Coordination, Control and Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Frontline CrossCoord</th>
<th>Supervisor CrossCoord</th>
<th>Internal Coord</th>
<th>Supervisory Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn Time</td>
<td>-0.83</td>
<td>-0.07</td>
<td>-0.55</td>
<td>-0.67</td>
</tr>
<tr>
<td></td>
<td>(0.0053)**</td>
<td>(0.8647)</td>
<td>(0.1250)</td>
<td>(0.0499)*</td>
</tr>
<tr>
<td>Staffing</td>
<td>-0.70</td>
<td>0.10</td>
<td>-0.50</td>
<td>-0.80</td>
</tr>
<tr>
<td></td>
<td>(0.0358)*</td>
<td>(0.7980)</td>
<td>(0.1705)</td>
<td>(0.0096)**</td>
</tr>
<tr>
<td>Complaints</td>
<td>-0.65</td>
<td>0.02</td>
<td>-0.25</td>
<td>-0.73</td>
</tr>
<tr>
<td></td>
<td>(0.0581)*</td>
<td>(0.9661)</td>
<td>(0.5165)</td>
<td>(0.0246)*</td>
</tr>
<tr>
<td>LateArrivals</td>
<td>-0.07</td>
<td>0.17</td>
<td>0.48</td>
<td>-0.03</td>
</tr>
<tr>
<td></td>
<td>(0.9647)</td>
<td>(0.8682)</td>
<td>(0.1875)</td>
<td>(0.9322)</td>
</tr>
<tr>
<td>LostBags</td>
<td>-0.38</td>
<td>0.03</td>
<td>-0.25</td>
<td>-0.45</td>
</tr>
<tr>
<td></td>
<td>(0.3085)</td>
<td>(0.9322)</td>
<td>(0.5165)</td>
<td>(0.2242)</td>
</tr>
<tr>
<td>Obs</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

+ Significant at p<.100  
* Significant at p<.050  
**Significant at p<.010

Spearman's rank correlation coefficients are used here. Note that a negative sign on time or staffing signifies a decrease in time or staffing used, and therefore an efficiency gain. A negative sign on complaints, late arrivals or lost bags signifies a decrease in those problems, and therefore an improvement in quality. In parentheses is the probability that the two variables are independent.

Turn Time = Minutes of scheduled turn time at the gate per departure, excluding originating flights.
Staffing = Airport employees (excluding skycaps, maintenance and fueling) per 1,000 daily passengers enplaned.
Complaints = Customer complaints per 100,000 passengers enplaned.
Late Arrivals = Percent of flights that fail to arrive at downline station within 15 minutes of schedule (see Table 4.5 for derivation).
Lost Bags = Bags mishandled per 1,000 passengers enplaned.
Table 4.12:
Effects of Coordination and Control on Efficiency of the Departure Process

<table>
<thead>
<tr>
<th></th>
<th>Turn Time coefficient(t-stat)</th>
<th>Staffing coefficient(t-stat)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>coefficient</td>
<td></td>
</tr>
<tr>
<td>Frontline CrossCoord</td>
<td>-38.39 (4.23)***</td>
<td>-78.91 (8.18)***</td>
</tr>
<tr>
<td></td>
<td>-32.19 (12.31)***</td>
<td>-29.21 (3.15)***</td>
</tr>
<tr>
<td>Supervisor CrossCoord</td>
<td>15.92 (2.03)*</td>
<td>40.92 (6.60)***</td>
</tr>
<tr>
<td></td>
<td>7.30 (5.18)***</td>
<td>8.61 (1.60)</td>
</tr>
<tr>
<td>Internal Coord</td>
<td>-21.43 (1.85)+</td>
<td>3.98 (0.74)</td>
</tr>
<tr>
<td></td>
<td>19.81 (28.72)***</td>
<td>21.98 (1.77)+</td>
</tr>
<tr>
<td>Supervisory Ratio</td>
<td>-2.79 (4.22)***</td>
<td>-2.95 (4.35)***</td>
</tr>
<tr>
<td></td>
<td>-1.28 (20.45)***</td>
<td>-2.40 (4.13)***</td>
</tr>
<tr>
<td>Cargo</td>
<td>3.11 (7.74)***</td>
<td>10.96 (7.23)***</td>
</tr>
<tr>
<td>Length</td>
<td>0.01 (4.61)***</td>
<td>0.03 (3.62)***</td>
</tr>
<tr>
<td>Passengers</td>
<td>-0.01 (0.17)</td>
<td>-1.16 (8.42)***</td>
</tr>
<tr>
<td>Connects</td>
<td>-25.66 (10.42)***</td>
<td>-52.97 (3.57)***</td>
</tr>
<tr>
<td>Constant</td>
<td>225.96 (5.14)***</td>
<td>171.77 (10.53)***</td>
</tr>
<tr>
<td>Adj Raq</td>
<td>91.6% 97.6%</td>
<td>82.1% 92.3%</td>
</tr>
<tr>
<td>Obs</td>
<td>99 99 99</td>
<td>99 99 99</td>
</tr>
</tbody>
</table>

Note: Ordinary least squares regression, with Huber correction of the standard errors for heteroskedasticity and within cluster correlation, due to panel structure of data. Negative signs indicate an decrease in time or staffing used, and therefore an increase in efficiency.
role in crossfunctional coordination. But, accounting for the effects of coordination by frontline employees, crossfunctional coordination by supervisors is related to longer turnarounds and higher airport staffing levels per passenger. These findings raise the question of what supervisors are doing to support lean operations, since their coordination activities do not appear to account for differences in efficiency.

Coordination and control have far less consistent effects on quality than efficiency (Table 4.13). Crossfunctional coordination by frontline employees is associated with fewer late arrivals and fewer lost bags -- high supervision is associated with fewer customer complaints. But once product characteristics are accounted for, only the effect of supervision on customer complaints remains.

The results on Tables 4.12 and 4.13 are consistent with two interpretations. Either coordination and control allow organizations to improve efficiency without detracting from outcome quality. Or alternatively, crossfunctional coordination and control allow organizations to achieve quality outcomes with less effort, thus freeing up energy for reducing turnaround times. Both interpretations of the results are plausible, and both are good news for organizations.

4.12 Effects of Coordination and Control Hold Across Strategies

The effects of coordination and control on outcomes are not substantially changed when we account for whether the airline has a quick turnaround strategy. Based on an analysis of airline strategies
Table 4.13: Effects of Coordination and Control on Quality of the Departure Process

<table>
<thead>
<tr>
<th></th>
<th>Customer Complaints</th>
<th>Late Arrivals</th>
<th>Lost Bags</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>coefficient(t-stat)</td>
<td>coefficient(t-stat)</td>
<td>coefficient(t-stat)</td>
</tr>
<tr>
<td>Frontline CrossCoord</td>
<td>-19.75 (1.45)</td>
<td>-10.76 (1.32)*</td>
<td>-2.75 (1.88)*</td>
</tr>
<tr>
<td></td>
<td>18.55 (1.56)</td>
<td>1.75 (0.24)</td>
<td>1.35 (0.65)</td>
</tr>
<tr>
<td>Supervisor CrossCoord</td>
<td>1.64 (0.19)</td>
<td>5.97 (1.50)</td>
<td>0.21 (0.18)</td>
</tr>
<tr>
<td></td>
<td>-3.10 (0.57)</td>
<td>0.37 (0.13)</td>
<td>-1.10 (1.14)</td>
</tr>
<tr>
<td>Internal Coord</td>
<td>5.66 (0.42)</td>
<td>26.51 (7.37)**</td>
<td>3.50 (2.81)**</td>
</tr>
<tr>
<td></td>
<td>-39.18 (3.17)**</td>
<td>18.79 (1.95)+</td>
<td>2.16 (0.89)</td>
</tr>
<tr>
<td>Supervisory Ratio</td>
<td>-3.72 (3.69)***</td>
<td>-0.20 (0.46)</td>
<td>-0.11 (0.91)</td>
</tr>
<tr>
<td></td>
<td>-4.95 (6.26)***</td>
<td>-0.28 (0.51)</td>
<td>-0.19 (1.25)</td>
</tr>
<tr>
<td>Cargo</td>
<td>1.30 (2.72)**</td>
<td>0.57 (0.62)</td>
<td>0.85 (3.61)***</td>
</tr>
<tr>
<td></td>
<td>Length</td>
<td></td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>0.01 (1.58)</td>
<td>0.010 (3.00)**</td>
<td>0.000 (0.70)</td>
</tr>
<tr>
<td>Passengers</td>
<td>-0.39 (3.35)**</td>
<td>-0.36 (7.02)***</td>
<td>-0.02 (1.62)</td>
</tr>
<tr>
<td></td>
<td>Connects</td>
<td>-10.27 (0.89)</td>
<td>5.17 (1.97)*</td>
</tr>
<tr>
<td></td>
<td>56.12 (3.59)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>72.85 (1.39)</td>
<td>-86.95 (5.16)***</td>
<td>-2.42 (0.55)</td>
</tr>
<tr>
<td></td>
<td>213.79 (5.02)***</td>
<td>-48.35 (1.44)</td>
<td>-2.71 (0.31)</td>
</tr>
<tr>
<td>Adj Rsq</td>
<td>72.7% 99</td>
<td>14.3% 24.7%</td>
<td>15.9% 27.7%</td>
</tr>
<tr>
<td>Obs</td>
<td>99 99</td>
<td>99 99</td>
<td>99 99</td>
</tr>
</tbody>
</table>

Note: Ordinary least squares regression, with Huber correction of the standard errors for heteroskedasticity and within cluster correlation, due to panel structure of data. Negative signs indicate a decrease in complaints, late arrivals or lost bags, and therefore an increase in quality.
to improve departure process outcomes, reviewed in Chapter Two, the quick turnaround strategy was identified as one in which the product is simplified -- short haul, small jets, point to point route network in place of the hub and spoke -- in order to achieve high utilization of aircraft and airport staffing. Southwest, Continental and the United Shuttle were identified as having quick turnaround strategies for at least a portion of the 1994 study period. The other two United sites and American sites were identified as having traditional hub and spoke strategies. A dummy variable was created which equals one for the Southwest, Continental and United Shuttle sites (starting in April 1994 for the Continental sites and October 1994 for the United Shuttle), and zero for the American and other United sites.

Controlling for these strategy differences, coordination and control continue to have significant effects on the reduction of turnaround time and staffing (Table 4.14). This result suggests that coordination and control are relevant for achieving efficiencies in the departure process, even for airlines who choose not to pursue a quick turnaround strategy. This is good news, since Chapter Two points out the hazards of imitating the Southwest quick turnaround strategy without regard to an airline's own inherited physical assets and customer base, which may not be well-suited to a quick turnaround strategy. Even Continental, which expended tremendous effort in changing to a Southwest-type product and in learning to do faster turns, ultimately failed due to inadequate understanding of the constraints posed by its inherited physical assets and customer base. The results on Table 4.14 suggest that Continental could have
Table 4.14: Effects of Coordination and Control, Accounting for Differences in Strategy

<table>
<thead>
<tr>
<th></th>
<th>Turn Time Coefficient (t-stat)</th>
<th>Staffing Coefficient (t-stat)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frontline CrossCoord</td>
<td>-34.08 (11.33)***</td>
<td>-34.59 (4.18)***</td>
</tr>
<tr>
<td>Supervisor CrossCoord</td>
<td>10.29 (5.36)***</td>
<td>17.15 (2.71)**</td>
</tr>
<tr>
<td>Internal Coord</td>
<td>16.10 (8.42)***</td>
<td>11.41 (1.01)</td>
</tr>
<tr>
<td>Sup Ratio</td>
<td>-1.12 (7.85)***</td>
<td>-1.92 (4.17)***</td>
</tr>
<tr>
<td>QuickTurn Strategy</td>
<td>-4.27 (5.16)***</td>
<td>-12.20 (4.07)***</td>
</tr>
<tr>
<td>Cargo</td>
<td>2.82 (6.47)***</td>
<td>10.13 (6.17)***</td>
</tr>
<tr>
<td>Length</td>
<td>0.01 (2.75)**</td>
<td>0.02 (2.04)*</td>
</tr>
<tr>
<td>Passengers</td>
<td>0.01 (0.19)</td>
<td>-1.10 (7.37)***</td>
</tr>
<tr>
<td>Connects</td>
<td>-22.84 (6.02)***</td>
<td>-44.93 (2.93)**</td>
</tr>
<tr>
<td>Constant</td>
<td>39.98 (6.91)***</td>
<td>152.42 (4.22)***</td>
</tr>
<tr>
<td>Adj Rsq</td>
<td>97.8%</td>
<td>92.9%</td>
</tr>
<tr>
<td>Obs</td>
<td>99</td>
<td>99</td>
</tr>
</tbody>
</table>

Note: Ordinary least squares regression, with Huber correction of the standard errors for heteroskedasticity and within cluster correlation, due to panel structure of data. Negative signs indicate an decrease in time or staffing used, and therefore an increase in efficiency.
maintained its hub and spoke strategy, while still reaping gains from speeding its turnarounds and decreasing its staffing relative to its product. Similarly, the results suggest that an airline like American need not abandon its hub and spoke strategy in order to gain benefits from speeding its turnarounds and decreasing its staffing levels.

4.13 Savings From Reduced Turnaround Time

What are the dollar savings from the efficiency improvements brought about by improved coordination and control? Savings from reduced staffing are well understood, but savings from reduced turnaround time can also be substantial when costly fixed assets are involved. Savings from reduced turnaround time differ for each airline, depending on a number of factors which are described in Chapter Two. The analysis will be summarized here, for American, Continental, Southwest and United only.

Savings from reducing turnaround time depend on the operating revenue earned per aircraft minute, net of the costs that increase with increased flying, i.e. labor, fuel, airport fees and maintenance. Net operating revenue per aircraft minute is listed for each of the four airlines on Table 4.15. This quantity can be thought of as the opportunity cost of turnaround time. It is greater, the better able an airline is to achieve a revenue premium from ticket sales, and the longer its average flight length. [Note: See p. 37 for further explanation.] American and United have relatively high opportunity costs of turnaround time, while Southwest's and Continental's are relatively low.
Table 4.15
Annual Savings from Reducing Turn Time by One Minute Per Departure, Systemwide

<table>
<thead>
<tr>
<th>Net Rev/ Aircraft Minute</th>
<th>Annual Departures</th>
<th>Minutes Saved Systemwide</th>
<th>Annual Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>American</td>
<td>$64.0</td>
<td>763,115</td>
<td>763,115</td>
</tr>
<tr>
<td>Continental</td>
<td>$39.3</td>
<td>509,353</td>
<td>509,353</td>
</tr>
<tr>
<td>Southwest</td>
<td>$36.5</td>
<td>589,786</td>
<td>589,786</td>
</tr>
<tr>
<td>United</td>
<td>$58.3</td>
<td>668,969</td>
<td>668,969</td>
</tr>
<tr>
<td>Industry Average</td>
<td>$48.8</td>
<td>541,438</td>
<td>541,438</td>
</tr>
</tbody>
</table>

Note: All numbers are for 1994, domestic operations only. These results assume that a minute turnaround time becomes a minute of flying time, that fares are not reduced to sell additional seats, and that no costly organizational practices are required to make quicker turnarounds possible. These assumptions are challenged in the text. See Table 2.2 for derivation of net revenue per aircraft minute, for all ten major airlines. See Table 2.3 for annual savings for all ten major airlines.
Multiplied times the number of annual departures, we get the annual savings for a one minute reduction in turnaround time, systemwide. For American, those savings are about $50 million, while for Continental and Southwest they are about $20 million. Table 4.16 shows the annual savings per employee for a one minute and five minute reduction in turnaround time. They are greatest for Southwest employees, interestingly, even though Southwest’s total savings are among the lowest. This is explained by the fact that Southwest has an unusually high number of departures per employee, partly due to low staffing levels and partly due to its short haul route structure. With this many departures per employee, the per employee gain from savings in turnaround time is especially high.

The gains will also be affected by three other factors. First, a minute of turnaround time can become a minute of flying time only once enough minutes are accumulated throughout the system in a given aircraft type to fly an additional leg. Second, unless demand is growing, ticket prices will have to be reduced in order to sell additional seats. Third, the organizational practices that make quicker turnarounds possible without loss of staffing efficiencies or quality outcomes may themselves be costly. Practices that make up a supportive system of coordination and control are explored in Chapters Five and Six, and some of them are indeed costly. Still, the gains are potentially substantial for each of the airlines studied here.

How many minutes can be saved per departure with high levels of coordination and control? Using the results from Table 4.12, consider the effect of
Table 4.16
Gains, Per Employee, from Reducing Turnaround Time by One to Five Minutes

<table>
<thead>
<tr>
<th></th>
<th>Annual Savings/Minute Reduction</th>
<th>Total Employees</th>
<th>Departures/Employee</th>
<th>Annual Savings/Employee (one minute)</th>
<th>Annual Savings/Employee five minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>American</td>
<td>$48,839,360</td>
<td>65,390</td>
<td>11.7</td>
<td>$747</td>
<td>$3,734</td>
</tr>
<tr>
<td>Continental</td>
<td>$20,017,573</td>
<td>31,094</td>
<td>16.4</td>
<td>$644</td>
<td>$3,219</td>
</tr>
<tr>
<td>Southwest</td>
<td>$21,527,189</td>
<td>15,052</td>
<td>39.2</td>
<td>$1,430</td>
<td>$7,151</td>
</tr>
<tr>
<td>United</td>
<td>$39,000,893</td>
<td>50,900</td>
<td>13.1</td>
<td>$766</td>
<td>$3,830</td>
</tr>
<tr>
<td>Industry Average</td>
<td>$27,621,591</td>
<td>33,522</td>
<td>18.3</td>
<td>$848</td>
<td>$4,120</td>
</tr>
</tbody>
</table>

Note: All numbers are for 1994, domestic operations only. These results assume that a minute turnaround time becomes a minute of flying time, that fares are not reduced to sell additional seats, and that no costly organizational practices are required to make quicker turnarounds possible. These assumptions are challenged in the text. See Table 2.4 for gains per employee for all ten major airlines.
coordination and control on turnaround time by comparing the strongest site -- Southwest's Chicago station -- to the weakest site -- American's Los Angeles station. Assume that in order to increase frontline crossfunctional coordination and supervisory control, which help lower turnaround time, one must increase coordination within functions and coordination by supervisors, which tend to increase turnaround time. Table 4.17 shows that the difference in turnaround time between the best and worst site that is accounted for by coordination and control comes to a full 33 minutes. This is extremely high. More realistically, an organization would hope to achieve half of that, by moving from the bottom to the mean, or from the mean to the top. Assuming the real annual savings per minute reduction is $25 million for American rather than $50 million (due to the difficulties described above of translating a minute of turnaround time into a minute of flying time), American would achieve $375 million in annual savings from a 15 minute decrease in turnaround time, systemwide. These annual savings come to about $5,600 per employee.

4.14 Complementarity Between Coordination and Control

The above analysis shows that crossfunctional coordination allows airlines to achieve substantially lower levels of turnaround time and staffing, with no significant adverse effects on customer satisfaction, ontime arrivals or baggage handling accuracy. Alternatively, coordination allows airlines to achieve quality more easily, therefore freeing up energy for increasing efficiency. In either scenario, crossfunctional coordination allows organizations to run significantly leaner operations, without loss of outcome quality.
Table 4.17: Magnitude of the Effect of Coordination and Control on Turnaround Time

<table>
<thead>
<tr>
<th></th>
<th>Whole Sample* (coefficients)</th>
<th>Southwest: Chicago** (means)</th>
<th>(product)</th>
<th>American: Los Angeles*** (means)</th>
<th>(product)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frontline CrossCoord</td>
<td>-32.19</td>
<td>3.45</td>
<td>-111.06</td>
<td>2.44</td>
<td>-78.54</td>
</tr>
<tr>
<td>Supervisor CrossCoord</td>
<td>7.30</td>
<td>3.70</td>
<td>27.01</td>
<td>3.57</td>
<td>26.06</td>
</tr>
<tr>
<td>Internal Coord</td>
<td>19.81</td>
<td>4.69</td>
<td>92.91</td>
<td>4.20</td>
<td>83.20</td>
</tr>
<tr>
<td>Sup Ratio</td>
<td>-1.28</td>
<td>11.5</td>
<td>-14.72</td>
<td>3.0</td>
<td>-3.84</td>
</tr>
<tr>
<td>Turn Time (sum)</td>
<td></td>
<td>-5.86</td>
<td></td>
<td>26.88</td>
<td></td>
</tr>
</tbody>
</table>

Difference in Turn Time from High to Low Coordination and Control: 33 minutes

*Coefficients were estimated on the whole sample, in the equation depicted on Table 4.12.
**Southwest Chicago is the site with the highest level of crossfunctional coordination, and the second highest level of supervision.
***American Los Angeles is the site with the lowest level of crossfunctional coordination, and the lowest level of supervision.
A high ratio of supervisors to frontline employees also supports leaner operations. But the findings suggest that it is not their crossfunctional coordination activities that make supervisors so valuable. It is also not simply that supervisors are replacing higher level managers, thus reflecting a policy of delegation from station management to the frontline supervision. As shown in Table 4.18, the rank correlation between supervisors per frontline employees and managers per supervisor is negatively related, though not significant. Managers in some sites with high supervisory levels do have larger spans of control, in the sense of supervisors who report to them. But Table 4.18* also shows that the rank correlation between supervisors per frontline employee and managers per frontline employee is quite strong, significant, and positive rather than negative. With respect to frontline employees, a small supervisory span of control tends to be accompanied by a small managerial span of control. In other words, high supervisory ratios represent a net increase in managerial presence.

What are these supervisors doing that supports rather than undermines crossfunctional coordination by frontline employees? They may fill the traditional supervisory function of oversight to deter shirking. Or, alternatively, they may support coordination through coaching and qualitative feedback. In either case, these findings challenge the view that crossfunctional coordination among frontline employees is a substitute for vertical controls. Instead, vertical controls appear to have a complementary effect on performance, particularly on the ability to run a lean operation while maintaining quality outcomes.

*see page 299
A overview in Chapter Five of selected coordination and control practices and an analysis in Chapter Six of the systems of coordination and control in place at each of the nine sites, show that supervision is not an isolated means of achieving vertical control, but rather is one key element of a larger system that achieves vertical control without undermining horizontal coordination. A high supervisory ratio works with crossfunctional coordination to produce efficient outcomes, it is argued, because a high supervisory ratio is part of a system of vertical control based on qualitative accountability, while a low supervisory ratio is part of an arms length system of control based on "the numbers." In the terminology of Meyer (1994), the first system is based on process measures, while the second one is based on results measures. Accountability based on results measures relies little on the qualitative flow of information that supervisors can provide, but tends instead to fall back on the narrow functional measures of performance that are more easily quantified.

A system of qualitative vertical accountability is more conducive to crossfunctional coordination, which relies, as we shall see, on shared horizontal accountability for performance outcomes. Employees with more broadly defined goals are less easily monitored through an arms length system of control based on bottom line measures, and instead need closer attention from someone whose role it is to monitor and support coordination through the exchange of qualitative information.
Chapter 5: Practices that Support Coordination and Control

There are two kinds of practices that make up a distinctive system of coordination and control -- practices designed to support horizontal coordination across functional groups, and those designed to achieve vertical control throughout the organization. Some practices serve more than one function. This chapter briefly summarizes organizational practices that appear to account for observed differences in coordination and control, based on theory and based on observations at American, Southwest, Continental and United Airlines. Chapter Six describes how these practices combine in the nine sites studied to produce systems of coordination and control.

5.1 Coordination Mechanism

Principles of organizational design recommend some type of coordination mechanism to facilitate coordination across boundaries (Lawrence and Lorsch, 1967; Galbraith, 1973). In the departure process, this role has traditionally been played by the operations center, located in each station to coordinate activities for each airline. Operations agents working in the center are in touch with the airport control tower, pilots of the incoming and outgoing flights, the central dispatcher in company headquarters, as well as the upline and downline stations for any given flight. Operations centers are described at the major carriers as the "nerve center" or "brain" or "heartbeat" of the station. The operations agent is expected to be at the center of communication among the various employee groups who are working to get the plane unloaded, loaded and on its way. His or her tasks traditionally included organizing information about the load --
passengers, bags, freight, mail and cargo -- that is going out on a flight, and making calculations about how much of each can be loaded and where it should be loaded, consistent with weather and fueling information. These decisions involve input from each department and are critical to the viability of the flight, both financial and operational.

Aside from these similarities, the four carriers studied here use the operations function in quite different ways. Some carriers have centralized certain operations functions -- particularly load planning -- from the stations to a headquarters location. Another has gone in the opposite direction by expanding the presence of the operations function in the station and transforming it into a case manager or team leader for the departure process. Still another has developed an alternative mechanism for coordinating the departure process, along the lines of a crossfunctional team.

5.2 Shared Accountability for Outcomes

Successful crossfunctional coordination requires performance measures that relate an employee's job to shared process objectives to avoid subgoal optimization. Shared measures also leave open the possibility that a problem resulted not from individual error but from a collective breakdown in coordination or a weakness in the process itself, and thus open the door for learning and process improvement.

The traditional system of accountability in the airline industry violates this guideline. Outcomes of the departure process are divided up into departmental objectives, for which individual departments are held accountable. Airlines have measurement systems that
trace departure delay to the department that is responsible for them. Delays are coded into of categories according to their cause and are charged to individual departments and workgroups within them. A delay is recorded for a department only if it was determined to be that department's fault. Then on a daily, weekly and monthly basis, the percentage of ontime departures is calculated independently for each department. No one is directly rewarded for station performance -- only for their piece of it. No one is directly rewarded or penalized for a departure delay -- they are only charged if their department is deemed to have caused it. Departmental accountability leads to a search for individual rather than system failure. All four airlines studied have struggled to reduce the "fingerpointing" among functional groups that tends to result from this measurement system and to achieve shared accountability among functional groups.

5.3 Nonpunitive Vertical Accountability

Shared accountability within the station can be further undermined by the relationship between the station and headquarters, particularly by vertical accountability that is perceived as punitive and based "on the numbers" rather than on a rich flow of qualitative information conducive to learning and experimentation. Accountability based "on the numbers" is part of a hands off, arms length management style based on a philosophy of empowerment, but which in practice restricts a potentially valuable flow of information and motivates managers to achieve short term, quantifiable results at the expense of long term improvements. Objective measures are inherently weak in that they do not readily encompass the concept of helpfulness or doing whatever is necessary to get the
job done (Hammer and Champy, 1993). Organizational economists have predicted that excessive emphasis on rewards for objectively measured performance will lead to subgoal optimization (Gibbons, Murphy and Baker, 1993). Punitive enforcement of performance standards further restricts the flow of information and leads to cover-up which precludes problem solving (Deming, 1988). Despite the weaknesses of this style of accountability, however, it is the norm in the airline industry rather than the exception.

5.4 Supporting Role of Supervisors

Like companies in many other industries, airlines experimented with lower levels of supervision in the 1990s, with the joint goals of cost savings and pushing decisionmaking down to the frontline. Company leaders spoke proudly of "removing layers," and creating more direct paths for information flow. In most airlines, the role of nonmanagement lead agents was expanded as the role of supervisors contracted. But certain elements were lost with the reduction of supervisors. The ability to give rich, qualitative feedback, to identify problems and to bring discipline when needed, all are jeopardized with the move away from supervision. Ironically, a more quantitative form of accountability may take the place of the qualitative interaction between levels -- forcing a focus on quantifiable measures, often functionally specific ones. Other losses include a restriction of the promotional path between frontline and management, and restriction of social contact between these groups. Management may come to appear as being more remote from the frontline, and from frontline concerns and considerations. These losses however must be counterbalanced by the gains from empowerment.
5.5 Promotion from Within

Promotion from within creates a job ladder for movement from frontline to management positions, thereby increasing frontline opportunities and providing a mechanism for aligning employee goals with company goals (Aoki, 1990). One side effect of the trend toward reduced supervision is the restriction of the job ladder between frontline and managerial employees. The job ladder between field managers and headquarters has been restricted in the airline industry with the trend toward bringing MBAs into headquarters positions from the outside, rather than promoting from field positions. This trend was started in the early 1980s by American Airlines.

5.6 Selection for Team Players

Friction across employee groups is common in the airline industry and at American, for example, has been the downfall of several attempts to improve coordination -- between gate agents and flight attendants, between ground workers and pilots, and between pilots and gate agents. Pilots and flight attendants are accused by station employees of having an attitude of superiority -- and pilots in particular are accused by people throughout the organization of wanting to be in charge even in situations that call for teamwork, like the departure process. The selection process can be used to identify people who are more oriented toward teamwork, and who are likely to step across functional lines to help when needed. Whether or not this kind of selection process really does identify people who have are intrinsically more team-oriented, it sends a strong signal as to what kind of behavior is acceptable in the organization. Such a selection process however relies heavily on qualitative
assessment and may require considerable investment of organizational resources. This approach to employee selection is not common in the industry, particularly for frontline airport employees.

5.7 Training for Teamwork

For successful crossfunctional coordination, learning is required, whether formal or informal, not just about one’s individual job but about the relationship of one’s job to the overall process. Some of this will be occur through crossfunctional coordination itself, in the form of learning by doing, since employees learn through frequent communication with their counterparts in other departments. This mode of learning is continuous and allows quick adaption to contingent events (Aoki, 1986). Given the geographical, knowledge and status boundaries between employee groups in this industry, however, some initial training about the overall process seems to help. It can take many forms besides formal training programs – on the job training led by a knowledgeable coworker, job trading between functional groups, or offline crossfunctional problem solving teams.

5.8 Conflict Resolution across Functions

When disparate functional groups are involved in a highly interdependent work process, conflicts can be expected to erupt. For smooth functioning of the process, conflict resolution practices that specifically address conflicts across functional boundaries can be used. These practices are not well-developed in the major airlines. Due to the presence of unions, practices for addressing conflicts between nonmanagement and management employees are far better developed. It has been taboo in traditional unions to
air conflicts within the union, or with other unions, and particularly to allow management intervention in those conflicts. Still, given the need, innovations are occurring. One of the airlines studied put a great deal of effort into improving conflict resolution among employees in the departure process, using an interpersonal approach. Another relied more on task focused crossfunctional problem solving teams, led by facilitators trained in conflict resolution, where conflict resolution was just one of several outcomes.

5.9 Egalitarian Company Culture

Status boundaries between employee groups are a significant obstacle to teamwork in the airline industry. Among station employee groups, there is a tradition of namecalling like "agent trash" and "ramp rats." There is a hierarchy on the ramp that starts with the highly paid mechanics and ends with cabin cleaners. Some of these barriers are due to the very different work that each group does, and to the geographic distance among these groups, even though their work is highly interdependent.

The pilots are at the top of the status hierarchy and tend to consider themselves to be first among equals. This status is partly due to their pay, which is high relative to their fellow employee groups, and partly due to the special status they get from the Federal Aviation Administration. When in flight, pilots are in charge of the aircraft and everybody in it. This command status sometimes extends inappropriately into their interactions with station employees. "Pilots are great at being self-righteous," said a pilot. "It’s something about the job. The major airlines treat you well. People do what you say.
It brings out a certain decisiveness that becomes arrogance. But a pilot’s license is on the line all the time. The FAA does random checks. You can get fined thousands of dollars or lose your license. This is part of the reason pilots can be tough sometimes."

An egalitarian culture, defined as one with a dense network of personal relationships that span status boundaries, is expected to have a powerful effect on respect among functional groups.

5.10 Flexible Workrules

Unions can help employees share in the gains from crossfunctional coordination as well as have a voice in top management decisions, and as such are helpful in establishing vertical control. For successful coordination, however, it is important that neither unions nor managers use workrules to draw hard distinctions between their work and the work of others. It is important to uphold the principle that everyone’s job is to do what needs to be done, even though the rules for such behavior cannot be specific contractually.

5.11 Shared Monetary Rewards

Monetary rewards can be used to align employee interests with those of the company, but can also have the side effect of setting employees at crosspurposes if the rewards are tied to functionally specific outcomes. The benefit of tying rewards to functionally specific outcomes is that the employee is rewarded for outcomes more under his or her control. But in a highly interdependent process, like the departure process, employees ideally would try to influence a broader range of outcomes and can be discouraged from
this by overly narrow rewards.

5.12 Respect for Employee Representation

The airline industry is highly unionized and managers in the industry often blame their unions for high costs and inefficiencies. But across the industry, there are important variations in the quality of that relationship, and the strategies managers have used to work with or against their unions. Employee representation within an organization can give that organization increased legitimacy with its employees, and thus serve as a key element of a system of coordination and control (Aoki, 1990) if employee representatives are respected and communication is open (Kochan, Katz and McKersie, 1986). Of the four carriers studied here, three are highly unionized and the fourth is nonunion, but with active employee interest groups (EIGs) and management interest groups (MIGs). See Table 5.1.

5.13 Trust Building by Top Leadership

Top leadership can build trust with frontline employees in several ways in addition to showing respect for their elected representatives. Top leaders of two of the organizations studied here attempted to build trust with frontline employees by bypassing their representatives and communicating directly with them. Others pursued a dual strategy of trust building by both communicating directly with frontline employees and working in partnership with their representatives. The risks and rewards of the two strategies are well established in negotiation theory (Walton and McKersie, 1958). By attempting to compete with employee representatives, one risks losing the trust of those
<table>
<thead>
<tr>
<th></th>
<th>American</th>
<th>Continental</th>
<th>Southwest</th>
<th>United</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pilots</strong></td>
<td>APA</td>
<td>IACP</td>
<td>SAPA</td>
<td>ALPA</td>
</tr>
<tr>
<td><strong>Flight attdt</strong></td>
<td>APFA</td>
<td>IAM</td>
<td>TWU</td>
<td>AFA</td>
</tr>
<tr>
<td><strong>Gate</strong></td>
<td>nonunion</td>
<td>CEIG</td>
<td>IAM</td>
<td>nonunion</td>
</tr>
<tr>
<td><strong>Ticketing</strong></td>
<td>nonunion</td>
<td>CEIG</td>
<td>-IAM</td>
<td>nonunion</td>
</tr>
<tr>
<td><strong>Operations</strong></td>
<td>nonunion</td>
<td>CEIG</td>
<td>ROPA</td>
<td>nonunion</td>
</tr>
<tr>
<td><strong>Fuelers</strong></td>
<td>TWU</td>
<td>contract</td>
<td>RCPA or contract</td>
<td>IAM</td>
</tr>
<tr>
<td><strong>Freight</strong></td>
<td>TWU</td>
<td>CEIG</td>
<td>ROPA</td>
<td>IAM</td>
</tr>
<tr>
<td><strong>Bagroom</strong></td>
<td>TWU</td>
<td>CEIG</td>
<td>ROPA</td>
<td>IAM</td>
</tr>
<tr>
<td><strong>Ramp</strong></td>
<td>TWU</td>
<td>CEIG</td>
<td>ROPA</td>
<td>IAM</td>
</tr>
<tr>
<td><strong>Cleaning</strong></td>
<td>TWU</td>
<td>CEIG</td>
<td>ROPA or contract</td>
<td>IAM</td>
</tr>
<tr>
<td><strong>Mechanics</strong></td>
<td>TWU</td>
<td>CEIG</td>
<td>IBT</td>
<td>IAM</td>
</tr>
<tr>
<td><strong>Skycaps</strong></td>
<td>contract</td>
<td>contract</td>
<td>IAM</td>
<td>contract</td>
</tr>
<tr>
<td><strong>Security</strong></td>
<td>contract</td>
<td>contract</td>
<td>contract</td>
<td>contract</td>
</tr>
<tr>
<td><strong>Caterers</strong></td>
<td>contract</td>
<td>contract</td>
<td>ROPA</td>
<td>contract</td>
</tr>
</tbody>
</table>

AFA = Association of Flight Attendants
ALPA = Air Line Pilots Association
APA = Allied Pilots Association (single carrier union)
APFA = Association of Professional Flight Attendants (single carrier union)
CEIG = Continental Employee Involvement Group (nonunion representation)
IACP = Independent Association of Continental Pilots (single carrier union)
IAM = International Association of Machinists
IBT = International Brotherhood of Teamsters
ROPA = Ramp, Operations and Provisioning Association (single carrier union)
SAPA = Southwest Airlines Pilots Association (single carrier union)
TWU = Transportation Workers Union
who remain loyal to their representatives. One also risks dividing the group against itself, and groups against each other. This adversarialism is useful for certain kinds of control strategies, but undermines teamwork and the possibility of frontline employee coordination.

5.14 From Practices to Systems

The practices introduced in this chapter form cohesive systems of coordination and control, I will argue in Chapter Six. They fit together and are mutually reinforcing, and in that sense represent components of particular systems. In addition, I will argue that these systems of coordination and control account in part for observed variations in efficiency and quality outcomes.
Chapter 6: Systems of Coordination and Control

This chapter describes the systems of coordination and control in place during 1994 at each of the nine sites studied. Further, this chapter explores the extent to which these systems account for variations in coordination outcomes and, ultimately, for variations in departure process outcomes (Table 6.1). The method used here is one of induction (Eisenhardt, 1988). From case study comparisons, bolstered by accumulated quantitative measures, a model of coordination and control is developed, particularly focusing on how systems of practices affect operating outcomes through influencing the ways people think and act. The process of induction is bolstered by accumulated quantitative measurements, and broadly guided by the literatures on organization design and human resource systems.

A detailed breakdown of the outcomes this chapter seeks to explain are shown on Table 6.2. Most of these measures have been introduced and discussed in Chapter Four, but are reproduced here for easier reference. The coordination index is disaggregated here into its component parts for more detailed analysis. One new measure presented here is an aggregate index of departure process outcomes, for ease in ranking the sites. The aggregate index is simply the sum of the five outcome measures used in Chapter Three and Chapter Four analyses -- turnaround time per departure, airport staffing per 1,000 daily passengers, customer complaints per 100,000 passengers, percentage of late arrivals, and bags mishandled per 1,000 passengers. A low score indicates high performance and vice versa.
Table 6.1: Coordination and Control of the Flight Departure Process

**System of Coordination and Control**
- **Coordination**
  - Crossfunctional Coordination Mechanism
  - Horizontal Accountability
  - Selection for Team Players
  - Training for Teamwork
  - Conflict Resolution
  - Egalitarian Culture
  - Flexible Workrules

- **Control**
  - Supporting Role for Supervisors
  - Qualitative Vertical Accountability
  - Internal Promotion
  - Shared Rewards
  - Respect for Employee Representation
  - Trust Building by Top Leaders

**Cognitive Frame**
- Shared Goals
- Shared Knowledge
- Shared Respect

**Coordination Behavior**
- Frequent
- Timely
- Interdepend
- Problem Solving
- Helping

**Departure Process Outcomes**
- Operating Efficiency
  - Turn Time
- Staffing
- Quality
- Customer Satisfaction
- Ongoing Arrivals
- Baggage Handling

**Product Complexity**
- Cargo and Mail
- # Passengers
- Flight Length
- % Connections
Table 6.2: Coordination, Control and Operating Outcomes

<table>
<thead>
<tr>
<th></th>
<th>SWA Chicago</th>
<th>United Shuttle</th>
<th>Continent Boston</th>
<th>SWA Los Ang</th>
<th>United Boston</th>
<th>American Boston</th>
<th>Continent Cleveland</th>
<th>United Los Ang</th>
<th>American Los Ang</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coordination</strong></td>
<td>3.45</td>
<td>3.38</td>
<td>3.13</td>
<td>2.97</td>
<td>2.92</td>
<td>2.89</td>
<td>2.86</td>
<td>2.80</td>
<td>2.44</td>
<td>2.93</td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>3.08</td>
<td>2.72</td>
<td>2.76</td>
<td>2.71</td>
<td>2.71</td>
<td>2.77</td>
<td>2.80</td>
<td>2.71</td>
<td>2.52</td>
<td>2.75</td>
</tr>
<tr>
<td><strong>Timeliness</strong></td>
<td>3.48</td>
<td>3.08</td>
<td>3.49</td>
<td>3.03</td>
<td>3.11</td>
<td>3.24</td>
<td>3.22</td>
<td>3.06</td>
<td>2.22</td>
<td>3.13</td>
</tr>
<tr>
<td><strong>Interdependent</strong></td>
<td>3.15</td>
<td>3.00</td>
<td>3.06</td>
<td>2.46</td>
<td>2.58</td>
<td>2.84</td>
<td>2.81</td>
<td>2.52</td>
<td>2.47</td>
<td>2.72</td>
</tr>
<tr>
<td><strong>Problem solving</strong></td>
<td>3.80</td>
<td>4.15</td>
<td>3.38</td>
<td>3.26</td>
<td>3.42</td>
<td>3.00</td>
<td>3.08</td>
<td>2.93</td>
<td>2.16</td>
<td>3.24</td>
</tr>
<tr>
<td><strong>Helping</strong></td>
<td>3.19</td>
<td>3.01</td>
<td>2.93</td>
<td>2.56</td>
<td>2.80</td>
<td>2.85</td>
<td>2.66</td>
<td>2.64</td>
<td>2.72</td>
<td>2.74</td>
</tr>
<tr>
<td><strong>Respect</strong></td>
<td>3.73</td>
<td>3.90</td>
<td>3.59</td>
<td>3.51</td>
<td>3.19</td>
<td>3.11</td>
<td>3.06</td>
<td>3.26</td>
<td>2.93</td>
<td>3.33</td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
<td>3.16</td>
<td>2.92</td>
<td>2.92</td>
<td>2.86</td>
<td>2.60</td>
<td>2.67</td>
<td>2.48</td>
<td>2.62</td>
<td>2.13</td>
<td>2.69</td>
</tr>
<tr>
<td><strong>Shared Goals</strong></td>
<td>4.30</td>
<td>4.19</td>
<td>3.38</td>
<td>3.75</td>
<td>3.43</td>
<td>2.94</td>
<td>3.17</td>
<td>3.08</td>
<td>2.64</td>
<td>3.38</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>SWA Chicago</th>
<th>United Shuttle</th>
<th>Continent Boston</th>
<th>SWA Los Ang</th>
<th>United Boston</th>
<th>American Boston</th>
<th>Continent Cleveland</th>
<th>United Los Ang</th>
<th>American Los Ang</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control</strong></td>
<td>11.5</td>
<td>4.7</td>
<td>6.3</td>
<td>13.0</td>
<td>5.7</td>
<td>2.4</td>
<td>8.5</td>
<td>6.5</td>
<td>3.0</td>
<td>7.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>SWA Chicago</th>
<th>United Shuttle</th>
<th>Continent Boston</th>
<th>SWA Los Ang</th>
<th>United Boston</th>
<th>American Boston</th>
<th>Continent Cleveland</th>
<th>United Los Ang</th>
<th>American Los Ang</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating Outcomes</strong></td>
<td>93.1</td>
<td>151.2</td>
<td>187.9</td>
<td>110.5</td>
<td>215.8</td>
<td>242.3</td>
<td>190.0</td>
<td>194.0</td>
<td>256.9</td>
<td>178.8</td>
</tr>
<tr>
<td><strong>Adj Turn Time</strong></td>
<td>38.5</td>
<td>46.4</td>
<td>52.9</td>
<td>35.3</td>
<td>54.0</td>
<td>55.5</td>
<td>53.7</td>
<td>52.9</td>
<td>63.7</td>
<td>50.7</td>
</tr>
<tr>
<td><strong>Adj Staffing</strong></td>
<td>35.1</td>
<td>63.3</td>
<td>79.0</td>
<td>50.6</td>
<td>110.2</td>
<td>108.4</td>
<td>76.1</td>
<td>91.7</td>
<td>122.3</td>
<td>77.1</td>
</tr>
<tr>
<td><strong>Complaints</strong></td>
<td>0.5</td>
<td>20.7</td>
<td>27.1</td>
<td>0.6</td>
<td>25.5</td>
<td>50.5</td>
<td>27.7</td>
<td>23.3</td>
<td>47.1</td>
<td>24.7</td>
</tr>
<tr>
<td><strong>Late Arrivals</strong></td>
<td>15.1</td>
<td>13.6</td>
<td>27.1</td>
<td>19.9</td>
<td>21.7</td>
<td>22.5</td>
<td>26.1</td>
<td>19.1</td>
<td>17.8</td>
<td>20.9</td>
</tr>
<tr>
<td><strong>Lost Bags</strong></td>
<td>3.86</td>
<td>7.27</td>
<td>5.26</td>
<td>4.09</td>
<td>4.39</td>
<td>5.38</td>
<td>6.45</td>
<td>6.94</td>
<td>6.1</td>
<td>5.36</td>
</tr>
</tbody>
</table>
Three rankings of the nine sites are shown on Table 6.3. The first column is ranked by coordination, the second is ranked by a single measure of control -- supervisory ratio, and the third column is ranked by departure process outcomes. It is clear from visual inspection of the rankings that, following the argument of Chapter Four, departure process outcomes are shaped jointly by coordination and control. Table 6.4 shows the rank correlations between coordination and outcomes, between control and outcomes, and between the sum of coordination and control, and outcomes. The result -- a stronger and more significant relationship for the combined effect than for either of the individual effects -- gives further support to the joint effect of coordination and control on outcomes. The sites are discussed here in the order of departure process outcomes, from best to worst.
<table>
<thead>
<tr>
<th>Coordinatio</th>
<th>+</th>
<th>Control</th>
<th>&gt;&gt;&gt;</th>
<th>Operating Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southwest:</td>
<td></td>
<td>Southwest:</td>
<td></td>
<td>Southwest:</td>
</tr>
<tr>
<td>Chicago</td>
<td></td>
<td>Los Angeles</td>
<td></td>
<td>Chicago</td>
</tr>
<tr>
<td>United:</td>
<td></td>
<td>Southwest:</td>
<td></td>
<td>Southwest:</td>
</tr>
<tr>
<td>Shuttle</td>
<td></td>
<td>Chicago</td>
<td></td>
<td>Los Angeles</td>
</tr>
<tr>
<td>Continental:</td>
<td></td>
<td>Continental:</td>
<td></td>
<td>United:</td>
</tr>
<tr>
<td>Boston</td>
<td></td>
<td>Cleveland</td>
<td></td>
<td>Shuttle</td>
</tr>
<tr>
<td>Southwest:</td>
<td></td>
<td>United:</td>
<td></td>
<td>Continental:</td>
</tr>
<tr>
<td>Los Angeles</td>
<td></td>
<td>Los Angeles</td>
<td></td>
<td>Boston</td>
</tr>
<tr>
<td>United:</td>
<td></td>
<td>Continental:</td>
<td></td>
<td>Continental:</td>
</tr>
<tr>
<td>Boston</td>
<td></td>
<td>Boston</td>
<td></td>
<td>Cleveland</td>
</tr>
<tr>
<td>American:</td>
<td></td>
<td>United:</td>
<td></td>
<td>United:</td>
</tr>
<tr>
<td>Boston</td>
<td></td>
<td>Boston</td>
<td></td>
<td>Los Angeles</td>
</tr>
<tr>
<td>Continental:</td>
<td></td>
<td>United:</td>
<td></td>
<td>United:</td>
</tr>
<tr>
<td>Cleveland</td>
<td></td>
<td>Shuttle</td>
<td></td>
<td>Boston</td>
</tr>
<tr>
<td>United:</td>
<td></td>
<td>American:</td>
<td></td>
<td>American:</td>
</tr>
<tr>
<td>Los Angeles</td>
<td></td>
<td>Los Angeles</td>
<td></td>
<td>Boston</td>
</tr>
<tr>
<td>American:</td>
<td></td>
<td>American:</td>
<td></td>
<td>American:</td>
</tr>
<tr>
<td>Los Angeles</td>
<td></td>
<td>Boston</td>
<td></td>
<td>Los Angeles</td>
</tr>
</tbody>
</table>

Coordination = Frontline crossfunctional coordination, as defined in Table 4.5.
Control = Supervisory ratio, as defined in Table 4.5. It serves here as a proxy for the system of vertical control that uses high levels of supervision for support and qualitative accountability.
Operating outcomes = Sum of turn time, staffing (each adjusted for product complexity), late arrivals, customer complaints and lost baggage. Each component of this outcome measure is defined in Table 4.4.
### Table 6.4: Rank Correlations Between Coordination, Control and Operating Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Operating Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordination</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td>(0.0159)*</td>
</tr>
<tr>
<td>Control</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td>(0.0159)*</td>
</tr>
<tr>
<td>Coordination and Control</td>
<td>0.81</td>
</tr>
<tr>
<td></td>
<td>(0.0096)**</td>
</tr>
<tr>
<td>Obs</td>
<td>9</td>
</tr>
</tbody>
</table>

* Significant at p< .050  
** Significant at p< .010

Spearman's rank correlation coefficients are used here. Note that a negative sign on time or staffing signifies a decrease in time or staffing used, and therefore an efficiency gain. A negative sign on complaints, late arrivals or lost bags signifies a decrease in those problems, and therefore an improvement in quality. In parentheses is the probability that the two variables are independent.

Coordination = Frontline crossfunctional coordination, as defined in Table 4.5.  
Control = Supervisory ratio, as defined in Table 4.5. It serves here as a proxy for the system of vertical control that uses high levels of supervision for support and qualitative accountability.  
Coordination and Control = Sum of frontline crossfunctional coordination and supervisory ratio.  
Operating outcomes = Sum of turn time, staffing (each adjusted for product complexity), late arrivals, customer complaints and lost baggage. Each component of this outcome measure is defined in Table 4.4.
6.1 Southwest: Chicago

The system of coordination and control at Southwest’s Chicago station features high levels of coordination as well as high levels of control, in the sense of alignment between employee and organizational goals.

Southwest’s coordination mechanism is highly effective and innovative. Southwest took the role of the operations agent, which every other airline has, and increased the staffing to allow the ops agent to function as a team leader or case manager.

"Dispatch doesn’t have the time to dedicate to each individual departure," said a pilot. "The operations agent is the team leader when the airplane is on the ground. It’s a real good job. A lot of stress."

In the meantime, the other airlines have been moving a key part of that function -- load planning -- to a central location outside the station or to a more remote location within the station, like a tower. The ops agent’s role at Southwest allows on-line, real time coordination and adjustment. The role involves a face to face interaction with every party involved in the departure process, on each flight that ops agent works. It is not coordination from a distance, as other carriers have tried to achieve by taking one of the primary coordination functions -- load planning -- out of the station. It is coordination with a human face.

"One thing this job will do for you is form a personality," said an operations agent. "You’ve got to talk to so many people. If you don’t like people you’ll either be miserable or get out of the job real fast."
The centrality of this role is supported by promotion policies that give a kind of prestige to this position -- it is a stepping stone into management. "They are real selective about who they put there," said a customer service agent. "They want people with smarts." This person also has some clout by virtue of having the responsibility of calling the delay. At the same time, the role involves interfacing with every group working a particular flight. It also involves taking boarding passes from each passenger on the flight, and dealing with passenger frustration when there are overbookings and delays. So it is a humbling role as well. In Chicago, the ops center is in central location with respect to maintenance, the gate and the ramp, so that ops agents are very accessible. [The ops agent is considered to be a team leader, but the team they lead is a virtual team in the sense that membership varies for each departure. After the study period, the station began efforts to make the role still more effective as a team leader by assigning ops agents to work with the same gate and ramp agents on each flight, creating more of an established team and less of a virtual team.] Partly as a result of this coordination mechanism, frequency and timeliness of communication are higher at this site than any of the other eight sites.

This site is highly successful in achieving shared accountability with coworkers, partly due to having a delay code called a team delay, meaning that the station and flight crew take collective responsibility for the delay.

Before the team delay, "we had too many angry disagreements between flight attendants and operations
agents about whose delay it was," said the vice president of field operations. "It was too hard to determine whose fault it was."

"The team delay is used to point out problems between two or three different employee groups in working together," according to one of Southwest’s chief pilots. "We used to do it -- if people were still in the jetway at departure time, it was a station delay. If people were onboard at departure time, it was a flight crew delay. But now if you see everybody working as a team, and it’s a team problem, you call it a team delay. It’s been a very positive thing."

Since the team delay was established in 1991, most of the delays were coded as team delays. The successful achievement of shared accountability at this site can be seen in its scores on shared goals, highest of all nine sites, and on problem solving, second only to the United Shuttle.

In addition to the team delay, shared accountability is influenced by the way that accountability to one’s superiors -- is achieved. It is difficult to achieve shared accountability between groups if people are overly concerned about the consequences of making a mistake and feel that only the outcome, not the process that led to the outcome, will be examined. At some sites, managers use fear as a way to motivate better performance, and use mistakes as an occasion to make things unpleasant so that future mistakes are less likely to happen. They may ask ‘what happened?’ but as a way to put someone on the spot rather than as an occasion for learning. With this approach, mistakes are not less likely to happen but are just more likely to be covered up. At other sites, managers use pride and mastery to motivate better performance. Mistakes are used as an occasion to learn more about the job and how to do it better, to
increase mastery. At Southwest in general, motivation through pride and mastery is emphasized over motivation through fear. In the Chicago station, this was particularly true, starting with the relationship to headquarters, and passed down to the relationship with the frontline.

"My director is the best boss I ever had," said the Chicago station manager. "He will look at overtime costs and ontime performance. But the biggest thing he'll look at is morale. He believes that morale affects the other things. If you are not treating people right, the other things will get you. They'll get you back in other ways."

This focus on qualitative assessment rather than bottomline results carried through to the station management's relationship with the frontline.

"I would be personally offended if their only drive was that if it didn't leave on time, they'd come in to my office to -- you know, the threats," said the Chicago station manager. "I don't feel they're afraid of me, and that means allot. If there's a delay, we find out why it happened. We get ideas from them on how to do it better next time. If you've got that kind of relationship then they're not going to be afraid. Say there was a ten minute delay because freight was excessive. If I'm screaming I won't know why it was late. They'll think, 'He's an idiot, if only he knew.' Then they'll start leaving stuff behind or they'll just shove it in, and I won't know. If we ask, 'Hey, what happened?', then the next day the problem is taken care of. We move the freight, we reroute the freight to where it's less damaging...You have to be in that mode every day. There's no one person who can do it. We all succeed together -- and all fail together. You have to truly live it. I think we do here."

This example makes clear how the way qualitative, nonpunitive accountability to one's superiors contributes to the success of horizontal coordination.
Supervisors play an active role in supporting and monitoring frontline employees at Southwest. They work side by side with employees, and communicate intensively with the frontline about their needs, their performance, and their contribution to a team effort. Supervisors therefore help to align employee behavior with company goals, by creating an active interface between management and nonmanagement that allows more finetuned monitoring of performance and more detailed feedback to employees.

"We work real hard to remove that barrier so that agents can come in and talk to a manager. There's an open door policy so when employees have a problem, they know we can work on it together. So they won't demean what we are doing. It's a totally different environment here. We sit and listen. When that person walks away, he'll have self esteem. Even when you did something wrong, they'll ask what happened. You know you screwed up. They'll tell you what you can do so it doesn't happen again. You walk away so upbeat that you work even harder. You don't want to let this person down."

This leadership role has been allocated to nonmanagement employees in other airlines, to "push responsibility down." Southwest makes this position a managerial one to assure consistency with company goals. Supervisors also play an active role in conflict resolution among frontline employees, either bringing the parties together directly or mediating for them. Supervisors therefore serve the dual function of supporting frontline coordination, and helping to achieve control. The high number of supervisors per frontline employee makes these multiple roles possible.

Internal promotion is another element of Southwest's system that supports both alignment with company goals. Consistent with the coaching role of
supervisors at Southwest, an important part of the supervisor's role is to look for people who want to take on additional responsibility in the organization, and help them learn. The company also actively supports and encourages internal promotion.

"At Southwest, there is a concerted effort at employee development," said a flight attendant base manager. "The company gives you the opportunity to find and develop your skills. The People Department has a program to develop front line leadership skills for supervisors. The company makes it worth your while. You get to explore your talents. There is alot of mobility here."

"People have alot of opportunity to move up in the company," said a station manager. "We select from within. Most of our managers started in frontline positions. It helps people to understand the whole process."

Internal promotion helps to bridge the management\nonmanagement boundary. It also tends to attract people to frontline positions who are interested in becoming managers.

"I did alot of research on the best company to work for," said a flight attendant supervisor. "It's a well known fact that the only way to move up in this company is from within. It's a company that supports its people, then the people support the organization."

The likelihood of being promoted into management is increased by Southwest's high supervisory ratios.

Southwest places a great deal of importance on selection, not only to identify people who are inclined toward teamwork and egalitarian attitudes, but also to send the message that teamwork and egalitarian attitudes are highly valued. Southwest's People Department handles the hiring of all employees at a few regional locations. According to the longtime vice
president of the People Department, Ann Rhodes, one of the important unwritten rules at Southwest is that "you can't be an elitist" (Hallowell, 1993). "We get this mutual respect partly from the selection process," said a chief pilot. "Ann Rhodes really tries to select people with the right attitude. We evaluate the impact they will have on internal and external customers." Even for pilots, who are typically chosen on the basis of flight training and experience, Southwest looks in addition for people who will have a positive effect on the overall operation.

The emphasis on selection is due in part to a belief that Southwest's success was based on certain attitudes that could not be taught.

"One thing we cannot teach is attitudes toward peers or to other groups," said the ramp manager. "There's a code, a way you respond to every individual who works for Southwest. The easiest way to get in trouble at Southwest is to offend another employee. We need people to respond favorably. It promotes good working relationships...You find an individual with an upbeat and positive attitude -- and you'll find that everything that needs to be done, will get done. It's very contagious."

Unlike other airlines where supervisors select frontline station employees with little support from management, at Southwest station employees are selected with the participation of station management and the People Department, using a time-consuming process to identify the desired characteristics.

"The entire process starts with an interview," said the ramp manager. "I'm very involved with that. Something we look at is people who are very team oriented from prior work experiences. We use target selection. In answering this question, take an incident from your prior work and walk us through it. Do they limit themselves to the job, or go above and beyond? We
don't just look at work history. We've turned away people with 15-16 years of airline experience in favor of people with none. The concept of teamwork is tough. You really don't know if a person will be able to cross over from his or her primary responsibility and do other things. We get a feel for people who will go above and beyond."

The large commitment of resources to the hiring of frontline station employees, and the willingness to look at nonquantifiable characteristics, is remarkable in this industry. These selection practices contribute to the Chicago station's high scores on respect and helping across groups.

Training at Southwest is geared toward teamwork, through on the job training for frontline employees, and through formal leadership training for supervisors. Each new hire has a training coordinator to guide on the job training. In the course of explaining the job, the jobs of each other functional group are explained. People also learn about each others' jobs through job exchanges, encouraged by the company. Pilot training at Southwest is also more team oriented than at other carriers. In addition to training about the flight attendants' job, pilot training also includes training about the jobs of station employees. This kind of training contributes to knowledge of the process -- how one's own job fits into the whole process. This site scores highest on knowledge of each other's jobs.

Conflict resolution is one of Southwest's biggest strengths relative to other carriers. The philosophy is that individual conflicts should be dealt with on an interpersonal basis. But it depends a lot on implementation. There have been efforts to design a process whereby the two parties get together and hear
each others’ perspective. The second best is that supervisors hear it out and really try to bring the two parties together, as opposed to advocating for one or the other and deepening the conflict. The Chicago station implements this practice pretty well.

"You’re going to have conflict," said the customer service manager. "You try to get them to talk it out. They can bring it up to the supervisors and myself. Hopefully they’ll do it in a positive tone. Maybe a wrong call was made in the heat of the moment. You give them the other side of it. Sometimes employees don’t get along. It has worked to get them together. But if the person is bitter, I will not bring them together -- it will make it worse. You just shed light on why they did what they did."

"What’s unique about Southwest is that we’re real proactive [about conflict]," said the station manager.

Conflict resolution processes should orient employees toward problem solving and away from blaming. They should also increase knowledge of each others’ jobs. This site scores high on both outcomes -- highest on shared knowledge and second only to the United Shuttle on problem solving.

Southwest works hard to build an egalitarian culture across functional groups. The company-wide culture committee is a recent innovation to prevent Southwest’s growth from causing divisions among groups. Individual stations have their own culture committees, and in addition have their own company picnics that aim to bring groups together. In addition, top leadership sends consistent signals that each group is critical to the whole and worthy of respect. This site implements the culture-building activities quite well, and as a result scores high on respect across functional groups. Southwest’s Chicago
station does not score the highest of all sites on respect, however -- the United Shuttle does.

**Workrules are flexible** at Southwest due not to the absence of unions -- Southwest is more heavily unionized than the other carriers studied here (Table 5.1) -- but due to the stipulation that no Southwest contracts can include "covered work." This contributes to helping across functional boundaries.

"There are no work restrictions in our contracts," said the vice president of field operations. "Most airlines have very restrictive workrules, will list in the contract very detailed job definitions. We don’t have stringent work definitions by job classifications. At Braniff, if a ramp agent was driving a baggage cart and a suitcase fell off, a mechanic walking by couldn’t put it back...We talk about it all the time, that everyone is working for the betterment of the company. We don’t have the ‘it’s not my job’ mentality. We have very thin contracts."

Southwest’s Chicago site has the highest score on helping across functional boundaries. Workrules also are flexible in the sense that they allow management personnel to do frontline work. This breaks down boundaries between management and nonmanagement, and enables supervisors to be more knowledgeable in their coaching roles. It also increases staffing efficiencies. If supervisors can step in and help in a difficult situation, then extra staffing of the frontline "just in case" is less critical.

**Employee representation** at Southwest plays two roles in the system of coordination and control. Respect for their elected representatives encourages employees to identify with the goals of the company. Southwest has an open door policy with regard to union
leadership. One of the main unions, however, was accused by its members of being "hard ass" in its relationship with the company. There is a continuing effort by employees to replace that union with another, called CARE. Southwest’s vice president of customers took the position that, "we really want them to have whoever they want," suggesting that employee representatives were respected for the fact that they were chosen by employees.

"We’re very, very lucky but we work very hard," said the vice president of customers. "It’s unbelievable but it’s paid us handsome dividends. I credit the same reasons with the employees in general. We treat all as family, including outside union representatives. We walk into the room not as adversaries but as working on something together. Our attitude is that we should both do what’s good for the company. They have their constituency, their customer base. We respect that. It’s pretty unusual, but I know them by their first names. We have a great relationship with the Teamsters and they have probably the worst reputation. We try to stress with everybody that we really like partnerships."

Chicago’s station management mirrors this headquarters philosophy in their relationships with local union leaders. Secondly, positive relations among employee representatives certainly do not guarantee but are conducive to good relations among the employee groups who interface in the departure process. Based on limited evidence, the degree of respect for each others’ unions appeared to be quite high at Southwest, in part due to the example set by top management.

Southwest also has shared rewards across employee groups. All employees are involved in profit sharing, where a portion of company profits are allocated to each employee as a percentage of their salary. Part of these profits must be reinvested in Southwest and the
rest can be invested at the employee’s option. Southwest employees collectively own 13 percent of the company’s outstanding stock. [Note: The percentage owned by employees will increase in the coming years. The pilots agreed recently to forgo wage increases for five years, and limit them to 3 percent for the following five years, in return for substantial stock options.] Profitsharing reportedly leads to monitoring across workgroups, or, as people like to say, ‘those are my profits you’re wasting.’ These shared rewards likely increase the perception of shared goals. Southwest’s Chicago station scores higher on shared goals than any other site. Profitsharing helps to create the perception of shared goals across employee groups, but it also helps to align employee behavior with company goals. Therefore profitsharing contributes in two ways to Southwest’s system of coordination and control.

The final element of Southwest’s system of coordination and control is trust building by top leadership. CEO Herb Kelleher and his top management team have excelled at gaining the trust of managers in the field and frontline employees, through respectful treatment of both employees and their representatives. They have built trust over time by being upfront and consistent in their message.

"It helps you as a manager when Herb gives it to the employees without sugar coating," said a ramp manager. "It makes our job easier. Something about Herb, if he says it, it’s law. Colleen [Barrett, vice president of customers] is a very very big part of this puzzle too. The programs we try to get across have her name on it. And we know it. Herb’s the showman but she’s a very very very big force. Colleen in many ways is just as big as Herb to us. When she speaks we all listen. They’ve both got credibility. It’s taken them a while
to get to that point. They've created this level of honesty with us. If it's bad, they tell you it's bad."

Southwest's top managers also build trust by being accessible to employees, both frontline and managerial.

"I can call Herb today," said a pilot. "You don't just call and say there's a problem. He'll say, 'think about it and tell me the solution that you think will work.' He has an open door policy. I can call him almost 24 hours a day. If it's an emergency, he will call back in 15 minutes. He is one of the inspirations for this company. He's the guiding light. He listens to everybody. He's unbelievable when it comes to personal etiquette. If you've got a problem, he cares."

The importance of trust as an aspect of Southwest's system of coordination and control should not be underestimated. It is one reason why people in the industry wonder whether there will be a Southwest without Kelleher. The answer, I think, is maybe, but only if new leadership is able to build a comparable level of trust with Southwest employees. At least one other top manager -- Colleen Barrett -- appears to be well on her way.

6.2 Southwest: Los Angeles

Southwest's Los Angeles station has a weaker system of coordination and control than Southwest's Chicago station, due to failures of local implementation. In addition, this station suffers from an employee turnover problem that is due in large part to transfers to other parts of the Southwest system, away from the high cost and low quality of living in the Los Angeles area. [Note: Employee turnover for Southwest as a whole is the lowest in the industry.] But the system still produced stronger outcomes than that of the non-
Southwest sites, due in part to the strong influence of Southwest’s organization design.

The Los Angeles station used the same case manager or team leader **coordination mechanism** as the Chicago station, but with poorer communication results. The frequency and timeliness of communication across groups at this site were slightly below average.

**Shared accountability** across groups is achieved to a great extent at the Los Angeles station -- the problem solving orientation there was only average but shared goals were high, exceeded only by Southwest’s Chicago station and the United Shuttle. Here, as at the Chicago station, the team delay was critical to achieving shared accountability.

At this site, **accountability to one’s superiors** tends to be achieved through divisions and competition between groups, rather than through pride. This is in part a function of the station manager’s personal style, which does not appear to be well matched to the usual management style at Southwest. He guards power more jealously than most, and in so doing creates unintended effects on coordination between groups. Still, the nonpunitive accountability practices of Southwest’s top leadership, based on a great deal of qualitative performance assessment, have had a mitigating effect on Los Angeles station outcomes and helped to break down the isolation that the station manager created for himself. Also, a large cohort of supervisors, each of whom was trained in the Southwest leadership style, helped to mitigate the effects of the station manager.
This site, like other Southwest sites, had a high number of supervisors per frontline employees. The large number was consistent with the role of supervisors at Southwest -- to support and monitor frontline employees. Support takes the form at Southwest of helping out by working frontline positions when needed, by taking an active role in conflict resolution, as well as providing qualitative feedback on performance and on contribution to the overall process.

Internal promotion was used a great deal at this site during the period of study, to fill positions that were being vacated as employees transferred out to more desirable stations. It appeared to be used by station management in a way that was not strictly consistent with Southwest's usual approach -- rather than promotion into supervisory positions on the basis of job skills and leadership skills, he appeared to use internal promotion to reward employees for personal loyalty. Still, oversight and active intervention by headquarters was beginning to ameliorate the situation.

Selection for teamwork began to break down in Los Angeles, where they had trouble finding people to meet Southwest selection criteria and where rapid turnover resulted in part from transfer to other more desirable Southwest stations and where it snowballed due to failure to hire quickly enough. This was addressed by a huge investment of resources into the hiring process in Los Angeles, by headquarters. The People Department set up shop in the station, next door to the station manager, and interviewed intensively to overcome the staffing deficit while maintaining Southwest selection standards for attitude and team spirit. In the
meantime, however, the station’s score on helping across functional lines was the lowest of all nine sites. This was not due strictly to a lack of knowledge on the part of new hires, however. The degree of knowledge of each others’ jobs was reasonably high. Instead it may have been due to a temporary weakening of the selection process -- whether people were hired who were intrinsically less helpful, or whether the message of teamwork was not clearly transmitted in the process. [Note: The new vice president of people also described the difficulty Southwest has experienced recently in finding employees with the right attitude or work ethic, particularly in California.]

Training practices were very similar between the Chicago and Los Angeles stations -- but with the exception that the Los Angeles station’s training system was overloaded during the period of study by heavy turnover. Still, this site’s above average score on knowledge of each others’ jobs suggests that the training function did not break down entirely.

The Southwest philosophy on conflict resolution would have been helpful during this period, but rather than being actively surfaced, conflicts appeared to be suppressed due in part to the station manager’s anxiety about his performance. Again the role of top leadership was critical. One of headquarters’ first moves, in responding to the need for help, was to encourage a dialogue between parties that were in conflict, particularly between the pilots who fly out of Los Angeles and the ramp group there. Pilots worked on the Los Angeles ramp for a week to increase understanding between the two groups. The effects were
reportedly quite positive.

"I was part of the Cutting Edge team," said one Southwest pilot based in Los Angeles. "After working a week here with people on their jobs, I see what they're up against. Out of it we got some good will, alot more understanding."

"It's true, said a ramp agent. "Especially here with certain flights with the heavy onload and offload. Pilots really learned what the delays were. The other day we took a 20 minute delay on an originator. The pilot came down calmly to talk -- it made all the difference in the world."

Successful resolution of crossfunctional conflict should increase problem solving, as well as knowledge of each others' jobs. Both were average or above average at the Los Angeles station, despite the failure of station management to take leadership on conflict resolution during this period.

According to supervisors in the Los Angeles station who came originally from Texas -- the home of Southwest Airlines -- establishing an egalitarian culture in this site was a real challenge.

"People in California are totally different from Texans," said an operations supervisor. "People here feel they have to know you to talk to you."

"I'm from Texas and coming here was a real rude awakening," said a customer service supervisor. "I said HI! People would say 'hi, do I KNOW you?' Alot of people here are prideful, not warm and friendly. It's a different environment, but Southwest is rubbing off. The core rubs off on the new stations. Colleen [vice president of customers] is the greatest. She spreads the Southwest spirit. She's adamant about it."

Due to strong encouragement from Southwest leadership, the station manager at the Los Angeles station established a local branch of Southwest's culture
committee. Even though at times it seemed quite forced, the committee managed to get employee participation in a number of activities outside the station, including baseball games, tailgate parties and a city-wide picnic that included the pilots. These efforts at establishing an egalitarian culture among Los Angeles employees apparently met with some success. The score on respect among employee groups was quite high, despite the obstacles reportedly faced in the California environment.

Despite the absence of contractual workrules at both sites, helping across functional lines was rated the highest by Southwest’s Chicago employees and lowest by Southwest’s Los Angeles employees, of all nine sites. Clearly company-level practices could not overcome all local problems. But company-level practices like shared rewards in the form of profitsharing, a high level of respect for employee representation, and a high level of trust in Southwest’s top leaders, all helped this troubled site to some degree.

Despite deviations by local management from the Southwest model, with negative effects on coordination and intergroup relations, still the system produced better departure process outcomes than non-Southwest sites. This might suggest that the system of coordination and control does not have a strong effect on departure process outcomes. Or alternatively it suggests that the company’s system of control -- particularly the alignment of employee goals with company goals -- was strong enough to overcome a temporary local weakness in the system of coordination.
included broader delay categories that span departmental boundaries, as well as the option of taking a team delay. Outcomes of these practices were high levels of shared goals and problem solving across groups. With respect to the other sites, the Shuttle scored first on problem solving and second only to Southwest’s Chicago station on shared goals.

To support shared accountability, the Shuttle also had a system of nonpunitive accountability to superiors. As noted above, it is difficult to achieve shared accountability between groups if people are overly concerned about the consequences of making a mistake and feel that only the outcome, not the process that led to the outcome, will be examined. During the study period, the Shuttle was battling a culture of punitive accountability that their employees were familiar with at the old United. To get around this, and free people to focus on problem solving rather than finger pointing, Shuttle management chose to dramatically relax any form of accountability to superiors. With a low level of supervision, they do not have the ability to achieve nonpunitive accountability through coaching and monitoring, as at Southwest.

During the study period, the hands-off approach to vertical accountability seemed to be working in that it allowed people to focus on shared accountability with coworkers. But this approach did not have the secondary ability to assure close alignment of the frontline with management objectives.

The Shuttle was designed with a philosophy of minimal supervision. The initial design teams decided
that supervisors were not needed. In the implementation, however, it was decided that Shuttle employees needed supervisors in a coaching and counselling role only. Supervisors had a wide span of control, since the managerial role was conceived as quite limited. The Shuttle supervisors were called team advisors, and were supplemented by supervisors back in the non-Shuttle operations who also had some responsibility for Shuttle employees. The supervisors’ job was not conceived to involve monitoring, per se, since Shuttle employees were expected to be self-monitoring. But supervisors had a hard time doing even the coaching and counselling that their job description called for. Ramp employees built a self-monitoring group with lead agents in charge, and wanted to have nothing to do with management. Customer service agents complained that supervisors were never available when needed. Neither frontline group had a strong relationship to management.

Rather than trying to assure consistency with management goals through some form of accountability to superiors, Shuttle management was taking a hands off approach. The Shuttle faced a choice with respect to supervision -- go all the way toward self-managing teams, and give people training in peer leadership where needed. Find some substitute for vertical accountability. Or take the Southwest path and expand the supervisory role to include a full range of support and monitoring activities, including doing frontline work when the need arises. Taking the latter path would require a larger number of supervisory positions, and a change in workrules to let supervisors work side by side with the frontline.
Internal promotions were severely compromised by the small supervisory staff on the Shuttle. This is a feature shared by other flat organizations. The Shuttle therefore does not have much help from upward mobility to help align the interests of frontline employees with those of management.

The Shuttle has had a tremendous advantage with respect to employee selection. Since employees from mainline United self-selected into a project that was publically premised on teamwork, one would expect that they were more inclined toward teamwork and egalitarian views. Due in part to this selection process, the Shuttle scores highest on respect and second highest on helping across functional groups.

Shuttle employees received initial training for teamwork when they first started working the Shuttle, in addition to total quality management training with a focus on teamwork. They also learned about each others' jobs through the same crossfunctional teams and shift briefings that aid in conflict resolution and in lowering status boundaries. Through these teams, "people are learning what others do," said a Los Angeles manager. "It is good for them. They ask, how does that affect you?" One headquarters manager for the Shuttle said that participation in the design of the Shuttle trained people in process thinking.

"People in the Shuttle tend to look at process because that's the way the Shuttle was designed. People were trained to that point of view through the design of the Shuttle. We took this perspective from the start. We integrated all the people. We used smaller teams to develop solutions, then communicated that to larger teams. They were all crossfunctional which also reinforced the process mindset. It's gotten the flight
attendants much more involved in the turnaround."

"At work, people physically touch someone who was involved in the design process. We are not trying to formalize it. We are taking the common sense view that people are the best communicators. They sit down beside each other and get the ideas. Six thousand employees participated in the design and implementation of the Shuttle. There were 100 people on the teams that made the recommendations for the changes. Everybody has a kernel of the idea."

The degree of shared knowledge at the Shuttle scored second only to Southwest’s Chicago station.

**Conflict resolution** was happening at United’s Shuttle, but through quite a different process than at Southwest. The crossfunctional teams that were used to design the Shuttle, began to be used for ongoing problem solving, to surface and resolve conflicts among functional groups. Crossfunctional briefings before and after shifts also served to surface and resolve conflicts between groups. The Shuttle’s approach to conflict resolution had a problem solving focus, rather than the interpersonal focus of conflict resolution at Southwest. The interpersonal part ‘just happens’ though, people reported, as they were engaged in problem solving. The Shuttle scores highest on problem solving, and second only to Southwest’s Chicago station on shared knowledge.

The Shuttle achieved a tremendously egalitarian culture during its short time in existence, coming out of a hierarchical culture with deep divisions among employee groups. This was perhaps one of the most notable early achievements of the United Shuttle. In designing the Shuttle, several things were done to foster an egalitarian culture, on the assumption that
quick turnarounds would not work unless people worked closely together across functional lines. First, the design of the Shuttle itself, and then the implementation in individual stations, was carried out by crossfunctional teams of frontline employees. Pilots and flight attendants were very active on these teams, in addition to airport employees. Another change was in uniforms. All Shuttle airport employees wore the same uniform -- even maintenance started wearing the Shuttle polo shirt in the Los Angeles station after about six months. Finally, Shuttle airport employees shared a common break room, where they sat around the same table before shifts and during breaks. [Note: During the study period, airport employees were encouraging other groups with their own contractually-established break rooms -- pilots, flight attendants and mechanics -- to share the break room.] Due in part to these practices, each of which is unique to the Shuttle, this site had the highest level of mutual respect across functional groups.

The success of the Shuttle was thought to depend greatly on increasing the flexibility of workrules, such that employees could step over job boundaries to help each other out. Much of the relaxation of workrules on the Shuttle has been accomplished through tacit agreement among employees rather than through formal union agreement. Still, the extent to which people are willing to step out of their job classification to help others is dramatically greater at the Shuttle than on the mainline, and higher than any other site studied other than Southwest's Chicago station, as measured by score on helping.

"In the Shuttle, they were able to cross that line,"
said a customer service agent. "I don’t know how they
did it. It’s everybody’s job. There [in the regular
United operation], you try not to offend anyone. You
ask for their permission. Here, it’s more informal.
Flight attendants help cabin service clean the cabin."

Reportedly, pilots at the Shuttle were also beginning
to help station employees on occasion, to speed the
departure process.

The new United management has demonstrated a great
deal of respect for **employee representation**. A new
CEO was chosen by the pilots for the position of CEO,
and enjoyed the support of the other employee groups as
well, partly on the grounds that he was perceived to
respect their unions. The former CEO was criticized
for having a view of cooperation that meant -- I decide
and you agree. Under the new management, United’s
unions are represented on the board, as well as in
crossfunctional problem solving teams. In addition to
union employees, nonunion employees make up a
substantial group of frontline employees at United --
they are not represented in negotiations for wages and
benefits, but they have a nonunion mechanism for
bringing grievances against the company. This respect
for employee representation helps to create a sense of
shared interests between union employees and
management. The sense that all groups enjoy the
respect of top leadership also helps to bridge the
sizeable conflicts of interest among the unions
themselves, and between union and nonunion groups.

The Shuttle has **shared rewards** in the sense that
all employee groups other than flight attendants,
including nonunion employees, jointly owned more than
half of the company’s stock, due to an employee buyout
that occurred during the period of study. [Note: The
flight attendants’ decision not to join the buyout was a major loss, since they play a critical role in the departure process. Mechanics joined the buyout, but supported it by a narrow margin. Rather than becoming more unified around the buyout over time, as observers had hoped, employees became increasingly divided over the buyout in the months following the study period. The mechanics voted to leave the IAM and join a new union, to reopen the issue of participation in the buyout. The vote failed by only a narrow margin. Pilots pressured company leadership to make changes in management, with the goal of achieving visible changes. The flight attendants’ union continued to oppose the company plan to move some flight attendant jobs to overseas bases -- the plan that was the primary reason they didn’t join the buyout.] United employees collectively own more of the airline than do Southwest employees -- 52 percent versus 13 percent -- but unlike Southwest employees they do not get a share of annual profits. Still, the perception of shared goals was quite high across employee groups in the study period -- higher than any site other than Southwest’s Chicago station. Stock ownership also has the effect of aligning the interests of frontline employees with those of management, as well as with other frontline employee groups.

**Trust building** by the new United management has been highly successful. Greenwald has worked on building relationships both with employees and their unions. He travelled throughout the United system early in his leadership to learn from employees about the company. Frontline employees got the message that Greenwald cared and was interested in what they do. They expressed hopefulness and outright enthusiasm
about the new leadership.

On the whole, the United Shuttle has only a few weak spots in its system of coordination and control. First, the coordination mechanism needs to be refined - either by giving employees the support they need to coordinate their own activities, or by giving operations agents the support they need to play a lead role in coordination, along the lines of the Southwest model. Second, the philosophy of supervision needs to be explicitly addressed. Based on the experience of other sites, it will be difficult to maintain alignment of the frontline with company goals without some improved management/nonmanagement interface, and without some stronger role for supervisors in monitoring and coaching.

6.4 Continental: Boston

The coordination mechanism at Continental's Boston station yielded only average results on frequency of communication, but the score on timeliness was the highest of all nine sites. The primary coordination mechanism at Continental's Boston station was the operations center, as at Southwest. Although Continental did not have individual operations agents assigned to coordinate all communication with respect to that flight, like Southwest, Continental's operations agents were equipped to play the role of team leaders to some extent -- operations coordinators and load functions were both located together in the ops room, and were centrally located between customer service and the ramp. Their job did not involve a direct interface with every functional group, as did the Southwest ops agent -- but their location as well as their active role in load planning produced alot of
face to face contact with pilots, rampers, fuelers and mechanics, and produced a result that approximated that of Southwest's ops agent. [Note: Ironically, during the study period, the load function began to be shifted outside of the airport to a central location in company headquarters. This was a move that followed the path taken by American Airlines in the early 1980s, as we shall see.]

The mechanisms at Continental for achieving shared accountability with coworkers were not strong. Unlike at Southwest and United, there was no team delay. There was also a culture of punitive accountability in Continental's headquarters, which pressured station managers to focus on the numbers to the neglect of the process. Still, at the Boston station the score on shared goals was average and the degree of problem solving was above average. The credit for creating this degree of shared accountability despite a structure that acted against it was due to management practice in the Boston station during the study period. The station manager at Boston made deliberate, consistent efforts to shield station employees from the divisive effects of Continental's culture of punitive accountability to superiors. Station meetings to discuss delays were extremely low key and oriented toward problem solving. Still, the company's delay accounting system forced delays to be charged to one department or another, even in the case of a communication breakdown, making station management's efforts to create joint accountability only partially successful. [After the period of this study, Continental's new CEO recognized these problems and proposed changes to rectify them.]
Continental as a whole did not have a strong coaching and counselling role for supervisors during the period of study, primarily because their numbers, though greater than at United or American sites, were too small to do justice to the role. This was also true in the Boston station. Their job description included coaching and monitoring but a good deal of their time was required for doing paperwork regarding wages and scheduling. Nonmanagement lead agents played a role in directing the operations, as at United and American, but played only a minor role in coaching and counselling. Still, station managers in Boston placed high priorities on coaching and counselling and encouraged supervisors to do it despite their limited numbers. [Note: In the interests of reducing staffing, supervisory levels were cut again after the period of study. But this time the role of supervisors was changed at Boston to include working side by side with the frontline, combining somewhat the role of supervisors and lead agents as at Southwest. One issue is whether than levels will be cut too far to perform these dual roles effectively.]

Internal promotion practices were common at Continental’s Boston station and throughout the company, up through middle management. With few supervisors per frontline employee, the likelihood of promotion into management positions was relatively slim at Continental, though greater than at American or United. In Boston, promotions were reportedly made on skills that were compatible with a coaching and counselling view of the supervisory role. "In management promotion, we look at coaching and counselling and problem solving as part of the evaluation...the ability to hear what’s being said. To
read between the lines."

At Continental, there was nothing in place like the selection process used by Southwest’s Chicago station to identify an orientation toward teamwork or the self-selection process at the United Shuttle that yielded similar results. At Continental, supervisors were in charge of hiring frontline employees, guided only by a checklist. But some qualities relevant to teamwork were considered. Two key items on this checklist, according to a Boston supervisor, were ability to get along with others, and even more importantly, flexibility. Still, it was a relatively weak mechanism for identifying the inclination for teamwork. Continental’s Boston station scored high both on shared respect and willingness to help across functional lines -- exceeded only by Southwest’s Chicago station and the United Shuttle -- but probably due to practices other than the selection process.

A great deal of training for teamwork occurred at Continental’s Boston station through crossutilization across station jobs. There is a great deal of rotation within the ramp, for example between cabin cleaning and loading. "We like to do that here in Boston -- crosstraining, crossutilization," said a ramp supervisor. "There is alot of switching between ticketing and the gate in Boston too," said a customer service supervisor. Historically there was even crossutilization between customer service and the ramp, and employees in these two groups can still bid for positions in either department unlike at any of the other sites. In addition, a fair amount of training for teamwork, in the sense of learning about the whole departure process, was done to support the Continental
Lite quick turnaround strategy.

Despite lack of formal mechanisms for conflict resolution across functional groups, Continental's Boston station was quite attentive to resolving these conflicts. Supervisors were expected to mediate between employees. "Ultimately a supervisor will hear both sides and I'll be the referee," said a customer service supervisor. "We get people to work it out. No hard feelings. It's a very important part of the supervisor's job. It's all a part of coaching and counselling, part of the training that supervisors get. Supervisors are valued because they can identify and solve problems in communication."

Continental's Boston station appeared to enjoy a highly egalitarian culture, due in large part to the example set by station management in each department. There were no culture committees in place, and not an unusually high level of organized social events outside of work. But the management staff treated each other and the supervisors with a high level of respect, in visible ways like the twice weekly staff meetings, which then seemed to cascade down to the frontline.

Continental had highly flexible workrules, even in its unionized work groups. According to Continental employees, there are no contractual workrules that exclude employees in one group from doing the work of another group, aside from those that are FAA mandated. "The only workrule that I can think of is that only flight attendants can do safety demos," said a station manager. "But this is an FAA rule. It's OK to help people to get seated." Supervisors are also not prevented from doing the work of frontline employees.
"Company Policies and Procedures are the workrules for ops, customer service and the ramp," said a manager. "Maintenance has its own. They are different, along the line of union rules. Their supervisors have to come through the ranks, for example. But people can help each other out. Even the maintenance guys will ask if they can help."

Ever since the unions were broken at Continental in 1983, in a conflict with then-CEO Frank Lorenzo, Continental employees have earned low wages relative to the industry. But Continental employees participated in shared rewards in the form of profitsharing until Continental's bankruptcy of the early 1990s, when profitsharing was abandoned and pay was cut further. Half of the pay cut was restored before coming out of bankruptcy, with the promise that the balance would be restored after coming out of bankruptcy. The promised restoration was deferred a year, however. In the spring of 1994, during the period of study, the company announced a plan to reward employees for their sacrifice and tie their future income more closely to the company's performance. Pay would be restored completely, and profitsharing would distribute 15 percent of Continental's pretax earnings to employees based on their salary level. In addition, four percent of the company's stock would be distributed to employees. According to a Boston supervisor, "it's not looked at as an employee ownership effort. More as giving employees a level of reward." Although these measures did not go into effect during the study period, they were announced by management and anticipated by employees. Employees clearly had the sense that their fates were tied to that of Continental. [Note: After the period of study, the
company carried through on profitsharing and stock distribution. But rather than restore base pay to previous levels as promised, the new CEO Bethune announced that base pay would be transformed into performance pay as well, and would be tied to company-wide departure process outcomes as measured by the Department of Transportation -- ontime arrivals, customer complaints and baggage handling. Although the reasoning behind this new policy was sound, it represented yet another commitment that top leadership did not follow through on.]

Continental station employees had not been unionized since 1983, but they had a form of employee representation that received a great deal of respect from Boston's station management, and at times from company leaders. Customer service, ramp and maintenance employees had employee interest groups (EIGs), and supervisory employees had a parallel institution called management interest groups (MIGs). They were taken quite seriously by customer service and ramp employees, and the EIGs often formed alliances with the MIGs to pursue matters of mutual interest. According to a Boston supervisor,

"EIGs have been going on, in various forms, for the past ten years. They've had different focuses, organized under different titles, as the company has changed. Prior to 1987 and the merger of all the various companies, it was different. How much input they have has varied. Probably since 1990 there's been a far greater reliance and inclusion. As Lorenzo's power began to wane, there became more emphasis on relying on employees. There was more pressure to go union from the Eastern people who came in. A lot of concern to get communication strengthened so we wouldn't blow our cost structure. There was a lot of advantage from making employees feel they were getting a fair shake. You don't want the view that everything takes place in an ivory palace."
EIGs and MIGs were active at the station level in Boston, and also participated in regional and company-wide forums. Employees at the Boston station had surprisingly high demands for inclusion in issues of company-wide importance, such as the formulation of the Continental Lite strategy and the rewriting of Company Policies and Procedures.

Aside from customer service and the ramp, however, other employee groups were not satisfied with this form of representation and either had or were seeking to find their own forms of representation, with no outward signs of management opposition. The flight attendants' union, which had never been destroyed, became active again after ten years of dormancy. The pilots voted in a new, independent union. And maintenance workers were being courted by an outside union, with reports that the effort would be successful. A flight attendant base manager expressed what appeared to be the new attitude toward unions.

"When you have a union on board...in today's environment it's different from even seven years ago. It used to be combative. Now in the U.S. we work together more. We are not trying to get as much as possible for the least work. These days everybody knows we have got to be lean."

In other words, Continental managers were not actively opposing unions, in part because the unions were trusted to be restrained with respect to their demands.

Gordon Bethune was promoted into the top leadership position at Continental during the period of study, based in part on his reputation in the industry for credibility with employees. [Note: This reputation was signalled by the fact that he was
seriously considered by United's unions to be their CEO. Early in his leadership Bethune started to build trust with employees, by sending a few strong signals about openness and an egalitarian spirit. Within two weeks of the announcement, he declared Fridays casual dress days and all offices in Houston open to all Continental employees without a special access card. He increased the employee newsletter to a monthly frequency, introducing a new publication for employees called the Continental Quarterly, and generated a daily "Message from Senior Management" available through voicemail to the entire Continental workforce.

Bethune's frankness with employees about the strategy shift and attempts to reach them directly also helped his credibility a great deal.

"Our strategy is changing constantly. No one knows what's going on...Senior managers just walk into training sessions and say things that no one has ever heard. [But] there has been some attempt at informing us. Bethune made a videotape that we just viewed here in the station. He says that senior management fucked up for the past year. All the people who were fired because they were saying CALite was moving too fast -- were right! Now we are doing a reversal. We have to make money by hook or crook. We will do whatever we have to do...That's it, plain and simple.

Still, one of the biggest weaknesses in Continental's system of coordination and control remained -- the gulf between headquarters and the field, and excessive reliance on punitive accountability. Although the Boston station manager was able to shield his employees from the effects, to a great extent, the system still left him and other station managers without a viable source of advice and support outside the station.
6.5 Continental: Cleveland

Practices at Continental’s Cleveland station were quite similar to those at the Boston station, with the exception of the coordination mechanism. The coordination mechanism at Continental’s Cleveland station is different from that in the Boston station, in particular, due to Cleveland’s larger size. The Cleveland operations center has a greater division of labor. Operations coordinators maintain contact with pilots and central dispatch. Load planners organize information from central dispatch and the various departments to assure that passengers, baggage and freight are loaded properly. And, in addition, maintenance, ramp and customer service have representatives who sit in the operations center to provide a link between operations and their departments. Load planners are separated out in a separate room, and therefore don’t have ongoing contact with the rest of the operations center staff. This mechanism produces about the same score on frequency of communication as the Boston station, but a lower score on timeliness.

Aside from the coordination mechanism, there were also some differences in the implementation of certain practices designed to improve horizontal communication. The primary difference was in shared accountability. Despite efforts of the Cleveland station’s new management, there was a tendency toward fingerpointing with regard to delays during the study period. Every day in the Cleveland station was a management meeting to discuss delays. From station management’s point of view, “We might take one delay and take one or two hours to find the root cause of the problem. Instead of punitive action, we use a positive constructive
approach." But interviews with supervisors and frontline employees revealed that this "positive constructive" approach was counterproductive in certain respects. It encouraged them to pay excessive attention to documenting who did what at what time, rather than looking ahead to figure out together what should be done to get the next plane out.

"The supervisor has to track down the cause of the delay," said a customer service supervisor. "With a delay, we'll first talk to the agent and the customer service lead, and ask what kind of problems were there. Was it the captain, the flight attendant, the control center, cleaning, catering, a disabled passenger? Any of these would be legitimate, non-station delays. They should know what time the cleaners got on, what time the cleaners got off. If it was a catering delay, it would be charged to catering or to the flight attendants if they counted wrong."

Despite the efforts to focus on objective reporting of what happened, fear still plays a major role. "There's this fear over taking a delay -- everybody fears they'll be chastised for it," said an operations coordinator. "You spend so much time filling out delay forms and fighting over a delay -- just think what we could be doing. We had a two minute delay that no one would take responsibility for."

The Cleveland station suffered the same problem as the Boston station -- a punitive form of accountability to headquarters. But The station manager acknowledged the seriousness of the problem.

"Barriers between groups -- it all comes down to the delay coding system. Upper management just wants to have a tracking system. We have to find a better tracking system. If you have allot of code 31's, a maintenance delay, and then the maintenance guy is gone, you know it is punitive. That is the bottom
line. You come in front of a tribunal. Headquarters doesn't have time to look at the details. They just see code 10s and then passenger services has alot of explaining to do. Instead, we should be looking at underlying problems.... But we can’t acknowledge the root cause or else people will blame the problems on things they can’t control. It's a punitive system, but if you’re a good station manager, you buffer it, don’t allow it to cascade down to the frontline employees."

Based on reports from Cleveland employees however, the fear factor is still quite high. The buffering may not be as effective as it is intended to be, and not as effective as that which has been achieved at the Boston station.

In terms of an egalitarian culture, the new station manager was working hard to break down barriers between employee groups, mostly through example but also through company picnics. Still, this site's score on mutual respect was second lowest of all sites studies. In particular, there were still major divisions between customer service and the ramp -- two groups that are quite interdependent -- despite the station manager's efforts to create mutual respect between the groups. According to a customer service director, "They call them ramp rats for a reason -- they’re pigs."

The biggest deficits at this site were punitive accountability from headquarters, excessive attention within the station to who did what to cause delays, and finally the legacy of status barriers among employee groups.
6.6 United: Los Angeles

United's Los Angeles station has a coordination mechanism that is designed almost identically to that of Continental's Cleveland station. As with a traditional operations center, all operations functions are located within the station. But it has a higher division of labor than the traditional ops center, it is geographically separated from the operations, and the load function is located in a separate area, away from the ops coordinators. In addition, maintenance, ramp and customer service departments have representatives who sit in the operations center to provide a link between operations and their departments. Despite its similarities with Continental's Cleveland ops center, this site produces somewhat lower scores on the frequency and timeliness of communication -- below the sample average on both dimensions.

During the period of study, in April 1994, United introduced a new way of delay accounting system, designed to increase shared accountability between groups involved in the departure process. This is the same system that was adopted for the Shuttle, as described above.

"Individual managers are not responsible for just their own department's delays because we have families of delays now," said the Los Angeles station manager. "I may be responsible for delays that are partly caused by flight attendants. This means I'm supposed to communicate with that other group. Flight attendants and customer service agents interact a lot. This system makes them talk. It's a family of delays. There is no win or lose. We all win or lose."

Earlier in the study period, the system was quite different.
"At United and I'm sure at others there was always a lot of fingerpointing. Different departments and different divisions. All divisions had their own goals. They weren't interconnected. The attitude was, if they are taking a delay at least it's not mine, so you would sort of forget about it. Whereas if you're responsible for them all, you might get more involved in the process and help them out."

Before this new system was adopted, assigning delays involved a great deal of conflict, said the operations manager. "It's a nonevent now, but you used to need a titanium suit. We used to spend hours and hours figuring out whose delay it was."

The new system also included a focus on ontime arrivals rather than departures, in effect combining the goals of the station and the flight department. In keeping with this, a team delay code was added, to allow the station and flight department to take joint responsibility for a delay. The team delay was to be used exclusively, however, for getting additional revenue on the flight, for example additional passengers or freight. It was not supposed to be used to take joint responsibility for breakdowns in communication, as at Southwest.

Managers had clearly adjusted to the new team approach, however, and had switched to a problemsolving approach among themselves. But shared accountability at the frontline level was not well achieved at this site within the period of study. Despite new mechanisms at the company level to allow for shared accountability and despite efforts from a new management team to encourage problem solving, the site's scores on problem solving and shared goals were the lowest of any sites studied other than American's.
Reportedly, the new standards that were intended to create shared accountability had not been fully communicated to the frontline, perhaps due to a fear that frontline employees would become lax.

The Los Angeles station's move toward shared accountability should have been eased by changes that occurred at United during the period of study, away from a punitive system of accountability to superiors toward one based on more qualitative information exchange and problem solving. Now, said a Los Angeles manager, "in evaluating a manager, it's important to ask not what did you get, but how did you get there?" This change at United away from a culture of punitive accountability began prior to the buyout, but accelerated afterwards. The new CEO Gerald Greenwald set the tone. Top managers were the first to go through TQM training, which is training with an emphasis on problem solving. It was no longer considered acceptable for regional or headquarters managers to take an approach not based on problem solving.

Supervisory levels at this site were just about average for the sample. But the coaching and counselling role of supervisors was relatively neglected in recent years and during the period of study, according to the customer service manager. Supervisors had both administrative and operational responsibilities but were stretched quite thin. As a result, during the study period,

"You only got to see supervisors two or three times a day," said the customer service manager. "They would make sure that people were there at the start of the flight, then would go off to the next. They would deal with crises only. As a result, customer service reps weren't getting the attention they needed on critiquing
their work. Also there was no help with their career plans. The operation took precedence. There was no softer side. On the coordination of the departure, yes, you would get feedback. But critique without the benefit of analysis...We haven't developed our talent."

The new supervisory role would be more of a mentoring role -- one that is not easily carried out at arms length. [Note: After the period of study, the role of supervisors was redefined at this site to include a specific focus on coaching, mentoring and monitoring. However, this role would have to expand without an increase in the number of supervisors, apparently. "The word supervisors does not exist in Greenwald's nomenclature," said a Los Angeles manager. "We have held the line where we were at the time of the buyout. Supervisors and managers will not grow."]

United traditionally relied heavily on promotion from within for supervisory and management positions, and still does to a great extent. The Los Angeles station pays particular attention to developing talent within.

"We have a conscious program in the station where we see an individual with advancement opportunities and we move them into other departments to develop them, so they see the overall workings of the station," said a Los Angeles manager. "For example, we let a customer service and a ramp sup swap jobs for six months. There is always the possibility of being a promotable type person, from ground maintenance to ops and vice versa. And we have a flight attendant supervisor now working on the ramp, as a ramp sup. I oversee the job switching. They'll sit down at a management briefing and say, today we'll talk about the job rotation program. They identify individuals and then talk to them. The rotation program is for six months. It doesn't really lead to a management position, by itself, but it gives them the opportunity to say that they've had a multidepartmental experience, if a job opens up somewhere."
Promotional paths within the station are expected to benefit both horizontal coordination -- by crossing over departmental boundaries, and vertical control -- by crossing over the management/nonmanagement boundary and promoting upward mobility.

But at the headquarters level it was becoming more common to hire MBAs from off the street, as at American Airlines. This caused some resistance by managers in the field. "There is a perception that they sit in headquarters and come up with new thoughts about new ways to do new things," said a manager. "There is some resentment, a feeling that they are out of touch with reality. Some say, 'let them get out there and they'll see.'" The restriction of the job ladder between field management and headquarters is expected to contribute to a division in perspectives.

As we saw, the United Shuttle had the advantage of self-selected employees into an operation that was clearly advertised as based on teamwork. United's non-Shuttle operation in Los Angeles did not have this advantage. United's hiring practices did not put a great deal of emphasis on selecting frontline employees for teamwork skills. Instead, they followed the more traditional approach of looking for skills specific to the particular job being filled. "Selection for teamwork is not something we've paid attention to in the past," said a manager. "It's something we need to do in the future. It's not just work experience and background, but communication skills." The score for mutual respect is about average, but the score for helping is near the bottom of the sample, compared to very high scores on both dimensions for the Shuttle.
Before the employee buyout, training for teamwork was not done at United, with the exception of Crew Resource Management training for pilots and job trading for promotional purposes. After the buyout, TQM training was scheduled for every employee at United, and opportunities were available for employees to participate on crossfunctional teams at the company-level as well as within the Los Angeles station, just as at the Shuttle. But though the Shuttle had experience with these teams throughout the study due to their role in the design of the Shuttle and due to crossfunctional shift briefings, these efforts were just beginning in United’s non-Shuttle operations at the end of the study period. The score for knowledge across functional lines at this site was about average.

As at the Shuttle, conflict resolution was beginning to occur at United’s non-Shuttle operation in Los Angeles through crossfunctional teams, both within the station and at the company level. These teams had barely been launched during the study period, but one early example suggested the possibilities. The ramp and freight departments were engaged in ongoing conflict over their interface in the departure process.

"At first, we would blame them and they would blame us," said the ramp manager. "So we started having joint meetings, twice monthly. At first they were bitch sessions. Now they evolved into -- 'I can take that on, I can do that.'" One meeting was the turning point, the manager recalled. "The meetings started out first with attacks on management, then attacks on each other. Terry [a ramp manager] came in with flip charts and thought it was chaotic. But Charlie [a ramp lead] said it’s the best meeting we ever had. Everyone spoke their minds, and people were behind the scenes saying here’s what we’re going to do."

Perhaps given the early stages of these mechanisms and
the history of divisions to be overcome, this site still scored below average on problemsolving and shared knowledge.

Unlike the Shuttle, which achieved a tremendously egalitarian culture during its short time in existence, United’s non-Shuttle operation in Los Angeles had not yet done so during the period of the study. Unlike the Shuttle, non-Shuttle employees did not have shared break rooms or shared uniforms -- both of which seemed to contribute to an egalitarian mentality. This site ranked fifth on mutual respect, in contrast to the Shuttle which had the highest score of any other site. But fifth was the highest ranking this site received on any dimension of coordination. Interviews suggested that the Shuttle spirit was beginning to infect people in the regular United operations in Los Angeles, in part due to proximity and movement between Shuttle and regular operations in Los Angeles.

There is a traditional union attitude toward workrules at United that has been difficult to transform. According to a ramp lead,

"We try not to get out of our classifications because it can get grieved... It’s a silent type of thing. If they don’t have enough manpower, that’s for management to fix."

"Covered work is a big deal at United," said a manager. It’s very symbolic...Unions have always been an obstacle to productivity at United. Even within the IAM, only mechanics can put in the chalks [under the plane’s wheels when the plane comes to a stop at the gate]. Everybody would sit and wait for the mechanics to arrive, if necessary."

Without changing contractual language, still there has
been progress, due in part to the employee buyout and in part to the example of the Shuttle. It is now possible, for example, for a customer service representative to go into the bag room to help identify bags.

"As long as it's presented in a positive way and not as trying to do your job, it's not been a problem," said the station manager. "There has been no grieving it so far. We say someone's just trying to assist you -- it's for a better product. Maintenance sometimes puts the jetway in place, to help customer service reps. We are trying to get more of it. There have been no grievances over this since I've been here [since late 1993]."

Still, as of the end of the study period, the score on helping across functional lines was one of the lowest in the sample.

Practices with respect to employee representation, shared rewards and trust building by top leadership mirror those described above for the Shuttle. The new leadership of United in its brief tenure had successfully communicated a sense of respect for employee representation, and won the trust of employees I spoke with. In addition, representatives of union and nonunion employees had negotiated an employee buyout that was perceived by many to offer long term rewards for employees, with the exception of the flight attendants and dissatisfied factions within each of the other groups. "I used to raise hell around here for minor little things," said a ramp lead agent. "I was thrilled with the ESOP. Even the serious problem children were thrilled...People are coming around." The buyout had the advantage of aligning employees interests with those of management, and doing so in a way that did not undercut cooperation between employee
groups, with the possible exception of the flight attendants.

In summary, practices for achieving horizontal coordination and vertical control -- alignment between employee and company goals -- were put into place at United’s non-Shuttle Los Angeles operations during the study period. But some of the practices were put into place very late in the study period, and others would not be possible to replicate at all. The Shuttle operation scored much higher on coordination and departure process outcomes, due in part to differences in a few key practices -- selection for teamwork, shared breakrooms, participation on crossfunctional design teams and participation in daily crossfunctional shift briefings. These practices were expected to be replicated in some form or another over time in United’s regular operations. But selection for teamwork through wholesale self selection would not be possible -- United would have to rely instead on transformation of existing employees through its other practices.

6.7 United: Boston

United’s Boston station was very similar to the Los Angeles station in organizational practices including accountability, supervision, promotion, selection, training, conflict resolution, egalitarian culture, workrule flexibility, employee representation, shared rewards and trust building by leadership. The primary difference between the two sites was in the coordination mechanism. Largely due to its smaller size, operations staff members in the Boston station share the roles of ops coordinator, load planner and
departmental representatives. The ops function is less fragmented than in the Los Angeles station, perhaps accounting for a slightly higher score on timeliness of communication.

There were differences in the implementation of shared accountability as well. The team delay option was reportedly used more frequently in Boston than at the Los Angeles station, perhaps explaining the higher score on problem solving across functional groups in Boston than in Los Angeles.

The Boston station did have the disadvantage, however, of distance from the West Coast Shuttle operation. Many of the lessons were being diffused throughout the United system, through company-wide crossfunctional teams which Boston employees participated on. The station manager was also quite active in headquarters planning for the Shuttle and supported very strongly the diffusion of Shuttle practices throughout United. But employees did not have the direct experience of the egalitarian culture of the Shuttle, perhaps explaining a relatively low score on shared respect, relative to the Los Angeles station which had a front row seat.

6.8 American: Boston

At American, the coordination mechanism is in trouble and despite much experimentation has not been repaired. The coordination role used to be performed by the ops agent through the load planning task, but this task was centralized to a central location outside of the station. The coordination role has gone from the operations agent to the gate agent, by default, without explicit recognition for or support for that
role. The gate agent is responsible for communicating with the other groups, and is made to feel responsible for delays. But the gate agent does not have the ability to call delays, and his or her coordination role is not explicitly recognized in selection or training. It is not a position that gets a great deal of respect, or that has a key position in the job ladder as does the operations agent at Southwest. More senior employees recognized the loss of this role. According to a Boston-based pilot, the older operations agents

"could identify a problem, solve a problem. Ops agents used to be this way. They used to have a leadership role. Their authority was changed in 1980. Nobody has this role now. The gate agents do it by default."

But in Boston, coordination is substantially better than in Los Angeles, despite having the same basic mechanism. In particular, the timeliness of communication is relatively high. One key difference between the stations is that, even though the load function has been removed from the Boston ops center, the ops center is still centrally located and still tends to serve as a "watering hole" for pilots, flight attendants, ramp, maintenance and customer service workers. Despite its reduced formal role and its low staffing levels, the local ops center still serves as a central point for face to face and telephone contact. "That's the number everybody still calls," said a ramp agent. "It's a tough tough job. Sal gets it from everywhere."

Shared accountability was an elusive goal at American's Boston station during the period of study. This site scored near the bottom on both problemsolving and the perception of shared goals across employee

224
groups. Part of the problem was due to the absence of a team delay code or even delay codes with some overlap across departmental lines. [Note: There were several efforts over the past few years to create a team delay code that would involve a joint decision between station employees and the pilot, as has been implemented at United, for example. But that effort failed miserably, according to several reports, because pilots wanted to be in charge rather than deferring to the knowledge of station employees.] Departmentally specific delay codes forced allocation of a delay to one department or another, even if the problem was a breakdown in communication between two or more groups. The result seemed to be frequent misidentification of the problem.

"We have delay codes for when the Pope visits, or if there are beetles in the cockpit, but sometimes a problem occurs routinely and we have no code for it," said a supervisor. "What usually happens is a communication breakdown, but we have no code for that. So we tag it on the last group off the plane."

This method of delay coding leads to a breakdown in shared accountability, and a loss of focus on the outcomes that are critical to the customer.

"If you ask anyone here, what’s the last thing you think of when there’s a problem," said a supervisor. "I bet your bottom dollar it’s the customer. And these are guys who bust their butts everyday. But they’re thinking how do I keep my ass out of the sling."

Cheating also occurred due to the perceived harshness of consequences for delays, for example the practice of releasing the brake early to prevent a delay from being registered electronically.

"Gate agents are so much under the gun," said a pilot. "They are scared shitless of disciplinary action. Some of us will tell the gate agent -- take all the time you
need to load this plane. I’ll take care of it. Captains have authority. We can use it well. If you use your authority as a captain to take the fear away from the gate agent, they can relax and do their job. It’s informal, behind the scenes. We were distorting the data to keep the gate agent from getting in trouble."

These outcomes were due not only to the delay coding system, but to the **punitive form of vertical accountability** used at American that places high pressure on station management to produce good numbers with no excuses. The field managers of every department at American have performance standards called Minimum Acceptable Performance Standards (MAPS), for ontime departures and a range of other outcomes. "I am harassed on a daily basis," said a manager. "Headquarters has a performance analysis department that is looking at my MAPS every day, analyzing the station’s performance." Employees attributed fingerpointing in the Boston station to the external pressures American placed on station managers. "Here, you only care about delays," said a customer service agent. "Otherwise [the station manager’s] little report card won’t look good that week. The ultimate goal is not the customers, it’s the report card." It was clear that failure to meet MAPS was perceived, accurately or not, to result in punitive action, and that this perception led to management behaviors that undermined shared accountability among employee groups.

**Supervisory levels** in American’s Boston station were the lowest of any site studied, at only 2.4 supervisors per 100 frontline employees. In keeping with the push of the early 1990s to empower the workforce, American had reduced supervisory levels and increased the responsibility of frontline,
nonmanagement lead agents. One side effect of this move was to lose the coaching and monitoring role of supervisors. Lead agents took over leadership of the operations, and supervisors, severely reduced in number, performed administrative functions with regard to scheduling and wages. [Note: In the Boston station, supervisory levels were reduced even further than elsewhere at American, so that lead agents were even taking over administrative functions.] The job of lead agents, as frontline employees, did not include coaching or discipline, while supervisors were stretched too thin to perform that role. Communication between the frontline and management was severely restricted, posing problems for consistency between employee actions and company goals. [Note: At the end of the study period, American management began to implement a new philosophy with respect to supervision. Supervisory levels would increase dramatically, to one supervisor for every twelve agents, or 8.3 supervisors per 100 agents.]

**Internal promotion** was a tradition at American, as at the other major airlines, but in the early 1980s American started a trend in the industry toward hiring MBAs from the outside. Although these MBAs were generally brought in to headquarters positions, rather than field positions, this practice interrupted the job ladder between the field and headquarters, and contributed to a division in perspectives. [Note: After the study period, a consulting group brought in to "Reinvent Headquarters" reported that remarkably few of American's top management had come from management positions in the field.] In addition to the interruption of the job ladder between the field and headquarters, the low levels of supervision at American
served to constrict the job ladder at another critical spot -- at the management/nonmanagement interface. Fewer and fewer frontline employees would have the opportunity to move into management. Thus low supervisory levels affected consistency between employee actions and company goals not only by reducing interaction between management and nonmanagement, but by reducing the flow of people from nonmanagement to management positions.

**Selection** at American did not place a great deal of emphasis on identifying frontline people with an inclination toward teamwork. As mentioned above, Southwest is by far the exception in the industry, in the attention and resources invested in the selection of frontline station employees. For station employees, selection is done locally by the stations, often by supervisors, and typically is based on job skills. At the Boston station, "we look for people who speak clearly and distinctly," said a supervisor. American's hiring practices for pilots were notable not just for overlooking teamwork but for running counter to the goal of teamwork across functional boundaries.

"There is a certain amount of hostility that pilots face from the other employee groups," said an employee relations manager. "The personality of the pilot generates that hostility. We look for command presence, the most self-assured arrogant people we can possibly find. Then we teach them to be even more arrogant, so to speak."

These selection practices, which either overlooked or were biased against teamwork attitudes, predict low scores on respect and helping across employee groups. But although the Boston station scores very low on respect, the score on helping is above average. Other factors appeared to counter the effects of selection
practices, particularly training. [Note: These selection criteria contributed to the failure of earlier efforts, described above, to increase shared accountability through a team delay involving a joint decision between station employees and the pilots.]

In particular, American offered several training programs designed to increase shared knowledge and teamwork across functional groups. Along with Southwest and United, American’s Human Resource Department implemented a program called "Walk a Mile" that encouraged employee to trade jobs across functional lines. [Note: This job trading program was also designed to give employees an opportunity to try out other positions for the purpose to job transfers and promotions.] Along with other airlines, American invested tremendous resources into Crew Resource Management training to encourage pilots to be team players, and to listen to others. In addition, the Human Resource Department designed training programs to address particular breakdowns that occurred in teamwork around the departure process. For example, a half-day program called Commitment to Courtesy was offered systemwide at American to improve communication between flight attendants and gate agents. Finally, there was some job rotation at American within the customer service and ramp departments, contributing to better teamwork between gate and ticketing, and between ramp and baggage sorting. These training efforts may have had a beneficial effect on helping across functional groups, contributing to Boston's relatively high score on this dimension of coordination.

Formal conflict resolution processes at American were confined to the management/nonmanagement
relationship, and not designed to address the relationships among peers in different departments. Still, some of the training programs identified above were designed to resolve ongoing conflicts between functional groups in the departure process. Though only a half day program, the Commitment to Courtesy is a clear example.

"We needed this because the boarding process is the most stressful and chaotic part of any flight. Gate agents and flight attendants have typically worked against each other rather than together. We wanted them to have a chance to sit down and find new ways to interact."

Active conflict resolution across functional groups is expected to increase levels of mutual respect among these groups. Mutual respect at the Boston station is significantly below average, suggesting the possibility that these isolated efforts at conflict resolution are not sufficient to have an impact.

An egalitarian culture, defined as one with a dense network of personal relationships that span status boundaries, is another factor that is expected to have a powerful effect on respect among functional groups. American shares the industry-wide problem of status boundaries between functional groups whose cooperation is needed for the departure process. But aside from training programs designed to improve teamwork across functional lines, there were few systematic efforts to build an egalitarian company culture at American. Employees at the Boston station pointed out management actions that reinforced rather than weakened status lines among employee groups.

"There was a get together for sales and reservations at the opening of the new gates," said a customer service
agent. "The ticketing and gate agents were not invited. I want to [the manager] to say you missed a big opportunity here. We could have learned who they were, to go with the voices. [The manager] said, 'I was not aware of that.' They deliberately try to keep us apart," she continued. "'No,' they say. 'You go in that room over there.' They miss so many opportunities."

The shortage of active efforts to bring employees together across functional lines, whether through conflict resolution or through more general relationship-building activities, contribute to the Boston station low score on mutual respect.

American has more workrule flexibility than United, but less than Southwest and Continental. Increased workrule flexibility within the ramp group was achieved through negotiation in the early 1980s. But the work of the ramp group was remained off limits to those outside the ramp union. Customer service agents in the Boston station report that,

"if you want to help the cabin crews clean up because you're running late, you can't because that's their work. Also, when a passenger brings excess baggage to the gate, "union-wise, the ramp won't come up and get it," said another customer service agent. "We send it back to the passenger and they take it back to the ticket counter."

Workrules also restricted the extent to which flight attendants could assist station employees to achieve faster turnarounds.

"At Southwest and American West, flight attendants collect trash on the plane," said a Boston manager. "They go through the aisles and collect trash periodically throughout the flight. Our attendants do not. Our ground people have to do it. By the time the plane gets to the ground, it is full of trash. It creates extra work, unnecessarily. And it slows down
our turnaround time."

Flight attendants did agree, however, to tidy the planes on through flights, for example by picking up newspapers. Despite the strong workrules in place at American, still the Boston station scores above average on helping across functional groups.

American has performance-based rewards for many of its employee groups, in the form of profitsharing, management bonuses, and pay tied to operating performance. But the basis for these rewards at American are departmentally specific and therefore may not serve to bring disparate groups together. In the recent profitsharing payout, for example, The Admiral's Club was treated as a separate division, so that its employees were rewarded differently than other station employee groups. This fact created enough resentment that it may have undercut the positive effects of profitsharing, even though it was the first payout in years.

"We got our profitsharing checks today," said a customer service agent. "Morale is at an alltime low. They separated out the Admiral's Club agents so they got alot, even those with low seniority. People down here in customer service with high seniority got alot less."

Similarly, managers' bonus payments were tied to attainment of their individual MAPS, or Minimum Acceptable Performance Standards. Similarly, pay for performance for ramp employees was tied exclusively to attainment of the ramp department's MAPS, while rewards for customer service employees were tied to customer service department's MAPS. This more targetted approach to performance rewards had the benefit of
tying people's rewards to the outcomes they could most directly influence. But the negative side is that employees were encouraged to focus on their own piece of an interdependent process, perhaps undermining overall outcomes. In the view of a former employee relations manager at American, this approach led "to a tendency to misidentify the problem so as to insure that each group met their targets and received their payments." In other words, rewards for individual functional outcomes can reduce cooperation between functions.

At American, **union/management relations** fluctuate between tentative and adversarial. The pilots and flight attendants unions have especially conflictual relations with the company. The union which represents ramp employees and mechanics has had more of a mixed relationship with the company, at times fairly cooperative and at other times quite conflictual. But station managers can exercise substantial influence over the relationship with the local ramp workers' union. The Boston station manager, who started as a ramp agent and union member, and who subsequently worked in employee relations specializing in the ramp union contract, was able to quickly earn the respect of the local union through his ability to relate to them socially and his detailed knowledge of their contract.

Despite the importance of station management's approach to employee representation, signals sent by top management strongly influence employee perceptions and behavior. American's current leadership has pursued the strategy of going around the unions to communicate directly with frontline employees. This strategy in and of itself does not necessarily inspire
mistrust. Southwest’s leadership, which enjoys strong relations with its employees’ unions, does a tremendous amount of direct communication with frontline employees. The difference is that American’s CEO is perceived not to respect the unions as legitimate representatives of American employee groups. Top management tended to take the view that the unions’ opposition is "institutional" rather than reflective of its members’ views, then was surprised by the strength of frontline opposition to management’s policies, as, for example, in the 1993 flight attendants’ strike. Management also tended to pit employees against each other when convenient, risking the teamwork that they worked to build through training.

"After the flight attendant strike, they tried to put us union against nonunion," said a Boston customer service agent. "They made it look like the flight attendants were out to screw the company. They pitted us against another work group. They preach team but they don’t practice it."

Management’s perceived disrespect for employee representation appeared to reinforce the status boundaries among groups that undermined crossfunctional teamwork at American. "You know, if American really wanted cost savings, they should bust the [ramp workers’ union]," said a pilots’ union representative. "They should get the mechanics out, since they’re the only skilled workers in the group. And bust the rest." Similar attitudes were expressed by pilot representatives toward the flight attendants’ union. [Note: This lack of respect for employee representation was evident just after the period of study in American’s efforts to thwart organizing efforts in the customer service group -- a traditionally nonunion group at American.]
The strategy of going around the unions, and suggesting that they did not truly represent their members, was a risky one for American’s CEO, particularly as a strategy for winning the trust of frontline employees. Rather than working with the unions, Crandall gave the impression he was competing with them for the trust of the employees. This tended to put employees on guard against Crandall. Other specific incidents undermined trust in his leadership as well. He presented a strategic plan in 1993 called the Transition Plan, saying the only unprofitable piece of American’s holding company, AMR, was the airline. Under the Transition Plan American would continue to fly in those markets where it could still compete, exit the markets where American can no longer compete, and grow the profitable nonairline businesses that AMR owned, such as information systems and management services. The Transition Plan was clearly a way to pressure the unions for concessions, but it also made people question Crandall’s commitment to the business that was their livelihood.

After that event, Crandall made several efforts to work directly with employees and rebuild trust in his leadership. Although his first efforts appear to be toward placating the investor community, it became apparent that the investor community needed reassurance that he had the trust of employees. One recent effort was an invitation to all employees to a summer retreat in Seattle called Council on American’s Future. He also established a crossfunctional team for frontline employees called the Customer Satisfaction Council. "Pilots, flight attendants and everybody else participates. He showed the pilots the books. He asked each station to put crossfunctional teams
together."

Still he faced an uphill battle. "There is still no trust for Crandall," said one pilot. "He is nasty, mean. He's irascible, he points his finger, he's boiling inside. One young pilot showed me a full page ad taken out by Southwest employees to recognize CEO Herb Kelleher on Boss' Day. "It really makes you sad when you read it," he said. "Crandall is a manager of the 70s, Herb is a manager of the 90s."

"Crandall is not loyal to his employees," said a more senior pilot. "He has no respect for employees." He went on to explain the effect of this perception on relations among employees. "We're not going to be loyal to the company or each other. When there is no love for the company, it translates to how you treat each other...People do what they can get away with."

Another widely held view, however, was that Crandall is extremely knowledgeable of the industry. That was generally not perceived to be sufficient, however. "Crandall knows more than any other CEO in the world," said a ramp crew chief. "He was the right person for American Airlines because he knew so much. He would always tell you the answer or get it for you. But he's too isolated now. He gets the wrong information."

Partly in recognition of the difficulty he has had in winning the trust of employee groups, Crandall and American's board of director handed over the direct leadership of the airline to Don Carty in early 1995. Crandall remained as CEO of American's parent, the AMR Corporation. Carty was reputed to be more of a people person than Crandall, and to have the trust of the pilots. He had demonstrated during the time of the Transition Plan a stronger commitment to the airline
business and therefore was able to start his leadership without the stigma of the Transition Plan.

6.9 American: Los Angeles

Of the nine sites studied, American's Los Angeles station has the weakest system of coordination and control. [Note: As in the Boston station, changes were introduced after the study period to remedy some of the weaknesses.]

The coordination mechanism in the Los Angeles station shares the primary weakness of the mechanism in the Boston station. The load planning function of the operations center was centralized to a location outside of the station, and operations agent staffing reduced, without a recognition of the coordination function formerly performed by the operations agent. The operations center was supposed to still do coordination, but was no longer staffed for that purpose, and the job was no longer well designed for that purpose. By default, the gate agent took over the coordination function, but without explicit support from the organization through selection or training.

"We find that a lot of the responsibility for communication with the flight attendants and the ramp falls on [our department]," said the customer service manager. "We have assumed the responsibility of coordination at the point of departure. It has just evolved that way. Certainly not because of the calibre of our employees."

An additional weakness of the Los Angeles coordination mechanism, not shared by the Boston station, is that the operations center was moved to a remote location within the station, further reducing face to face contact between the operations center and
the other departments. Whereas in the Boston station, the operations center still served as a "watering hole" where pilots, flight attendants, ramp agents and customer service agents would linger, the Los Angeles operations center was perceived to be remote and out of touch from the realities of other departments. "Ops went upstairs a few years ago," said a ramp supervisor. "They tend to get a little distant." This view was confirmed by the operations supervisor. "Up here everything looks OK. We don't tend to think of what's going on downstairs with the passengers." The score for the role of operations in coordination, as perceived by other station employee groups, was much lower at this site than any other, and significantly lower than American's Boston station as well.

The Los Angeles station also struggled to achieve shared accountability across departments. This site's scores on problem solving and shared goals across groups were the lowest of all sites studied. This site operated under the same disadvantage as the Boston station with regard to shared accountability -- there was no mechanism akin to the team delay that Southwest and United had, or the broader delay categories that United also adopted. [Note: In recognition of the severe problems, station management was working very hard after the period of study to create broader delay categories for internal station use, along the lines of those adopted by United Airlines. It was questioned whether these internal delay categories would carry weight with employees and influence their behavior, since departmental delay codes would still be assigned for the purpose of meeting headquarters requirements.] To meet the requirements of the delay coding system fairly, station management in Los Angeles took an
approach that emphasized highly objective reporting of the times that each step of the departure process was completed, to enable an accurate determination of fault. But rather than eliminating conflict over fault, this precise, engineering approach appeared to create even more conflict. The reported times became subject to manipulation and created even more fingerprinting, as reflected by the fact the the Los Angeles scores on shared goals and problem solving are substantially lower even than those of the Boston station.

As with the Boston station, employees in the Los Angeles station believed that the fundamental problem was the punitive form of vertical accountability in place at American Airlines, the external pressure on station management to produce good numbers with no excuses.

"It seems like it should be very easy to sit down and develop a plan for everyone to work as a family," said a ramp supervisor. "It's because of all the report cards, the cover your ass stats, the cover your boss. You'll do whatever you can... How can everyone work together, striving to be perfect, when it's going to be on your report card, reflect on your performance?"

The attempt to gain strict vertical accountability through the numbers and without the support of qualitative feedback, reinforced the divisive effects of the delay accounting system and fingerprinting among departments.

This site, like the Boston station, also suffered from the effects of union/management antagonism at the top levels of the company. The Los Angeles site had one additional disadvantage, however. Rather than the frontline ramp and labor relations background of the
Boston manager, the Los Angeles station manager came from an industrial engineering background. So union/management relations at the Los Angeles station were more directly influenced by top management's handling of the relationship.

With the exception of the coordination mechanism, accountability practices, and local union relations, all of which were even more problematic at this site than at the Boston station, most other practices were roughly equivalent between sites. The Los Angeles station faced the same problems with respect to supervisory levels, the shortage of promotional paths into management, and the weak emphasis on selection, conflict resolution and culture building. This site, like Boston, also suffered from the divisions caused by work rules, the design of the reward system, and Crandall's failure to build and maintain the trust of employees. Despite these problems, this site scored near average on helping across employee groups, while all other measures were the lowest in the sample. This bright spot may speak to the strength of the company's training programs that emphasized teamwork between functional groups.

6.10 Discussion

This comparative case study suggests that there are alternative human resource systems for achieving coordination and control of the departure process, but that not all of them work very well. On two ends of the spectrum are the system of functional accountability and the system of crossfunctional accountability. The system of functional accountability achieves control through specialization
of tasks, knowledge and responsibility. Outcomes can be clearly traced to a particular department, and to a particular individual within that department. Departments and individuals are measured "by the numbers." Incentives, performance evaluations, training and promotion all tend to be designed to support functional specialization and the vertical flow of information.

To achieve efficiencies in such an organization, supervisory and coordinating functions can be replaced by information technology since the control mechanism is based on objective performance evaluation and can be done from more of a distance. Such an organization can therefore become quite flat in the field operation, and even achieve employee participation within functional groupings, while remaining a system of functional accountability. This system characterizes American Airlines. The system has a certain resilience in that it can operate with a relatively low level of trust, but in areas that require high levels of crossfunctional coordination, like the departure process, it is not effective. Accordingly, the airline has been finding its success in high level partnerships with other airlines, where American provides the information systems and frequent flier program, while the other airline provides the operating skills.

The system of functional accountability achieves vertical coordination and control in a fairly efficient way, but suffers efficiency losses from a lack of horizontal coordination and control across functional lines. Vertical coordination and control is achieved at the expense of horizontal coordination and control. The same specialization of tasks, knowledge and
responsibilities, supported by incentives, performance evaluations, training and promotions, creates a conflict of interests among frontline employees in different functional areas. This is particularly true for frontline employees who are in different functional areas but involved in a highly interdependent process such as the departure process.

At the other end of the spectrum is a system of crossfunctional accountability, where horizontal coordination and control are achieved through overlapping tasks, knowledge and responsibilities. Employees in different functional areas are encouraged to coordinate with each other and to exert some peer pressure toward achieving common ends. These horizontal ties are supported by a crossfunctional coordinating mechanism, joint accountability for outcomes, selection and training for teamwork skills and peer evaluations. They are also supported by an emphasis on identifying and resolving conflicts across functional groupings. This system of crossfunctional accountability, with its emphasis on horizontal coordination and control, is particularly effective when frontline employees in different functional areas are involved in a highly interdependent process such as the departure process.

But by developing crossfunctional accountability, this system gives up the highly efficient form of vertical coordination and control used by the system of functional accountability. Employees are not as easily evaluated and motivated in terms of their achievement of clearly delineated functional goals. Good performance is not so easily defined. Often, it is defined as "doing whatever is needed to get the job
done." Such performance goals cannot be measured easily "by the numbers." Either employees must learn to evaluate each other as colleagues with no need for evaluation "from above," or a more fine-tuned evaluation is needed "from above."

This system achieves vertical control through a variety of alternative practices, most of which emphasize the rich flow of information up and down the organization. The span of control is decreased to allow a more fine-tuned interaction between supervisors and frontline employees, and so on up the organizational ladder. A narrower span of control lends itself to a more permeable boundary between management and nonmanagement -- more permeable in terms of the flow of information, social contact and career mobility. These vertical ties are supplemented by other practices that complement rather than detract from horizontal ties -- including an organizational commitment to promote from within, trust building by top leadership and respect for the representation of employee interests.

Though it certainly is not an elegant model, the model of coordination and control developed here is relatively robust for explaining the rank order of operating outcomes. There are perhaps too many relevant practices in it for it to be elegant. It is not possible right now, as the researcher, to say there are two or three practices here that really matter the most. Whether that is a result of closeness to the material, or a theoretical point of view, remains to be seen. I am inclined to say that when systems of coordination and control work, they work first of all because they have solved the problem of achieving
control without undercutting crossfunctional coordination, and that secondly they have the virtue of completeness -- many if not all practices reinforce the central tendencies of the system to achieve a particular kind of coordination and control.

The primary insight from this thesis is that there are two contrasting ways -- represented by Southwest and the United Shuttle -- of achieving control without undercutting crossfunctional coordination. One relies on qualitative feedback and mentoring "from above," while the other relies feedback from colleagues. My hunch is that the Shuttle is moving toward the second system, and that it is more challenging from the standpoint of human development. It is challenging because both coordination and control are achieved horizontally. It is hard enough to reach a level of maturity to use a horizontal feedback system effectively in academia. And even the academic profession has vertical elements of control such as seniority and the up or out promotion system.

The relative merits of the hybrid and the pure horizontal systems deserve continued attention, both within and beyond the context of the airline industry. Aoki's and Leibenstein's shared insight -- that the hybrid system has particular strengths and resiliencies unmatched by pure vertical or horizontal forms -- is compelling but not yet proven.
Bibliography


Feldman, Joan. "USAir: Where Have All the Good Times Gone?" Air Transport World, June 1994.


Appendix A: Employee Survey on Coordination

Who Do You Communicate With?

Survey for Employees of American Airlines
Boston Station

Jody Hoffer Gittell
Massachusetts Institute of Technology
50 Memorial Drive
Cambridge, MA 02139

Years with American _________________
Job title _________________
Position you are working today_______________

1. Please answer all questions from the perspective of the position you are working today.

2. Communication includes talking, hand signals, radio, telephone, written and computer messages.

THANKS VERY MUCH FOR YOUR HELP!!
1. When you are working this position, how often do you communicate with people in these groups?

<table>
<thead>
<tr>
<th></th>
<th>Constantly</th>
<th>Often</th>
<th>Occasionally</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilots</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Flight attendants</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Gate area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Ticketing area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Caterers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Fuelers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Freight area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Bag room</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Ramp area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Mechanics</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Aircraft cleaners</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Operations</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
2. Do people in these groups affect how well you can do your job?

<table>
<thead>
<tr>
<th>Group</th>
<th>Very much</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilots</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Flight attendants</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Gate area</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Ticketing area</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Caterers</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Fuelers</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Freight area</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Bag room</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Ramp area</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Mechanics</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Aircraft cleaners</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Operations</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
3. Do people in these groups communicate with you in a timely way?

<table>
<thead>
<tr>
<th></th>
<th>Usually</th>
<th>Not usually</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilots</td>
<td>1</td>
<td>2 3 4 5</td>
</tr>
<tr>
<td>Flight attendants</td>
<td>1</td>
<td>2 3 4 5</td>
</tr>
<tr>
<td>Gate area</td>
<td>1</td>
<td>2 3 4 5</td>
</tr>
<tr>
<td>Ticketing area</td>
<td>1</td>
<td>2 3 4 5</td>
</tr>
<tr>
<td>Caterers</td>
<td>1</td>
<td>2 3 4 5</td>
</tr>
<tr>
<td>Fuelers</td>
<td>1</td>
<td>2 3 4 5</td>
</tr>
<tr>
<td>Freight area</td>
<td>1</td>
<td>2 3 4 5</td>
</tr>
<tr>
<td>Bag room</td>
<td>1</td>
<td>2 3 4 5</td>
</tr>
<tr>
<td>Ramp area</td>
<td>1</td>
<td>2 3 4 5</td>
</tr>
<tr>
<td>Mechanics</td>
<td>1</td>
<td>2 3 4 5</td>
</tr>
<tr>
<td>Aircraft cleaners</td>
<td>1</td>
<td>2 3 4 5</td>
</tr>
<tr>
<td>Operations</td>
<td>1</td>
<td>2 3 4 5</td>
</tr>
</tbody>
</table>

259
4. If there’s a problem with a flight, do people in these groups work with you to solve the problem or do they try to avoid getting blamed?

<table>
<thead>
<tr>
<th></th>
<th>Try to solve the problem</th>
<th>Try to avoid blame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilots</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Flight attendants</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Gate area</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Ticketing area</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Caterers</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Fuelers</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Freight area</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Bag room</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Ramp area</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Mechanics</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Aircraft cleaners</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Operations</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
5. How much respect do you get from people in these groups?

<table>
<thead>
<tr>
<th></th>
<th>Alot</th>
<th>2</th>
<th>3</th>
<th>Not much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilots</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Flight attendants</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Gate area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Ticketing area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Caterers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Fuelers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Freight area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Bag room</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Ramp area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Mechanics</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Aircraft cleaners</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Operations</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
6. How much help do you get from people in these groups?

<table>
<thead>
<tr>
<th>Group</th>
<th>Alot</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilots</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Flight attendants</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Gate area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Ticketing area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Caterers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Fuelers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Freight area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Bag room</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Ramp area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Mechanics</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Aircraft cleaners</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Operations</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
7. How much do people in these groups know about your job?

<table>
<thead>
<tr>
<th>Group</th>
<th>Alot</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilots</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Flight attendants</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Gate area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Ticketing area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Caterers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Fuelers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Freight area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Bag room</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Ramp area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Mechanics</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Aircraft cleaners</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Operations</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

263
8. Do the people in these groups have the same work goals as you?

<table>
<thead>
<tr>
<th></th>
<th>Same goals</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilots</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Flight attendants</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Gate area</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Ticketing area</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Caterers</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Fuelers</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Freight area</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Bag room</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Ramp area</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Mechanics</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Aircraft cleaners</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Operations</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
9. What do you communicate with these people about?

Pilots

Flight attendants

Gate area

Ticketing area

Caterers

Fuelers
Freight area

Bag room

Ramp area

Mechanics

Aircraft cleaners

Operations
10. Anything you would like to change about your communication with these groups?

Pilots

_________________________________
Flight attendants

_________________________________
Gate area

_________________________________
Ticketing area

_________________________________
Caterers

_________________________________
Fuelers
Freight area

Bag room

Ramp area

Mechanics

Aircraft cleaners

Operations
ORGANIZATIONAL PRACTICES:

INTERVIEW WITH MANAGERS

Jody Hoffer Gittell
Massachusetts Institute of Technology

Room E52-583
50 Memorial Drive
Cambridge, MA 02139

Directions:
This interview is being given to managers of customer service, ramp and operations employees in your station. It will be used to help researchers identify the organizational practices that support communication between jobs when there is pressure to work quickly and accurately.

THANKS VERY MUCH FOR YOUR HELP!
1. Name and phone number

2. What is your job?

3. What is the usual path to your job? Has it changed?

4. Which groups do you supervise or manage?

Mechanic

Ramp agent

Cleaner

Dispatcher

Freight agent

Catering

Pilot

Flight attendant

Gate agents

Ticket agents

Skycap

Operations agent

Other
5. How many reports between you and the frontline employees in the groups you manage?

<table>
<thead>
<tr>
<th>Role</th>
<th>Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanic</td>
<td></td>
</tr>
<tr>
<td>Ramp agent</td>
<td></td>
</tr>
<tr>
<td>Cleaner</td>
<td></td>
</tr>
<tr>
<td>Dispatcher</td>
<td></td>
</tr>
<tr>
<td>Freight agent</td>
<td></td>
</tr>
<tr>
<td>Catering</td>
<td></td>
</tr>
<tr>
<td>Pilot</td>
<td></td>
</tr>
<tr>
<td>Flight attendant</td>
<td></td>
</tr>
<tr>
<td>Gate agents</td>
<td></td>
</tr>
<tr>
<td>Ticket agents</td>
<td></td>
</tr>
<tr>
<td>Skycap</td>
<td></td>
</tr>
<tr>
<td>Operations agent</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>
6. Is there a nonmanagement leader of any kind? How chosen?

Mechanic

Ramp agent

Cleaner

Dispatcher

Freight agent

Catering

Pilot

Flight attendant

Gate agents

Ticket agents

Skycap

Operations agent

Other

7. Who do you report to?

8. Who does that manager report to?
9. Who else reports to that manager?

<table>
<thead>
<tr>
<th>Position</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanic</td>
<td>______</td>
</tr>
<tr>
<td>Ramp agent</td>
<td>______</td>
</tr>
<tr>
<td>Cleaner</td>
<td>______</td>
</tr>
<tr>
<td>Dispatcher</td>
<td>______</td>
</tr>
<tr>
<td>Freight agent</td>
<td>______</td>
</tr>
<tr>
<td>Catering</td>
<td>______</td>
</tr>
<tr>
<td>Pilot</td>
<td>______</td>
</tr>
<tr>
<td>Flight attendant</td>
<td>______</td>
</tr>
<tr>
<td>Gate agents</td>
<td>______</td>
</tr>
<tr>
<td>Ticket agents</td>
<td>______</td>
</tr>
<tr>
<td>Skycap</td>
<td>______</td>
</tr>
<tr>
<td>Operations agent</td>
<td>______</td>
</tr>
<tr>
<td>Other</td>
<td>______</td>
</tr>
</tbody>
</table>
10. Coordination between work groups

How does your group coordinate its work with each of these groups? Examples: Direct online communication, communication through another party, daily or weekly meetings, ad hoc meetings.

Mechanics

Ramp agents

Cleaners

Bag room

Freight agent

Catering

Pilots

Flight attendants

Gate agents

Ticket agents

Skycap

Operacions agent
11. Shared accountability for departure delays

Does your group share accountability for departure delays with any of these groups? How?

Mechanics
Ramp agents
Cleaners
Bag room
Freight agent
Catering
Pilots
Flight attendants
Gate agents
Ticket agents
Skycap
Operations agent
12. Conflict resolution between employee and management

What is the grievance procedure in your group?
13. Conflict resolution between employees

How are departure-related conflicts identified and resolved within your group, and between your group and the others?

Within group

Mechanic

Ramp agent

Cleaner

Bag room

Freight agent

Catering

Pilot

Flight attendant

Gate agents

Ticket agents

Skycap

Operations agent
14. Managerial role in resolving conflicts

Are you responsible for resolving conflicts with your group, or between your group and these other groups?

Within group

Mechanic

Ramp agent

Cleaner

Bag room

Freight agent

Catering

Pilot

Flight attendant

Gate agents

Ticket agents

Skycap

Operations agent
15. Cross-group evaluation

Are you or other members of your group evaluated by members of other groups? Do you evaluate them? How?
Examples: written complaints, appreciation awards, formal performance reviews.

Within group

Mechanic

Ramp agent

Cleaner

Bag room

Freight agent

Catering

Pilot

Flight attendant

Gate agents

Ticket agents

Skycap

Operations agent
16. Selected for ability to work well with others

Are people in your group selected for their ability to work well with the people in these other groups?

Mechanic

Ramp agent

Cleaner

Bag room

Freight agent

Catering

Pilot

Flight attendant

Gate agents

Ticket agents

Skycap

Operations agent
17. Promoted for ability to work well with others

Are people in your group promoted for their ability to work well with the people in these other groups?

Mechanic

Ramp agent

Cleaner

Bag room

Freight agent

Catering

Pilot

Flight attendant

Gate agents

Ticket agents

Skycap

Operations agent
18. Trained for ability to work well with others

Are people in your group trained for their ability to work well with the people in these other groups?

Mechanic

Ramp agent

Cleaner

Bag room

Freight agent

Catering

Pilot

Flight attendant

Gate agents

Ticket agents

Skycap

Operations agent
19. Shared monetary rewards

Does your group get any monetary rewards based on outcomes? Are they for the same outcomes, for noncompeting outcomes, or for competing outcomes as these other groups are rewarded for?

Mechanic

Ramp agent

Cleaner

Bag room

Freight agent

Catering

Pilot

Flight attendant

Gate agents

Ticket agents

Skycap

Operations agent
20. Shared unions

What unions, if any, do each of these groups belong to?

Mechanic

Ramp agent

Cleaner

Dispatcher

Freight agent

Catering

Pilot

Flight attendant

Gate agents

Ticket agents

Skycap

Operations agent

Other
21. Contractual workrules

Does your group’s contract prohibit them from doing the work of people in these jobs? Are the prohibitions actively enforced?

Mechanic

Ramp agent

Cleaner

Bag room

Freight agent

Catering

Pilot

Flight attendant

Gate agents

Ticket agents

Skycap

Operations agent

22. What is your role in the departure process?
Appendix C: List of Interviewees

American Airlines

Bob Baker, executive vice president of operations.
Kay Baker, team leader, Boston station.
Jim Barowy, ramp crew chief, Los Angeles station.
Joannie Barretta, customer service agent, Boston station.
Roger Barry, ramp crew chief, Boston station.
Diane Beshong, flight attendant, local APFA chair, Boston station.
David Boone, team leader, Los Angeles station.
Gil Brassard, team leader, Boston station.
John Calabro, cargo manager, Boston station.
Paul Cody, ramp manager, former customer service manager, Boston station.
Joannie Colston, customer service agent.
Ralph Craviso, former vice president of employee relations.
Stan Crosser, managing director of employee relations.
Mike Darrien, ramp scheduling crew chief, Los Angeles station.
Mark Dupont, ramp manager, Los Angeles station.
Tony Enright, station manager, Orlando station.
Cecil Ewell, vice president of flight operations.
Maureen Fanara, customer service agent.
Declan Flattery, team leader, Boston station.
John Fortune, ramp crew chief, local TWU president, Boston station.
Gerry Foster, manager of customer service, Los Angeles station.

Ed Freni, manager of customer service, former flight attendant base manager, Boston.

Silvio Galindo, catering coordinator, Boston station.

Bob Garrett, pilot, former local APA chair, Boston station.

Susan Harrigan, flight attendant, Boston station.

Bonnie Hawkins, secretary to station manager, Boston station.

Lynne Heitman, former station manager, Boston station.

Tracey Houston, operations agent, Los Angeles station.

Rich Italiano, network administrator, Boston station.

Claire Jedrey, former customer service supervisor, Boston station.

Bob Johnston, station manager, Detroit station.

Charles Jones, ramp supervisor, Los Angeles station.

Pat Kelly, vice president of financial planning and analysis.

Tom Kiernan, former senior vice president of human resources.

Ed Looper, cabin cleaning crew chief, Los Angeles station.

Don McNiven, operations manager, Los Angeles station.

Sal Misuraca, operations agent, Boston station.

Monte Moon, manager of airport services, Los Angeles station.

Elaine Moore, customer service agent, Boston station.

George Mueller, vice president of customer services.

Sal Neri, cabin service manager, Los Angeles station.

Jim Nobles, station manager, Boston station.
Don O’Hare, senior vice president of field services.
Brian Olson, chief pilot, Boston station.
Melinda Patino, team leader, Los Angeles station.
Walter Pax, ramp agent, Los Angeles station.
James Powers, corporate training and development.
Jim Ravanas, team leader, Boston station.
Nora Reed, team leader, Los Angeles station.
Joe Rhodes, ramp shift manager, Los Angeles station.
Ralph Richardi, former station manager, Dallas/Fort Worth station, former vice president of western division.
Gary Ritenhour, team leader, Boston station.
John Russell, managing director of employee relations.
Mark Russell, customer service agent, Los Angeles station.
Kathy Sheu, managing director of customer services.
Steve Swofford, former flight attendant base manager, Boston station.
Warren Stack, operations coordinator, Los Angeles station.
Willie Ward, cabin service crew chief, Los Angeles station.
Diane Welton, customer service agent, Boston station.
Todd Westbrook, team leader, Boston station.
Rob Zurlo, station manager, Los Angeles station.
Chuck, scheduling ramp crew chief, Boston station.
Danny, scheduling ramp crew chief, Boston station.
Donna Marie, customer service agent, Boston station.
Andy, team leader, Boston station.
Rick, customer service agent, Boston station.
Mary, team leader, Los Angeles station.
Frank, team leader, Los Angeles station.
Fred, operations coordinator, Los Angeles station.
Glen, operations coordinator, Los Angeles station.

**America West**

Tony Grantham, Station Manager, Boston.

**Continental Airlines**

Carol Albert, customer service supervisor, Management Interest Group representative, Boston station.

Robert Allen, former vice president of employee relations.

Paul Arthur, ramp supervisor, Boston station.

Earl Barnes, operations coordinator, Boston station.

Gordon Bethune, president.

Fred Brian, maintenance lead, Boston station.

Dick Cardell, chief pilot, Cleveland station.

Tom Dag, safety coordinator, Cleveland station.

Tom Dahlhausen, customer service duty manager, Cleveland station.

Trisha Day, operations coordinator, Boston station.

Ed Dolphin, ramp manager, Cleveland station.

Chris DiFranza, operations coordinator, Boston station.

Jim Ferenczy, customer service supervisor, Cleveland station.

Jim Foster, customer service supervisor, Cleveland station.

Mike Fox, operations coordinator, Cleveland station.
Bill Frazier, operations duty manager, former manager of airport operations, Cleveland station.

Richie Fredurra, ramp supervisor, Boston station.

Steve Giblan, ramp supervisor, Boston station.

Gordon Gregory, financial planner, Cleveland station.

Dominick Harper, ramp supervisor, Boston station.

Dave Hovan, customer service supervisor, Cleveland station.

Brian Hughes, customer service agent, Employee Interest Group representative, Boston station.

Steve Jaquith, customer service manager, Cleveland station.

Al Jubert, customer service coordinator, Boston station.

Kathleen LaCrosse, manager of airport operations, Cleveland station.

Bill MacLeod, customer service training coordinator, Boston station.

Danny Marowski, maintenance representative in operations center, Cleveland station.

Steve Marvin, assistant director of ramp, Cleveland station.

Darcy Mean, customer service supervisor, Boston station.

Hillary Paul, customer service supervisor, Boston station.

Tony Portugal, ramp supervisor, Boston station.

Tom Redman, pilot, Boston station.

Ellen Rondeau, customer service coordinator, Boston station.

Jim Russell, customer service supervisor, Boston station.

Robert Sallaz, station manager, Chicago station.
Charles Scully, station manager, Cleveland station.  
Dale Sims, ramp lead, Cleveland station.  
Mike Snow, operations duty manager, Cleveland station.  
Steve Stevens, customer service director, Cleveland station.  
Debra Thomas, flight attendant base manager, Cleveland station.  
Peter Walsh, ramp manager, Boston station.  
Bob Watson, customer service supervisor, Boston station.  
Cheryl Weeks, vice president of employee relations.  
Curt Whitney, maintenance manager, Cleveland station.  
Jeff Willis, station manager, Boston station.  
Anthony, customer service agent, Cleveland station.  
Marcie, customer service agent, Cleveland station.  
Jeff, customer service director, Cleveland station.  
Teresa, customer service supervisor, Cleveland station.  
Ann, assistant director of customer service, Cleveland station.  
Rita, customer service agent, Cleveland station.  
Craig, load coordinator, Cleveland station.  
Delores, secretary to station manager, Cleveland station.  
Craig Lawler, ramp agent, member of Corporate Policies and Procedures committee, Boston station.  
Kevin Gassert, customer service agent, Boston station.  
Jose Vieira, former customer service supervisor, Boston station.  
Maria Higgins, customer service agent, Boston station.
Brian Wolfe, customer service director,

**Delta Airlines**

Jim Dunkenbirger, station manager, Boston station.

**Northwest Airlines**

Ed Archer, station manager, Boston station.

**Southwest Airlines**

Ed Acoba, ramp agent, Los Angeles station.

Reese Alexander, flight attendant base manager, Chicago station.

Colleen Barrett, executive vice president of customers.

Bob Benson, pilot, Los Angeles station.

Demir Berrick, ramp agent, Los Angeles station.

Jessie Bines, ramp supervisor, Chicago station.

Ginnie Bona, customer service manager, Chicago station.

Dennis Carvill, manager of ramp and operations, Los Angeles station.

Stan Cielak, station manager, Los Angeles station.

Greg Crum, chief pilot, Dallas station.

Matt Domerofski, customer service manager, Dallas station.

Audy Donelson, station manager, Dallas station.

Willie Edwards, manager of ramp and operations, Phoenix station.

Russ Funk, customer service manager, Phoenix station.

Mike Gallagher, ramp and operations supervisor, Dallas station.

Rob Gilliam, pilot, Los Angeles station.
Bob Giovannoni, customer service supervisor, Dallas station.

Cathy Hooper, customer service supervisor, Los Angeles station.

Tom Hodner, ramp supervisor, Chicago station.

Jacob Israel, customer service agent, Los Angeles station.

Tammy Johnson, operations supervisor, Dallas station.

Cindy Kimbrell, director of budget and planning, ground operations.

Ruth Landau, chief council for labor relations, department of people.

Jerry Lemon, operations supervisor, Chicago station.

Gary Lopez, flight attendant base manager, Dallas station.

Rollie Lyson, station manager, Phoenix station.

Boat Mapu, assistant manager of ramp and operations, Los Angeles station.

Brad McElroy, operations supervisor, Los Angeles station.

Danny McMann, ramp supervisor, Chicago station.

Marcie Means, customer service agent, Phoenix station.

Dale Mundy, maintenance manager, Dallas station.

Gigi Ramsey, customer service agent, Dallas station.

Dave Rowand, pilot, Los Angeles station.

Mark Rowen, operations supervisor, Los Angeles station.

Bob Rushlow, operations agent, Chicago station.

Rose Russell, customer service training coordinator, Los Angeles station.

Mike Sand, manager of ramp and operations, Dallas station.
Libby Sartane, vice president of people.
Burt Seither, pilot.
Amy Shipley, customer service manager, Dallas station.
John Ski, operations supervisor, Chicago station.
Brook Smith, operations agent, Phoenix station.
James Story, manager of ramp and operations, Chicago station.
Gary Soloff, operations agent, Dallas station.
Christie Tangedall, customer service supervisor, Los Angeles station.
Karen Tangen, flight operations coordinator, Phoenix station.
Jonathon Tree, chief pilot, Phoenix station.
Chris Wahlenmaier, station manager, Chicago station.
Wylie Williams, flight attendant base manager, Phoenix station.
Jim Wimberly, vice president of ground operations.
Richard Woodley, operations agent, Los Angeles station.
Todd, operations agent, Chicago station.
Lori, customer service supervisor, Chicago station.
Joni, customer service supervisor, Chicago station.
Melissa, customer service supervisor, Chicago station.
Sandy, customer service supervisor, Chicago station.
Johnny, operations supervisor, Los Angeles station.
Edward, district marketing manager, Los Angeles.
Reggie, operations agent, Los Angeles station.
Richie, operations agent, Los Angeles station.
Carey, operations agent, Los Angeles station.
Lou, operations agent, Los Angeles station.
Yvonne, operations agent, Los Angeles station.
Lydia, operations agent, Los Angeles station.
Byron, operations supervisor, Los Angeles station.
Jody, ramp agent, Chicago station.
flight attendant supervisor, Chicago station.
Todd, operations agent, Chicago station.

**Trans World Airlines**
Gordon Humphries, station manager, Boston station.

**United Airlines**
Jeff Arnold, bagroom supervisor, Los Angeles station.
Andy Avila, operations agent, Shuttle, Los Angeles station.
Tony Barati, manager of administration, Boston station.
Bob Barnes, manager of maintenance, Boston station.
Suzy Brentzel, customer service agent, Boston station.
Bill Burns, director of Shuttle development.
Susan Cato, customer service director, Shuttle, Los Angeles station.
Ed Clevenger, station manager, Los Angeles station.
Ann Collins, customer service supervisor, Boston station.
Chet Cooper, customer service supervisor, Boston station.
Mark Corvis, team advisor, Shuttle, Los Angeles station.
Jim Dennison, operations manager, Los Angeles station.
Mary Disick, former operations agent, Boston station.
Shawn Donohue, station manager, Boston station.
John Donahue, ramp lead, Boston station.
Jean Durina, operations agent, Boston station.
Carleen Eddy, ramp supervisor, Boston station.
Alan Edgerton, customer service director, Boston station.
Laurie Faulkner, team advisor, Shuttle, Los Angeles station.
Pete Forsman, ramp lead, Shuttle, Los Angeles station.
John Herron, operations agent, Shuttle, Los Angeles station.
John Holman, ramp supervisor, Boston station.
John Hussy, ramp lead, Boston station.
Bob Jeffries, ramp and operations manager, Boston station.
James Hardigan, vice president of cargo; former vice president of ground handling, West Coast region.
Ron Hefnider, ramp lead, Los Angeles station.
Francis Henneken, customer service operating manager, Los Angeles station.
Mike Kane, bagroom lead, Boston station.
Jim Kyte, ramp manager, Los Angeles station.
Howard Lackey, manager of administration, Los Angeles station.
David Lampner, operations agent, Shuttle, Los Angeles station.
Sue Laport, customer service director, Boston station.
Cheryl MacIntyre, former operations agent, Boston station.
Oracio Marquez, customer service supervisor, Los Angeles station.
Patty Mix, customer service agent, Boston station.

Javier Moreno, ramp agent, Shuttle, Los Angeles station.

Linda Nobles, customer service supervisor, Boston station.

Pat Nelson, customer service director, Boston station.

Marty Padilla, ramp supervisor, Los Angeles station.

Jack Paluska, ramp supervisor, Los Angeles station.

Byron Perry, customer service manager, Los Angeles station.

Doreen Roberts, customer service director, Los Angeles station.

Reanne Rodriguez, former team advisor, Shuttle, Los Angeles station.

Lionel Rodriguez, customer service supervisor, Los Angeles station.

Bill Spruce, ramp supervisor, Boston station.

Jill Scheffield, team coordinator, Shuttle, Los Angeles station.

Jeffrey Scott, customer service director, Shuttle, Los Angeles station.

Michael Simonelli, customer service director, Boston station.

Tom Smith, ramp lead, Los Angeles station.

Dane Sparrow, customer service agent, Boston station.

James Squiller, ramp lead, Los Angeles station.

Lucinda Suga, customer service agent, Boston station.

Mertie Venable, customer service supervisor, Boston station.

Steve Wolfe, customer service director, Boston station.
USAir

Gil Shuckman, station manager, Boston station.
Table 4.18: Rank Correlations Between Supervisory and Managerial Ratios

<table>
<thead>
<tr>
<th>Supervisory Ratio (Supervisors/Frontline)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managers/Supervisor</td>
</tr>
<tr>
<td>Managers/Frontline</td>
</tr>
</tbody>
</table>

Obs 9

+ Significant at p<.100
* Significant at p< .050
**Significant at p< .010

Spearman's rank correlation coefficients are used here. Note that a negative sign on time or staffing signifies a decrease in time or staffing used, and therefore an efficiency gain. A negative sign on complaints, late arrivals or lost bags signifies a decrease in those problems, and therefore an improvement in quality. In parentheses is the probability that the two variables are independent.

Supervisory Ratio = Supervisors per 100 frontline employees.
Managers/Frontline = Managers (above supervisory level) per 100 frontline employees.
Managers/Supervisor = Managers (above supervisory level) per supervisor.