RAND Research in Support of Organizational Innovation

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PREFACE

This document is part of an on-going effort to build a RAND-wide approach to research in areas related to organizational innovation, organizational restructuring, and organizational performance. The first product of this effort was a one-day internal conference in January 1997 on the subject of "Supporting Organizational Innovation." The internal conference was organized around four substantive panels, covering topics related to implementing process improvement, supporting team-based work, redesigning organizational structures, and managing organizational change. The conference included nine presenters and eight discussants, who were fairly evenly drawn from five of RAND's nine research units. Participating research units included Project Air Force, the Arroyo Center, the National Defense Research Institute, Health Sciences, and the Institute on Education and Training. These research units along with the Research Staff Management Department provided funding to support the conference.

The conference organizers have put together this document as a next step in building a cross-unit research agenda. Rather than simply report the proceedings of the conference, the document surveys the broad base of current RAND research on organizational innovation and organizational performance that underlay the conference presentations and discussions. The authors of the document conducted a wide-ranging search of RAND's Robin database and had a number of informal conversations with other RAND researchers in an attempt to identify recent and on-going research related to the topics covered at the conference. The research has been organized in this document into four major categories, which together are somewhat broader than those covered by the conference panels. These categories are strategic planning,
organizational redesign, operational performance improvement, and change management and organizational learning.

In creating the document, we hoped to serve several purposes. A first goal was to encourage greater integration of on-going RAND research on organizational innovation. We have done this by contextualizing the RAND research in a broader framework of literature on public and private sector management. We have also organized the RAND work thematically, discussing research agendas found in different business units together. A second goal of the document was to facilitate cooperation and exchange across research units by creating an accessible reference to a number of well-developed research agendas. As more research units and research programs begin doing research on organizational innovation, the references should make it easier for researchers to identify related on-going research and key researchers. The final goal of the document was to take a first cut at organizing projects related to organizational innovation in “product lines” of research that can be marketed to RAND clients and potential clients. Clearly identifying products and thinking through their transferability from one business unit setting to another should help with the process of new business development.

Before turning to the substance of the document itself, several caveats and clarifications are in order. The first is that we have not attempted to discuss all RAND projects, documents, or briefings related to organizational innovation or restructuring. Rather, we have focused on major on-going research agendas and highlighted the documents that clearly illustrate their goals and findings. In general, we have drawn only on RAND projects conducted in the last three years. Second, in reporting on RAND research, our goal has been to be expository and descriptive, not evaluative. We have tried to explain how different research agendas contribute tools, techniques, or understanding to the broader
body of knowledge at RAND on organizational innovation. Finally, we have extended ourselves to cover a large body of internal and external literature, and we do not pretend that our attempts to organize and categorize this work is the last word on the subject. Our intent in summarizing and characterizing this large body of work was to create a starting point for an on-going dialogue.
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The numerous presenters, discussants, and participants at the January 14th internal conference provided us ample food for thought in how to structure this document and on-going work on organizational innovation. Tora Bikson, Sue Bodilly, Jim Dewar, Susan Gates, Jon Grossman, Lisa Meredith, Nancy Moore, Louise Parker, and Marc Robbins all made thoughtful and stimulating presentations. Beth Benjamin, Tora Bikson, John Folkeson, Ken Girardini, Doug McIver, Brian Mittman, Lisa Rubenstein, and Michael Shanley provided valuable feedback and commentary in their roles as discussants. Carl Builder’s penetrating discussion of emerging organizational forms was as thought-provoking as it was broad-ranging.

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1. INTRODUCTION

Trailing the commercial sector by at least a decade, the public and nonprofit sectors have entered a dramatic period of innovation and restructuring. There is growing pressure on government organizations at all levels to reduce resource expenditures while simultaneously providing more flexible and innovative solutions to policy problems. Pressure for dramatic changes comes from three convergent trends. The first is a reduction in the fiscal resources available to provide public services. Resistance to tax increases along with pressures to produce balanced budgets has forced government organizations of all types into an increasingly resource-constrained environment.

The second trend is the increase in citizen expectations of their public sector service providers. As consumers of private sector services, most citizens have become used to a higher levels of individual attention, customization, and responsiveness than is typical of the public sector. And though not willing to countenance a tax increase, they now increasingly expect their government and nonprofit agencies to provide service at a similar level of quality.

A third convergent trend is the growing sophistication of information and systems technology. Technologies that allow for more effective data management, internal communication, and delivery of services open the possibility of dramatically rethinking traditional patterns for organizing government agencies.

This need to achieve more responsive, flexible, and cost-effective service delivery has created a growing market for consulting and technical assistance services to government and nonprofit agencies in areas related to restructuring, performance, and innovation. According to a recent Economist survey of this market, nine percent of the revenue earned by
the 40 largest management consulting firms now comes from
government clients, and another nine percent from the health
care delivery industry (March 22, 1997). RAND is one of a
number of players that has begun to enter the market segment.
Significant national players include the Alliance for
Restructuring Government,¹ the management consulting firms
KPMG Peat Marwick, Arthur Andersen, Deloitte and Touche,² and
the Innovations Group.³

Mirroring the changes in public sector priorities,
research on topics related to organizational innovation and
restructuring is rapidly becoming a mainstay of RAND research
and analysis. There are on-going programs with research of
this type in at least five of RAND's nine research units,
including Project Air Force, the National Defense Research
Division, the Arroyo Center, the Institute on Education and
Training, and the Health Sciences Program. Research on
organizational performance and organizational restructuring
is being conducted for a broad range of clients. These
clients include agencies within the Department of Defense and
commands within the Air Force, Army, and Marine Corps,
universities and school districts throughout the country,
California-based health care providers, local government

¹The Alliance is a Washington, D.C.-based research organization
associated with the National Academy of Public Administration. It was
founded in 1993. David Osborne, author with Ted Gaebler of Reinventing
Government, is the Alliance Chair.
²Among big six consulting firms, KMPG is the acknowledged leader in
the area of public sector consulting, boasting 1,200 public sector
clients. Arthur Andersen and Deloitte and Touche also have sizable
public sector consulting practices.
³Innovations Group, a nonprofit firm based in Tampa, Florida, works
to transform city and county governments by publishing reports, offering
technical assistance, and hosting workshops. The Innovations Group
Conference on "Transforming Local Government" is considered by many to
be the premier conference on restructuring of city and county
governments. The conference was put on for the second time in 1996,
with representatives of several hundred local government organizations
attending.
agencies in California, agencies within the United Nations, and transit maintenance organizations in several states.

Despite the growing importance of project research in this area, RAND has yet to develop a common or integrated approach for entering this market segment. There is at present little interaction across business units to share ideas, concepts, and analytical tools. There are no mechanisms to support sharing of manpower across research units or for identifying and recruiting individuals with the necessary skill set into the organization. Finally, there is not as yet a common approach to marketing RAND’s expertise in this area.

This document is one element of an on-going effort to create a RAND-wide approach to research on organizational innovation and organizational performance. The goal of this document is to outline the various research projects and programs that demonstrate and contribute to RAND’s expertise in the area of organizational innovation. Rather than highlighting single projects or reports, the document concentrates on identifying robust research programs in the different business units at RAND. Descriptions of these research programs are organized in four categories. These categories include studies on strategic planning, on redesigning organizational structures, on operational performance improvement, and on organizational change.

- Under strategic planning we included all those research agendas that involve helping client organizations improve decisionmaking about organizational goals and priorities. Strategic planning, as we understand it, is the process by which an organization decides upon its core mission and core directions for the future.
- Under organizational redesign we include those research agendas that involve research on changing
organizational structures. Research agendas falling into this category are most concerned with developing strategies to more effectively source key resources and inputs, to consolidate functions and departments, and for balancing centralized and decentralized decisionmaking.

- With respect to operational performance improvement, we include all those research agendas focused on improving the efficiency, responsiveness, and quality of operational activities. Many of these projects revolve around efforts to raise operational performance through process improvement and process redesign. Other research on operational performance centers on more effective resource management through the use of performance measurement systems, information technology, and high-performance human resource management techniques.

- Finally, under organizational change we include those research agendas related to implementing innovations and restructuring. This research is focused on how to change behaviors, routines, and culture within an organization to facilitate the introduction of innovations.

Sections 2-5 of this report discuss RAND research in the order outlined above. The ordering of the sections reflects the logical stages of organizational innovation. Section 2 is on strategic planning at the level of an entire organization. The goal of strategic planning is to develop a clear organizational mission and a clear set of organizational goals to help align the activities of all units and functions within an organization. Strategic planning is the first step in effective restructuring.

Once the organizational mission has been clearly defined, the next set of decisions relates to developing an
organizational structure that helps realize that mission. The focus of these decisions is at the level of the corporate offices, support functions, and line business units. In making decisions about organizational structure, senior leaders must decide which functions and resource inputs will remain in-house and which will be purchased externally. They also must decide how to most effectively structure the relationship between the various units and functions involved in producing the organization's key outputs.

Having settled on an organizational structure, the next set of decisions relates to managing operational activities. These decisions focus on improving ongoing operational activities within line units and support. Having established a structure of relationships between functions and line units, an organization needs to develop techniques for resource management within line units that allow for high levels of operational performance.

A final set of decisions relates to creating a change management strategy for introducing new innovations. For any new innovation—whether it focuses on a new strategy planning technique, a plan for organizational redesign, a new approach to resource management, a new technology to improve productivity, etc., there needs to be an accompanying change management strategy to ensure successful implementation.

In practice, organizational innovation never unfolds as logically as it is described here. In most changing organizations, innovation is going on at a number of different levels. RAND research on reforming military logistics, for instance, is simultaneously addressing organizational structure, process design, and a variety of resource management issues. Similarly, researchers involved in working on total quality management in health care organizations have been involved in strategic planning exercises, process improvement, and evaluating change management strategies. We choose, however, to cover
strategic planning, organizational redesign, operational performance improvement, and change management in different sections to allow for a detailed discussion and careful exposition of techniques and strategies in each area. As we move through the document we have tried to highlight connections between the different levels of innovation.

In each of the four substantive sections we draw on the general management literature to build a framework for understanding issues related to strategic planning, organizational redesign, operational performance improvement, and change management. We then try to show how RAND research fits within and contributes to the context of this general management literature. The final section of the report turns to considerations of building a RAND-wide research agenda in the area of organizational innovation. In this section, we address issues related to building RAND's capabilities and marketing RAND's expertise for work on organizational innovation.
2. STRATEGIC PLANNING

Strategic planning is the process by which an organization creates an overall vision for its future by articulating core missions and key goals and by developing a plan to meet these goals. The focus of strategic planning is at the level of an entire organization. The goal of planning is to create a set of organizational priorities that brings the efforts of all functions and units in an organization into alignment. Strategic planning has a long history in both the public and private sector as a tool used by senior leaders to raise organizational performance. Strategic planning arrived on the corporate scene in the mid-1960s and has a history in military organizations stretching back to the early post-World War II period. In recent years, strategic planning has taken on an increased importance for public and private sector organizations alike. The accelerated pace of economic competition in the private sector and the financial constraints faced by public organizations are forcing senior leaders in both sectors to improve the focus and the internal alignment of their organizations. Competition and financial constraints are raising the demands on organizations to use all resources as efficiently as possible.

The literature on strategic planning suggests that successful strategic planning can raise organizational performance in three ways.

- **Strategic Thinking.** The first is to provide senior leaders with an opportunity to develop a clear vision about organizations goals, missions, and sources of competitive advantage. A clear organizational vision supports improved focus and a more efficient allocation of resources. It helps
organization leaders prioritize competing activities and resource demands.

- **Building Organizational Support for Planning.** The second important role for strategic planning is to solicit input and build commitment across an organization in support of a strategic vision. Strategic planning provides an opportunity for senior leadership to improve its understanding of an organization's strengths and capabilities by soliciting input from all functions and operational units.

- **Operationalizing a Strategic Vision.** Finally, strategic planning provides an opportunity to develop an operational plan to ensure that strategic goals and missions are realized. The planning process itself should be used to create an operational plan that links broad strategic goals down to activities and patterns of resource use within operational units.

Our survey of RAND research on strategic planning is set within this three-part framework.

**STRATEGIC THINKING**

According to strategic planning gurus Henry Mintzberg and Kenneth Andrews, the main goal of strategic planning process is to get senior leaders to engage in a creative process of discovery.\(^1\) Strategic planning should lead to the articulation of and justification future organizational directions. Too often, suggests Mintzberg, strategic planning becomes strategic programming--the articulation of

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\(^1\)Kenneth Andrews was a seminal figure in a first wave of strategic planning theory from the 1960s; Henry Mintzberg has been one of the key figures in the second wave of strategic planning theory, which started in the 1980s.
strategies or visions that already exist through the development of an elaborate plan rather than the development of a new and robust vision (Mintzberg, 1994: 107). Mintzberg calls this creative phase of planning strategic thinking; Andrews calls it strategy formulation. This phase of the strategic planning process involves deciding what to do rather than deciding how to do it (Andrews, 1980: 44).

The main goal of strategic thinking is to consider tradeoffs and make a choice about the organization's strategic direction. Prioritization of alternative strategic goals and missions is essential to strategic planning. Prioritization involves making choices and purposeful limitations on the type of products, services, and activities pursued by an organization (Porter, 1996; Shires, 1994). For private sector organizations, prioritization is a key element of generating sustainable competitive advantage. Choosing a core set of activities on which to focus a company's energies is the most important step in selecting a line of products that will allow the company to maximize revenues (Hamel and Prahalad, 1994).

Xerox's decision in the early 1990s to transform itself from a producer of copiers into the world's leading "document processing company" offers an example of a company using a guiding organizational vision to focus its activities. Xerox had spent almost the entire 1980s perfecting its approach to total quality management for its very stable set of copier products. Despite the dramatic operational gains that had been realized over the course of the decade, strategic studies suggested that the company was not prepared for the evolving changes in the market for office equipment. The PC revolution and, in particular, the shift to use of color computing and printing technologies had change the expectations of capabilities of copiers and other office equipment and were leading to a decline of Xerox's traditional product market. Xerox's senior
management responded to these market trends by re-orienting the company around a set of new products and new technologies that would allow it to generate a sustainable competitive advantage in the emerging market for office equipment.

In public sector and nonprofit sector organizations, the goal of planning and prioritization is not to increase revenue streams: The profit motive is generally absent in public and nonprofit organizations. Rather, the goal of planning is to help public sector organizations generate a specific and concrete organizational vision that can prioritize and guide resource expenditures (Shires, 1994: 17; Blackerby, 1994). As public sector resources become more scarce, the demand is increasing for public and nonprofit agencies to more clearly focus their activities.

Creative planning phases akin to strategic thinking are being used increasingly by a wide range of public and nonprofit organizations. Many city and state governments have begun to use strategic planning exercises as a tool to give coherence and clearly delimit their plans for economic and community development. Universities are similarly using strategic planning exercises to develop a clearer sense of organizational mission and to develop marketing strategies for an increasingly competitive market for college students. At the federal government level, a commitment to using strategic planning as a tool to develop concrete organizational missions has been institutionalized with the passage of the Government Performance and Results Act in 1993.

In both the public and private sector, strategic thinking involves the application of formal analysis and hard data to the consideration of a range of possible alternative futures. Strategic thinking involves both an internal organizational assessment and an external environmental scan (Andrews, 1980; Ziegenfuss, 1989). The
internal organizational assessment is used to identify distinctive competencies, strengths and weaknesses, as well as programs that can increase capabilities. The environmental scan is used to identify opportunities and risks through an assessment of economic, technological, and political trends. The environmental scan can also be used to assess the capabilities of other organizations that are providing similar products or services. It is the integration of the internal organizational assessment and the environmental scan that leads to a set of alternatives and helps encourage the establishment of an organizational vision and associated set of priorities.

AT&T's shift toward a competitive strategy based on "one-stop shopping" for telecommunications services is a clear example of a strategic posture that emerged from both an assessment of internal capabilities and an external environmental scan. In a product segment dominated by niche competitors focusing on a single type of production, e.g., long-distance, cellular, network access, AT&T is unique in providing a broad range of telecommunications and networks services. This unique set of capabilities became a compelling basis for AT&T's new strategy when it was combined with market research showing a strong demand among consumers for "one-stop" telecommunications shopping.

As county welfare agencies in California and other states move to embrace the new welfare legislation, they are being forced to go through a similar process of refining their organizational missions. External assessments of demand for different types of welfare services are being used to focus limited resources on the most pressing welfare problems facing county governments. An internal assessment of strengths and weaknesses is being used to support decisions on what types of services should be provided in-house and which type of services can be outsourced.
RAND analysts have recently developed two types of methodologies that help organizations engage in strategic thinking. The first is a strategic planning methodology called assumption-based planning (ABP). The ABP method involves identifying and challenging important assumptions underlying an organization’s operations or plans. Identifying and challenging key assumptions forces organizational decisionmakers to address the adequacy of the fit between external environmental demands and internal competencies. By focusing on how assumptions internal to an organization map onto the external environment, ABP helps organizations develop new strategies to meet emerging environmental conditions. The methodology has been applied by RAND analysts to both the Army’s general long-range planning process (Dewar et al., 1993) and to the specific case of Force XXI, the army’s guiding strategic concept for 21st century (Dewar et al., 1996).

Exploratory modeling and adaptive planning is a second methodology developed at RAND to help military and non-military organizations with strategic planning activities. Exploratory modeling explicitly acknowledges the dynamism of the emerging organizational environment. The underlying premise is that this dynamism makes it impossible to create a fixed plan for an organization’s future. Organizations need to be remain flexible to a variety of future contingencies by designing an adaptive planning mechanism. Rather than creating a single plan, an organization needs a “playbook” of options that will allow it to respond adaptively to multiple contingencies. Each option is based on the intersection of a different set of environmental demands and internal organizational capabilities.

The adaptive planning methodology is made possible by harnessing hardware and software technologies that allow a huge number of computational experiments to be executed and understood. The use of networks and computer technologies
allows large numbers of experiments to be run at the same time, making it possible to examine thousands to millions of cases in a manageable period of time. RAND analysts have applied the ideas and techniques associated with exploratory modeling to a variety of policy contexts and problems. These include the Department of Defense’s planning for investments in science and technology (Bonomo, 1997), the Air Force contingency planning (Bankes, 1996), environmental policy planning (Lempert et al., 1996), and strategic planning for California’s higher education system (Lempert and Park, 1996).

Though not developed at RAND, a third methodology that has been used by RAND researchers to help organizations engage in strategic thinking is an expert panel method for developing organizational goals and priorities. RAND researchers working in the health program have recently used an expert panel process to help health care providers improve the link between quality improvement and strategic planning. The three-step expert panel process leads top management and quality council members through a series of analytical steps designed to explore and rank the importance of quality improvement initiatives. The expert panel process provides members of an institution’s quality council a structured process to arrive at a consensus on the most pressing quality improvement initiatives (Rubenstein et al., 1995). It allows an organization’s leadership to draw on existing data, expertise, and institutional priorities to define a narrower set of high-priority “products and processes” that will enable an institution to move toward an anticipated future consistent with its clients’ needs.

ORGANIZATIONAL SUPPORTS FOR PLANNING

While the ultimate goal of strategic planning is to arrive at a vision and set of priorities, the process by which an organization arrives at its strategic vision is an
important determinant of the ultimate success of a strategic plan. The literature on planning suggests that planning processes that encourage broad organizational participation and input are superior to those that draw on a relatively narrow group of senior leaders (Prahalad and Hamel, 1994; Pombrum, 1994; Blackerby, 1994). Broad participation is important for two reasons.

First, much of the information senior leaders need to engage in strategic planning percolates up from subunits within an organization. Developing an effective vision for an organization’s future depends on having mechanisms to solicit and assimilate information from operational units (Pombrum, 1994). It is the operational units that are closest to changing customers, markets, and environmental demands and will have the clearest ideas about new product and concept development.

Chrysler’s shift to integrated “platform” teams for developing and manufacturing cars is a dramatic example of the role information flows from units can have in shaping strategic directions. Platform teams were at the center of Chrysler’s attempt to remake its market strategy. By developing autonomous professionals that combined representatives of all functional departments responsible for bringing a new car to market—e.g., design, engineering, finance, marketing, sales, etc.—Chrysler was able to dramatically reduce production costs and product development times. The shift to platform teams allowed Chrysler to take a leading strategic position among value-conscious consumers.

Despite its strategic importance, the platform team concept was not developed centrally by senior leadership. Rather, it came about somewhat serendipitously following Chrysler’s acquisition of AMC in 1988. The platform team concept had been in use in rudimentary form at AMC for years. Rather than disband and reassign the core of AMC
engineers into Chrysler's existing organizational structure, this group was put to work to design and manufacture the Grand Cherokee. The demonstrated success of this effort encouraged senior management to take a platform team concept corporate-wide.

A second reason for the importance of soliciting broad input into strategic planning processes is the role it plays in helping to build a consensus around an organizational vision (Blackerby, 1994). Broad inclusion in the process of planning encourages buy-in around a new set of values and activities. Senior leadership can wield the consensus that emerges from this process as a way of forcing organizational change and prioritization. The process of consensus-building is particularly important in public sector organizations. The large number of diverse stakeholders with demands on the public sector organization makes it easy for planning processes to degenerate into acrimony and partisanship.

The shift to participatory planning efforts by city governments throughout the United States illustrates the importance of building organizational consensus. In developing policy, city governments face cross-cutting political pressures from a broad range of stakeholders. These include developers, small businesses, residents and home owner associations, unions and employee representatives, and a variety of community groups. Having spent years arbitrating between different interest groups pursuing different economic and development objectives, many city governments have turned to participatory planning to depoliticize strategic planning. Participation forces groups with divergent political interests to become participants rather than obstructionists and encourages buy-

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2These ideas are taken from Blackerby (1994) and from Michael Shires (private communication).
in to a common vision for a city’s economic and social development (Keltner et al., 1996).

There is a strong tradition at RAND of research focused on helping military organizations develop organizational supports for strategic planning. Multiple project teams have concluded that RAND’s military clients need to improve their organizational capacity for planning and new concept development. Project teams working for the Air Force have concluded that it lacks a strong centralized integration function that allows inputs from the major Air Force commands to be integrated into a “corporate-wide” vision and set of alternatives (Lewis, 1996; Thaler and Shlapak, 1995). Project teams working for the Department of Defense have similarly found that individual departments within the DoD and the DoD more generally would benefit from having an improved capacity for formulating new concepts (Bracken et al., 1996; Kent and Thaler, 1993).

Recommendations for improving planning and new concept development have focused on three types of interventions. The first is a clearer articulation by those within an organization with responsibilities for new concept development. Analysts working on military planning have concluded that ambiguity about which part of an organization is supposed to take the lead in collecting data and developing alternatives to current operations can undermine the planning processes. In the absence of coordination of new concept development, organizational subunits—in this case major commands—focus on short-term material and programmatic planning, making it more to difficult develop a vision and long-range plans.

RAND researchers working for the Air Force identify and discuss three approaches for coordinating new concept development (Lewis, 1996). The three approaches are the centralized model, the structured participatory model, and the decentralized model. The models differ in the extent to
which they envision Air Force staff (centralized) or the Major Commands (decentralized) take the lead in collecting data and planning alternatives. Rather than taking a clear stand on centralized vs. decentralized planning, this research discusses and weighs the advantages and disadvantages of each approach. Other RAND research has come out more clearly in favor a decentralized planning. In work on planning for the Department of Defense, one RAND team concluded that it is the military departments as opposed to central DoD staff that should be primarily responsible for new concept development. (Kent and Thaler, 1993).

In addition to a clearer articulation of responsibilities for data collection and new concept development, a second recommendation made by several RAND researchers for improving planning is to increase the use of cross-functional planning teams. Bracken et al. (1996) suggest that overlaying a set of formal and informal teams on the existing organizational structure in the Acquisition and Technology (A&T) function within the Department of Defense would help the new concept development process by enhancing information flows. Kent and Thaler (1993) argue that the convening of cross-functional teams of operators, development planners, technologists, intelligence personnel, cost analysts, and acquisition personnel would help the planning process by improving the match between mission needs, technological opportunities, and alternative operational concepts.

A third recommended intervention designed to improve the process of new concept development is the increased use of information technology in supporting the sharing of ideas. Bonomo (1997) points out that successful planning for the DoD’s science and technology investment involves a large number of meetings and iterated communication over a long time period between a diverse set of groups. These
groups include military decisionmakers, military users, industrial groups, and academics. More effective use of information technology in the planning process would have multiple benefits for all parties involved. New electronic and asynchonic methods of communication can allow disparate groups to communicate their ideas, to discuss issues, and eventually to create a common understanding of an issue. Greater use of electronic methods of communication means that many military users would no longer need to travel to attend planning meetings. It would also allow more academics and industrial representatives to take part. The involvement of larger communities of affected individuals would not only enhance the flow of valuable information but also would enhance acceptance of the final plan.

While Bonomo (1997) touches on the importance of participation to promote acceptance of a final plan, other RAND work has addressed this issue more directly. Research on strategic planning in both city governments and universities has suggested that participatory planning is a key element of the overall success of planning exercises (Keltner et al., 1996; Shires, 1994). The heterogeneity of groups that are both clients and members of both types of institutions suggests that to be effective and gain buy-in, the planning process must be very inclusive and participatory. High levels of participation are considered to be particularly important at the early stage of developing and weighing new organizational visions.

**OPERATIONALIZING A STRATEGIC VISION**

The final element of strategic planning is the need to create an operational plan that links program development, short-term organizational goals, and specific tasks to the achievement of strategic goals. This is the phase of strategic planning that Mintzberg refers to as strategic programming. Whereas strategic thinking is open-ended and
creative, strategic programming is concrete and detail-oriented. Once the phase of strategic thinking has been completed and translated into a strategic plan, an organization needs a mechanism to allocate resources to those tasks that must be realized to accomplish the strategic goals.

The operational plan involves an articulation of the programs and tasks that will be used to realize strategic goals. Particular attention needs to be given to program development in areas where the organization falls short of realizing its strategic vision and goals. Developing and implementing programs to realize strategic objectives depends on successful completion of four actions (Shires, 1994: 38): (1) identification of specific program objectives, (2) development of a method for assessing on-going progress and effectiveness, (3) assignment of a program to a specific manager for accountability, (4) and quantification of the budgetary resources to be committed to the program. Failure to complete any of these actions could interfere with program implementation and in turn affect the viability of the organization's strategy.

In the area of operational planning, RAND analysts have developed and used in multiple research engagements a tool called the Strategy-to-Tasks Resource Management framework. The strength of the analysis in supplementing other RAND research on strategic planning is to provide a framework for linking high-level strategic goals to on-going program and resource allocation. The Strategy-to-Tasks framework creates a method for more systematically determining military resource needs by clearly linking national strategic objectives to specific operational tasks pursued by military commands. The process of establishing links is

3 The resource management framework builds upon earlier RAND work on a Strategy-to-Tasks framework developed for the Air Force in the late 1980s to help with planning decisions taken as part of the Defense’s
operationalized by taking steps through a descending hierarchy of strategies and resource needs.

The hierarchy begins with National Security Strategy and descends through National Military Objectives as formulated by the Secretary of Defense and Joint Staff. It continues with operational objectives that define how forces will be used to support national military objectives and ends with operational tasks, formulated by the commander of a specific command, that outline specific actions that must be taken to accomplish an operational objective. Each operational task, moreover, is defined by an operational concept that weaves together the various systems, organizations, and tactics needed to accomplish that task.

The final step is to examine and weigh alternative programs that help accomplish a command's objectives. Resource management staff at the command level can use the common framework to coordinate programs that affect the command's ability to accomplish operational objectives. The full Strategy-to-Tasks Resource Management methodology has been applied to both the U.S. Special Operations Command and the U.S. Force Korea (Lewis et al., 1994; Schrader et al., 1996).

3. REDESIGNING ORGANIZATIONAL STRUCTURES

Developing strategic and operational plans that align activities with an organization's core mission is one broad type of innovation that organizations have used to respond to a more demanding environment. A second is to redesign internal organizational structures in ways that allow strategic goals to be most effectively realized. While strategic planning focuses at the level of an entire organization, decisions about organizational structure focus one level down--on individual operating units, support functions, and corporate offices. The structure of an organization determines the patterns of interaction and coordination between all the various units and functions that contribute to producing an organization's main outputs (Duncan, 1979: 59; Lorsch, 1975: 1). Organizational structure establishes reporting relationships between superiors and subordinates, determines the relationship between central support functions and line units, and creates mechanisms to support horizontal communication across functional and line units (Galbraith, 1971).

Traditional organizational structures were built to facilitate top-down control and ensure predictable outcomes. Clear delineations between functional units and multiple levels of management were used to maintain clear lines of authority. Integration of all functions and units involved in producing intermediate products was used to guarantee access to necessary resource inputs. But the hierarchical and functionally divided organizational structure is poorly suited to a competitive and resource-constrained environment. Multiple layers of management and duplication of tasks across functions and organizational units increases costs and inhibits innovation. The centralization of decisionmaking authority in corporate offices reduces the
ability of line units to respond flexibly to emerging environmental demands. Failure to take advantage of more cost-effective production by outsourcing contributes to cost inflation.

To support higher levels of flexibility and cost competitiveness, public and private sector organizations have pursued two broad types of organizational redesign. The first is limiting the scope of their "core" business activities by making increased use of outsourcing. Rather than keeping in-house all activities that go into producing an organization's main outputs, some functions are being purchased from lower cost and higher-quality providers in the external market. The second broad type of organizational redesign is a series of changes aimed at streamlining interactions between those functions and departments that remain in-house. These changes include organizational flattening and organizational consolidation.¹

We organize our survey of RAND research on organizational restructuring using these two broad redesign strategies.

OUTSOURCING

The new organizational environment is encouraging a change in the way senior leaders weigh decisions about whether to make product and service inputs in-house or to purchase them on the external market. In the old management environment, purchasing decisions were driven by concerns for protecting proprietary technologies, supplier reliability, and the need to ensure steady access to

¹Improving cross-functional coordination through the shift from a functional- to process-oriented organization--popularly known as reengineering--is another type of restructuring that has ramifications for organizational structure. Reengineering efforts are designed to streamline work processes by reducing redundancies and improving linkages across functional departments. Reengineering is discussed in the process-improvement section of the next chapter.
materials to support large production volumes. All these concerns made companies averse to outsourcing key elements of the production process (Dobler et al., 1990; Scheuing, 1989). However, demands for increased cost competitiveness and production flexibility in new organizational environments are encouraging organizations to rethink this approach to sourcing.

Taking advantage of new contracting arrangements and new possibilities for long-term supplier relations, companies are making use of subcontracting for an increasingly large and varied type of resource input. U.S. private sector firms outsourced $100 billion in 1996 of traditionally in-house services and that number has been growing at a rate of 35% a year.\(^2\) Information technology and information technology services constitute the most important resource that organizations are buying externally. Together they account for 40% of the total outsourcing market. The outsourcing of administrative, human resources, customer service, finance, marketing and sales, and transportation represents another 30% of the market. The final 30% of the market is split between outsourcing of real estate and physical plant and outsourcing of logistics.

The drive towards increased outsourcing is motivated by a number of convergent factors.\(^3\) The first is a desire in a very complex and dynamic environment to focus scarce capital and management resources on what an organization does best, i.e., its core competencies. Nike, the athletic goods company, is a celebrated example of a company that has outsourced key parts of production to allow improved focus on core competencies. Nike employees do not actually make

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\(^2\)Estimates of the size and distribution of the outsourcing market are from the Outsourcing Institute cited in Moore et al. (1996c: 4).

\(^3\)These points as well as several of the business examples are summarized from Quinn (1992: Chap. 3), Levine and Luck (1994: 39), and Venkatesan (1992).
any part of the shoes that the company sells. All the manufacturing is outsourced to allow managers and employees to focus their energy on what the company does best—design and market athletic footwear products.

A second reason for the growing amount of outsourcing is to reduce costs and expand flexibility by turning to alternative sources for resource inputs. Outsourcing facilities can provide access to "better, cheaper, and faster" resource inputs. To take advantage of the benefits of specialization, Sun Microsystems chose to outsource the management of its distribution centers to Federal Express. The shift toward just-in-time production increased Sun’s need for highly reliable and cost-effective logistics. In another example of turning to cheaper and more sophisticated suppliers, when confronted with the need for more advanced piston designs to meet new emissions standards, Cummins Engine Company decided to outsource the production of pistons. The existence of several competitively priced suppliers of more advanced pistons encouraged Cummins to outsource a key input which is normally considered the "guts" of the engine. Turning to an external supplier for this key input made it possible to secure more advanced pistons quickly and to avoid the high level of investment that would have been required to build in-house capacity.

A final reason to outsource activities is that it allows organizations to exploit proprietary technical or market knowledge that a firm may not be able to get in any other way. The growth of outsourcing for information technology services is a reflection of the dynamism of the underlying technologies in this field. Rapid changes in information systems and applications make it difficult for public and private sector organizations to keep sufficient in-house expertise to run their technological systems. It has encouraged organizations to outsource information management to service companies such as Electronic Data
Systems and Automatic Data Processing, which have vast experience in systems integration, data-center management, and software upgrades.

RAND researchers have begun doing a considerable amount of project work aimed at bringing the benefits of outsourcing to the military (Camm, 1996; Moore et al., 1996a; Moore et al., 1996b; Saunders et al., 1995). Against the background of increased resource scarcity and growing demands for organizational flexibility, military organizations have turned to outsourcing as a tool to improve organizational efficiencies. Clients for RAND’s project work have included the Air Force, U.S. Marine Corps, the Navy, and the Commission on Roles and Missions for the Armed Forces. The research has focused on drawing on successful contracting in the private sector to understand the potential benefits and key types of decision processes that accompany the increased use of outsourcing (Chenoweth and Reynolds, 1996).

The “Make or Buy” Decision

A central premise underlying the RAND research on sourcing is that to develop a responsive and cost-effective sourcing methods organizations need to develop a decision process to determine whether an organization is better off producing something in-house or turning to an external supplier. Rather than simply turn to outsourcing to raise the efficiency of its sourcing operations, organizations needs to develop a “strategic” approach to sourcing. The decision whether to “make or buy” a resource or input should be based on a thorough comparison of the costs and benefits of both in-house and external provision. By leaving open the option to source from both in-house and external competitors, an organization increases the pressures on both types of suppliers for cost-effective and responsive
delivery of resources and inputs (Camm, 1996; Moore et al., 1996c).

The decision whether to use an in-house or an external supplier involves several different analyses. The first is the determination of an organization’s own core competencies. Core competencies have been defined as the base of knowledge and skills that provides potential access to a wide variety of markets, makes a significant contribution to customer satisfaction, and is difficult for competitors to imitate (Prahalad and Hamel, 1990). Core competencies are the functions that tend to be proprietary and hard to protect. They are also often areas in which a firm plans to develop strong capabilities (Moore et al., 1996a: 15). Outsourcing core competencies will typically have negative repercussions for an organization and these functions should not be considered as outsourcing candidates.

For private sector firms, outsourcing core competencies can undercut competitive advantage. Polaroid Corporation for years pursued a very profitable and high growth strategy by buying all its film from Kodak, its electronics from Texas Instruments, and its cameras from Timex and others while concentrating on developing its unique self-developing film packets. Designing and producing the next generation of self-developing film was at the core of Polaroid’s competitive advantage.

For public sector organizations, outsourcing core competencies may undermine the realization of an organization’s core mission. Many city governments are outsourcing parking control to independent contractors who can generate economies of scale in the use of capital and labor inputs by working across multiple municipalities. Outsourcing policing and traffic enforcement, to the contrary, is something most cities are loath to do. Both
activities are at the heart of a city's core activities and self-identity.

All functions that are not core competencies become candidates for outsourcing. But organizations should generally outsource only those functions that can be provided by a supplier at lower cost without sacrificing quality. Following a determination of core competencies, the second element of the make or buy decision is a cost comparison between in-house and external provision. A cost comparison with external suppliers begins with but should not be limited to production costs. RAND research suggests that a range of other often neglected factors needed to be included in a cost comparison to understand the true cost differential between in-house provision and external supply.

These factors include the costs of the comparison process itself, the costs of monitoring and managing supplier contracts, and the costs associated with employee dislocation (Gates and Robbert, 1996; Keating, 1996). The costs of conducting a cost comparison can in themselves be considerable. This is particularly true in the public sector, given the demands for "due process" and the strength of stakeholder claims. One study of cost comparisons completed in the Air Force found that the average cost comparison took more than two years with ten percent of initiatives taking four years or more (Keating et al., 1996: 42). Moreover, for every seven completed cost comparisons, three were canceled. Failure to capture the costs of these long, protracted, and frequently abandoned cost comparison processes leads to an underestimate of the full cost of the sourcing decision.

Failure to account for the costs of managing supplier relations once a function has been outsourced also can lead to an underestimate of the true costs of outsourcing. Once an organization has decided to outsource a function, it will need to devote personnel to developing and negotiating
contracts and monitoring supplier performance. A final reason that the true costs of outsourcing can be understated is a failure to take account of costs associated with employee dislocation. The process of placing people in new jobs and negotiating severance arrangements is labor-intensive and costly. Again, this type of cost will be particularly pronounced in the public sector.

A well-designed cost comparison not only presents an opportunity to find lower cost sources of resources outside of an organization, but also can support efforts at streamlining and reengineering internally. The cost comparison can be used by management to put pressure on internal suppliers to become more efficient. Successful internal reengineering can lead to reduced costs without exposing an organization to many of the difficult-to-quantify costs of outsourcing, e.g., the costs of the comparison process, the costs of employee dislocation, etc.

In addition to an evaluation of core competencies and a comparison of the costs of internal and external production, at least three other types of consideration affect the “make or buy” decision. The first is an assessment of an organization’s overall capacity needs (Camm, 1996: 26). While some functions can be produced cost-effectively in-house, an organization may decide to contract them to meet surge needs. The contracting option improves flexibility by allowing an organization to expand production to meet heavy demands without having to make heavy capital investments that can become burdensome in a slack market.

A second additional consideration is an assessment of the transaction costs involved in outsourcing a function or input (Camm, 1996: 26). An organization may not want to outsource activities that are difficult to specify and monitor even if they can be produced more cost effectively in the external market and do not represent a core competency. Difficult-to-specify tasks make it hard for a
buyer to state clearly what it wants from a supplier and to
monitor supplier performance. Outsourcing difficult-to-
specify tasks increases the risk that a buyer will be left
without resource inputs that are aligned with its production
needs. It also increases the risks of a buyer ending up in
costly litigation over contractual misunderstandings.

Establishing Supplier Relations

Once the decision is made to outsource an input or
function, the next decision step in the sourcing process
involves the selection of a supplier. RAND research
suggests that in selecting a supplier an organization should
use multiple criteria of two types (Moore et al., 1996a:
17-19). The first set revolves around a comparison of
suppliers' reputation and performance. In selecting a
supplier, private sector buyers compare the quality of a
prospective provider's service, the expertise of its staff,
and the sophistication of its technology. They are looking
to buy inputs from suppliers with a strong performance
record and a strong reputation.

The second set of criteria revolves around the fit
between the buyer and supplier. In the private sector, the
trend towards faster cycle times and leaner production
techniques is encouraging organizations to build deep
relationships with single suppliers rather than maintaining
relationships with multiple suppliers (Burt, 1989). Using
sole suppliers can lead to large savings in contracting
costs, high levels of motivation on the part of contractors,
and more willingness to cooperate in sharing product
development as well as technical and financial data (Levine

The reliance on deep relationships with single
suppliers rather than market mechanisms for insuring
supplier competition increases the demand on companies to
carefully screen potential contractors. A buyer needs to
select suppliers that are willing to make an investment in a long-term relationship and that have a similar enough corporate culture to ensure an effective relationship (Moore et al., 1996a: 17-19). To guarantee the viability of the long-term relationship, the supplier selection process needs to explore the extent to which a supplier relationship will lead to effective integration of the design process, sufficiently high standards of quality, and an equitable distribution of rewards and profits.

At the same time that an organization is selecting a supplier, it also needs to begin the process of developing a contract. Contract development and sourcing selection normally occur simultaneously rather than sequentially. RAND research suggests that key features of an effective contract include statements about the duration of the contract, expected workload and work tasks, and pricing flexibility (Chenoweth and Reynolds, 1996). The contract should outline which parties own the dedicated assets and should identify performance measures, enforcement rewards, and penalties. As part of contract design, the contracting organization also must develop procedures for managing supplier contracts. These procedures include an outline of data requirements, enforcement penalties and rewards, dispute resolution techniques, and an exit strategy.

Getting the contract right is especially important with supplier relationships that may develop into the long-term, quasi-vertical integration type product arrangements, which are increasingly common among firms pursuing just-in-time production. Successful long-term contracting according to RAND researchers has a number of components. First, it focuses on performance and overall value, not on how activities are performed (Moore et al., 1996a: 20). The buyer organization does not try to get involved in internal management and business decisions but focuses on the suppliers' performance. Second, successful contracts
emphasize flexibility (Keating, 1996; Chenoweth and Reynolds, 1996). They are usually written cooperatively to balance risks between buyer and provider carefully. They also contain adjustment clauses. Third, successful contracts establish simple contractual arrangements to support long-term relationships (Chenoweth and Reynolds, 1996). They are often only two to three pages long but are written to cover multiple years of business.

Managing an Outsourcing Program

Thoroughly working through the make or buy decision, selecting a supplier, and writing a supplier contract are all key steps in getting an outsourcing program off the ground. The on-going success of an outsourcing program, however, depends on an organization developing a range of new competencies. Chief among these is the ability to gather and analyze information. The key to effective sourcing is the availability of staff with the skills necessary to conduct cost comparisons between in-house suppliers and a variety of external suppliers (Moore et al., 1996b: 10-12). An organization also needs to be able to keep abreast of changing market and technological conditions and to continually reevaluate the split between internal and external production of inputs (Camm, 1996: 34-36). Finally, an organization needs to improve its ability to measure the performance of suppliers continually to generate feedback that can be built into the on-going relationship (Moore et al., 1996a: 24).

One strategy for putting this new organizational capacity in place is to create outsourcing teams and outsourcing “process owners” while simultaneously refining the role of senior management in organizational decisionmaking (Moore et al., 1996b). Private sector examples suggest that close senior management involvement in outsourcing is important. Management selects the
outsourcing strategy, creates the outsourcing team for a business area, and provides guidance and resources. Guidance includes the organization's strategic plan for outsourcing, an overview of areas to be considered and those to be excluded, and final decision on outsourcing recommendations.

The nuts and bolts of data collection and analysis are done by an outsourcing team. The team is responsible for conducting the four analytical steps outlined above for comparing internal and external suppliers, exploring the costs and difficulties involved in contracting, and making recommendations to senior management. The team should consist of experts from all parts of an organization that will be affected by a sourcing decision (Burt, 1989: 135). On-going management of the outsourcing process can then be left to an outsourcing process owner. The process owner documents, continually updates, and refines and improves the process using feedback from outsourcing outcomes.

STREAMLINING INTERNAL ORGANIZATIONAL STRUCTURES

Outsourcing functions and inputs from the external market is one way an organization can improve its focus and flexibility while reducing operating costs. A second, complementary strategy for creating more cost-effective and flexible organizational structures is to streamline those functions that remain internal to an organization. The two key and interrelated elements of the drive to create more streamlined organizational structures are a shift to flatter organizational structures and a drive toward consolidation of functions and units. Both have been given a variety of names in the popular management literature, names such as "downsizing," "rightsizing," and "lean management."
Flattening Organizational Structures

Creating a flat organizational structure involves changing reporting relationships within an organization to improve and speed decisionmaking. Typically authority is taken away from one or more layers of middle management and is either pushed down to line managers and employees or else pushed up to senior management. In a flat organization, line units become the focal point of operational activities. They are given increased autonomy to make decisions about producing and marketing goods and services and held accountable for financial results. In some cases, line units are turned into "profit centers" and expected to market their goods and services to both internal and external clients. To facilitate operational control, line units are also often given increased control over sourcing, technological, and human resource decisionmaking.

For example, as part of its organizational restructuring, Xerox has given line business units the ability to purchase everything from computer support to training from external vendors. Internal support functions at Xerox are expected to act as profit centers and market their services to line managers. Washington state provides a public sector example. It undertook a major restructuring of its organizational structure in an effort to improve the cost-effectiveness and responsiveness of government. Across its 70 agencies and departments, layers of middle management have been removed to eliminate reporting requirements and increase flexibility. There has also been a shift to a "profit center" mentality, with departments and agencies encouraged to look for ways to generate new revenues and discouraged from being a net consumer of resources.

The shift to a flat organizational structure has a number of significant organizational implications. The first is the loss or removal of multiple layers of management (Davidow and Mallone, 1992: 168). One study of reengineered corporations suggests that the reorganization of tasks and empowerment of line personnel that accompany the shift to a flat organizational structure lead to the elimination of an average of two to six layers of administrative management (Quinn, 1992: 116). A second and related implication is a change in the nature of supervision. With the loss of so many middle managers, senior management becomes responsible for overseeing line operations and spans of control increase dramatically while line workers themselves are given more responsibility over quality. Oversight in the flat organization is typically exercised not through direct physical supervision but through information exchanges and performance measurement systems.

A third significant implication is the need to develop new budget, pricing, and accounting systems to support the devolution of significant operational decisionmaking to line units. In the “profit-center” model, line units need to be given more control over their own budgets and financial resources to reflect a greater accountability for costs and expenses. At the same time, to make sure that line units are using resources in ways consistent with overall organizational goals, senior managers need to develop new accounting systems that allow expenditures to be easily tracked. Finally, the shift to a profit-center model requires the development of new pricing schemes to regulate the transfer of goods and services between units within an organization.

In on-going work for the U.S. Army, RAND analysts are exploring the potential applications of the literature on organizational flattening to battlefield operations.
(Fukuyama and Shulsky, 1996: 28-30; Joe, 1994: 16). These analysts point out that the U.S. Army is facing environmental changes very similar to those that have prompted corporations to shift towards flatter organizational structures. The proliferation in number and types of security threats is forcing the military to develop more flexible and responsive structures. The analysts also point out that information technology presents similar possibilities in the Army as in the private sector for streamlining the processes involved in aggregating, filtering, and transmitting information.\(^5\) It can improve performance by increasing information exchange between echelons in the chain of command and across functional areas.

These analysts suggest a number of caveats in adapting flexible organizational structures to the military (Fukuyama and Shulsky, 1996: 28-30; Joe, 1994: 16). Most significantly, the leadership function exercised by middle management in the military is more important than in many other organizations. While technology can replace the function of middle managers as synthesizers of information, it cannot take over the function of providing decisive leadership, particularly in battle situations. Similarly, elimination of middle layers in the chain of command may undercut the important training and development function that systematic promotion through the ranks offers future senior commanders.

In other work related to organizational flattening, RAND researchers have evaluated the effect of changes in internal pricing of repairs on the interaction of military bases (analogous to commercial line units) and depots responsible for conducting repairs (analogous to a support

\(^5\) For a discussion of the effect of technology on Army warfare which touches on organizational themes, see Nichiporuk and Builder (1995).
function). In an effort to encourage more economic behavior on the part of both base and depot personnel, the military services have introduced a series of new pricing and financing schemes. Services are now using revolving funds (known as working capital funds) to finance their repair operations. Under this scheme, depots are using a uniform pricing scheme for depot-level reparables. The pricing scheme is designed to allow depots to recover the full cost of their operations and was intended to improve the “visibility” of costs to buyers, e.g., the military bases.

Both the revolving funds and depot-level reparables pricing have increasingly led to a “profit-center” mentality on the part of bases and depots. Rather than having resource transfers occur automatically and costlessly from the perspective of management in each organization, the reforms have led bases to act more like buyers and depots to act more like sellers of repair services. RAND evaluations of these new pricing and financing mechanisms suggest that while they are changing the behavior of bases, they are having less effect on depot operations (Camm and Shulman, 1993; Baldwin and Gotz, 1996; Hanks, 1997). In the absence of more significant reforms, e.g., internal competition between depots or introducing the possibility of depots going “out of business,” changes to the pricing and financing schemes have not eliminated perverse incentives within the purchasing relationship. The absence of true price competition has encouraged bases to avoid using the depot system and an ensuing "death-spiral" effect: High prices discourage use of depots, which leads to financial losses in the fund and to even higher prices the following year, which leads to fewer customers, which leads to more losses, and the cycle continues.
Organizational Consolidation

In addition to organizational flattening, a second method for streamlining internal organizational structures is through the consolidation of overlapping responsibilities across functions and units within an organization. Organizational consolidation may involve achieving economies of scale by consolidating two business or production units that are performing similar duties. Earlier attempts to improve the cost effectiveness of military logistics, for example, focused on consolidating logistics operations into a smaller number of depots.

Consolidation of organizational structures may also involve streamlining reporting relationships between line units and corporate support offices. As Xerox moved to implement its strategy of becoming the world's leading "document processing company," senior management reorganized the company from nine product divisions to three. In eliminating six self-standing product divisions, Xerox hopes to reduce overall operating costs by improving the efficiency of its support operations. The consolidations led to a reduction of the number of human resources, sales, and marketing individuals in each of the product divisions and also left the individuals in each of the corporate support offices better placed to serve a broader range of business needs.

With the shift toward an emphasis on cost containment and improved flexibility in the public sector, RAND researchers have begun working on organizational consolidation for a number of different clients. One research team has been working for the Air Force and Department of Defense to create a strategy for integrating all National Security Space Agencies into the Air Force Command (Pace et al., 1997; Johnson et al., 1995). In a first phase of this project work, the team evaluated five organizational options (Johnson et al., 1995). These
included (1) staying with the existing organizational structure, (2) integrating oversight of space activities, (3) integrating management of space activities, (4) integrating all National Security Space Agencies under a DoD agency, and (5) simply improving interagency coordination. The team concluded that integrated management constituted the best option. It had the potential to combine the best acquisition and operational practices of the military and space communities, to eliminate redundancies, and to improve support to the joint warfighter across the spectrum of conflict (Johnson et al., 1995). The second and on-going stage of the project involves designing doctrinal, organizational, career management, and resource management policies that will smooth the integration of Space Command into the Air Force (Pace et al., 1997).

In project work for the Army, two other research teams have been evaluating efforts to consolidate Army activities that perform repair work (Brauner et al., 1996) and to streamline and consolidate the Total Army School System (Winkler et al., 1996b; Shanley et al., 1996). The effort to consolidate Army repair activities revolves around developing "centers of excellence" (COEs) at Army installations that bid for and perform repair work for customers across the Army rather than having multiple local providers. These COEs also provide an alternative source of repair for installations that formerly had to send workload to the depot when they lacked the needed local capability. So ISM sometimes offered a way to avoid the prices charged by the working capital fund activities. In some cases, the local perception is that using ISM "saves" money, but the data show that, from the larger Army perspective, that is not always the case.

The other project team working for the Army is evaluating the Army's efforts to streamline and consolidate its extensive system of schools. The eventual aim of the
consolidation initiative is to develop a Total Army School System that is to be more efficient and integrated across the Active Component (AC) and the Army's two Reserve Components (RC), which include the Army National Guard and the U.S. Army Reserve. The restructuring initiative includes efforts at consolidation and specialization of missions. As a first step in the RAND evaluation, the research team developed a performance measurement system for assessing the effect of reform on quality of army training, the link between army school production and Army training requirements, and the efficiency of resource use and training costs (Winkler et al., 1996a). In on-going project work, these measures are being used to evaluate the performance of both a new regional prototype school and the overall school system (Winkler et al., 1996b; Shanley et al., 1996).

A fourth project team working under the auspices of the VA/UCLA/RAND Center for the Study of Healthcare Provider Behavior is evaluating the integration of VA medical centers (Mittman et al., 1997). Since 1994, 19 VA Medical Centers have merged to create new integrated Medical Centers; additional facility integrations have been proposed and are expected in the future as well. The primary goal of the facility integrations is improved performance and efficiency, enhanced coordination and quality of patient care, and expansion of the range of services available to medical center users. The RAND project team is documenting and analyzing the process and outcomes of VA facility and service integrations. Outcomes examined include patient satisfaction, resources directed from administration to patient services, expansion of patient services, waiting time for appointments, time until next appointment, and quality.
4. OPERATIONAL PERFORMANCE IMPROVEMENT

In addition to improving capacities for strategic planning, and redesigning organizational structures, a third focal point for innovation in both the private and public sectors is the use of innovative techniques that help an organization raise operational performance. Innovations designed to improve operational performance are those that focus on on-going activities within line business units and support departments. While improving cost, quality, and speed is one of the major goals of efforts to redesign organizational structures such as those surveyed in the preceding chapter, restructuring efforts tend to focus on the streamlining relationships across functions and units rather than on operations internal to these units.

By contrast, most of the techniques that come under operational performance improvement focus on resource use and management issues. These techniques include process improvement and process redesign, strategic performance measurement, more effective use of information technology, and the adoption of innovative human resource management techniques. Because operational processes can extend across organizations in a "supply chain," the application of these techniques is not necessarily confined by organizational boundaries.

Performance measurement, information technology, and innovative human resource techniques are all key building blocks of process improvement, but they can also contribute to operational performance improvement in their own right. We do not attempt to develop a comprehensive list of techniques used to raise operational performance here, but rather focus on four sets of techniques that are common in the management literature and that can be also found in RAND
research and analysis. Finally, we recognize that some techniques that we classify here under operational performance improvement, e.g., reengineering, affect both the structure of relationships between units and functions as well as on-going operations within units.

PROCESS REDESIGN AND PROCESS IMPROVEMENT

Perhaps the most significant management innovation of the last decade is the shift away from functionally divided to process-oriented organizations. In the traditional organizational structure, lines of reporting and control were organized along functional lines, e.g., sales, marketing, finance, product design, manufacturing, and information systems. The functional organization supports clear lines of control and stable career ladders but also contributes to higher product costs and lower levels of market responsiveness. Duplication of effort across functions leads to higher than necessary overhead costs. The time and energy involved in coordinating across functions slows down decisionmaking. The functional orientation of rewards and career ladders contributes to an inward-looking rather than market-focused culture.

As part of the effort to become more cost effective and responsive, many firms and government organizations are shifting to "process-oriented" organizational structures. Rather than thinking of employees and offices as belonging to a functional department, the relationship between functional departments is restructured and mapped into an

1There are a number of comprehensive discussions of the tools and techniques available to management for raising operational performance. For an overview of the role of process improvement, technology, and human resource changes in improving operational performance, see Levine and Luck (1994); for an elaboration and comparisons of techniques related to process improvement, see Euske (1996); for an overview of the role of technology in transforming organizations, see Venkatraman (1994) and Quinn et al. (1996); for an overview of high-performance human resource management techniques, see Osterman (1994).
organization’s core processes. Core processes are those activities that transform inputs into outputs, have definable interactions with other processes, and have measurable performance parameters (Levine and Luck, 1994: 16). Major or core processes typically can be divided into subprocesses, which have parallel or sequential relationships with each other.

The use of Integrated Product Teams (IPTs) by Texas Instrument’s Defense Systems and Electronics Groups is a good example of the shift toward a process-oriented organization. Each IPT draws on managers and employees from all the departments and functions necessary to produce a single weapons system. The teams have between 100 and 150 members and include representatives of logistics, manufacturing, product design and testing, human resources, and the information technology group. Both managers and front-line employees work collectively to plan and develop a product. Then they break into smaller work teams of six to eight to manage each of the subprocesses associated with product production.

IBM Credit Corporation’s shift to a case manager approach to underwriting is an example of the shift toward process orientation in a service firm (Davenport et al., 1994: 11). For years, arriving at a quote for computer financing involved five business functions and, on average, took seven days. By shifting all of the financial, product, and customer information needed to complete a quote into a single database system, IBM was able to shift the entire responsibility for the process of issuing a quote to a single manager and reduce the time necessary to generate a quote to six hours.

Shifting toward a process-oriented structure allows an organization to eliminate duplication of responsibilities, reduce cycle times, and improve responsiveness to customers and markets. The shift toward a process-oriented structure
also sets the stage for process improvement efforts. Once an organization has clearly mapped out its major work processes and subprocesses, it can begin to measure and improve the quality of outputs. The last decade has witnessed the proliferation of management techniques focused on process improvement. Described with a variety of different names—process reengineering, total quality management, continuous process improvement, continuous quality improvement—all of these process improvement techniques aim to reduce cycle times and costs, improve product quality, and increase flexibility in product delivery. The basic steps involved in each include a systematic definition of the elements of process design, an analysis of performance that leads to identification of causes of errors and defects, and an elimination of unnecessary steps in core processes and subprocesses.

Difference among types of improvement techniques are mainly a function of the scale of organizational change they address. Continuous process improvement efforts and total quality efforts normally involve incremental improvement of stable and well-defined work processes. Both involve continuous analysis of on-going business operations to identify opportunities to reduce errors and defects as well as to improve efficiency (Deming, 1986; Sirkin and Stalk, 1990). Improving processes to prevent defects can lead to significant cost savings and improved customer satisfaction. Quality improvement efforts for manufacturing processes aim to eliminate the costs associated with reworking and scrapping items (Carr, 1992; Garvin, 1984). Quality improvement for customer service or distribution processes aim to minimize lost paperwork, mistaken data entries, and late or lost shipments.

Reengineering is more complex than continuous improvement efforts. It involves the restructuring of large work processes that cut across functional areas and
departments and often touches directly on the structure of an organization. Many reengineering efforts contribute directly to the shift to a process-oriented organizational structure by encouraging a better linkage of cross-functional responsibilities. Ford’s redesign of the accounts payable function is a well-known example of reengineering. Rather than initiating a quality improvement effort to prevent errors, Ford completely reengineered the accounts payable function with the aid of a new information and communications system. The new information system replaced documents with electronic ordering, receiving, and payment transactions; allowed for a better integration of tasks previously dispersed across departments; and supported a dramatic reduction in staff levels (Levine and Luck, 1994: 22-23).

While differing in scope, all process improvement efforts rely on similar organizational supports. These include process mapping tools, performance measurement and reporting systems, performance diagnosis techniques, information technology, and new human resource techniques. Process improvement efforts begin with the use of process mapping tools that focus on the flow of objects and information rather than on the structure of existing departments. Process flowcharts or process maps are the most common type of process analysis tool. These are horizontal maps of an organization’s activities that contrast with the vertical maps of an organization’s structure (Burr, 1990a).

Once processes have been mapped, they are measured. A common mantra of the popular management literature is “if you can’t measure it, you can’t manage it.” There are at least three reasons to measure process performance: (1) to understand current performance, (2) to help identify sources of performance deficits, and (3) to monitor the effects of process changes. Combined with effective reporting systems,
measurement can help focus employees on improving the performance of key processes. The most effective performance systems focus on measuring not only the activities of the process but also the key outputs. They use hierarchies of measurements and reports (Kaplan and Norton, 1996). Reports for senior management focus on output metrics. Reports for front-line workers and those charged with implementing process improvements also include more detailed reports based on diagnostic metrics. Reporting at both levels is needed to help front-line employees and those charged with implementing process improvements to gauge their progress in meeting performance goals.

Once processes have been mapped and appropriate performance metrics have been developed, the stage is set for using techniques designed to help identify sources of performance deficits. These techniques include histograms, Pareto charts, and cause-and-effect diagrams that support detailed analyses of the drivers of performance variation (Juran Institute, 1990; Burr, 1990b and 1990c). Process improvement techniques are used to identify the causes of process defects and delays. Findings from use of these techniques are then used to further redesign work processes.

The effective use of information technology is a key element of process redesign and process improvement efforts. Software-based statistical process control techniques are core elements of quality improvement initiatives. Statistical process control can be used to analyze process performance measures to determine underlying causes of defects. As suggested by the reengineering examples at Ford and IBM Credit, database technologies are often central to an integration of tasks and responsibilities across functions. Database technologies allow a single case manager to draw directly on information from a number of support functions and departments, e.g., logistics,
production, and marketing. Database technologies can also support the efforts of cross-functional teams working on quality improvement initiatives. For example, all members of Texas Instruments IPTs--from those in production to design and product testing--are able to draw on the same database of information to see how well they are doing in meeting goals on costs and cycle times.

Process improvement efforts also benefit from the use of innovative human resource management techniques. Cross-functional teams play an integral role in mapping work processes and defining new performance metrics. Cross-training is needed to help workers develop teaming skills as well as skills in the areas of process analysis and statistics. Finally, performance incentives can be used to encourage workers to look for opportunities to continually improve performance levels.

**Reengineering Military Logistics Processes**

The most ambitious research at RAND on process redesign is in the area of military logistics. RAND project teams are currently working with a number of offices, commands, and installations in the Army, Air Force, and Marine Corps to reengineer logistics processes. Each effort is aimed at achieving dramatically improved performance from key logistics processes while reducing total support costs. The services' move to embrace reengineering is, in part, a reaction to the failure of an earlier wave of efforts in the early part of the 1990s to increase the efficiency of management and organizational structures in the Department of Defense.

Early attempts at generating cost savings focused on consolidation of overlapping and duplicating functions. Organizational consolidation was expected to allow activities to be carried out with lower funding levels without decreasing the effectiveness of the activity.
Analysis by RAND researchers of these early attempts at consolidation generally had neutral or negative effects on the achievement of efficiency goals (Brauner and Gebman, 1993; Kennedy, 1993). These analysts found that when implemented in large operations, consolidation can create a system that is less responsive. This is because consolidation--unless accompanied by a restructuring of internal management systems and processes, such as reengineering--can reduce capacity without increasing efficiency.

Logistics analysts at RAND are conducting research for several military service clients that focuses on improving the performance of operational processes while reducing costs: velocity management research for the U.S. Army logistics community, precision logistics for the Marine Corps, and lean logistics for the U.S. Air Force. These three research agendas are closely allied conceptually--particularly velocity management and precision logistics--but each has been developed under a distinctive umbrella concept and implementation strategy that are tailored to the needs of the specific service.

The velocity management (VM) concept and the VM approach to logistics process improvement were developed in 1994 by the Arroyo Center through research sponsored by the Deputy Chief of Staff for Logistics (DCSLOG). The Army formally adopted the VM concept in January 1995 and has since that time been working with Arroyo Center researchers to develop and implement process redesign for a number of activities associated with logistics operations. In the third year of the VM initiative, reengineering efforts are currently being implemented for order and ship processes (Dumond et al., 1995a; Girardini et al., 1995; Girardini et al., 1996b), repair processes (Dumond et al., 1995b; Lewis et al., 1996; Robbins, 1995; Robbins et al., 1996a, 1996b), stockage determination processes (Abell and Miller, 1995,
1996; Girardini and Miller, 1996), financial management processes (Brauner et al., 1997a, 1997b) as well the processes involved in deploying logistics capabilities (Kassing et al., 1997).

Reengineering efforts for the key processes associated with Army logistics began with the formation of process improvement teams (PITs). Composed of personnel across a range of functions, the PITs work with RAND analysts to implement the velocity management process improvement methodology. The process improvement methodology is encapsulated by the three words “define-measure-improve.”

The first step in the method is to define the process targeted for improvement efforts. The goal of the process definition step is to clearly understand and map the linkages between all of the activities involved in a task from beginning to end. For example, the velocity group stipulated a definition of repair cycle that not only included hands-on repair time in the maintenance shop but extended from the time an item was reported broken to the time it was repaired and made available for use. Repair cycle time was defined to include time to retrograde material, time to diagnose faults, time awaiting parts or labor, and time for other activities besides just “wrench-turning.” All these segments contribute to the total time that a broken item is unavailable for use and need to be addressed. The key activity for building an end-to-end understanding and map of a process is to have the PIT “walk the process” physically as a group. This activity, though time-intensive, creates in the PIT the expertise that will be needed in the measurement and improvement steps of the methodology.

Once a process has been defined the next step is to measure its performance. Measuring performance is done for three reasons: to develop an understanding of current performance, to help diagnose sources of poor performance,
and to monitor and guide interventions designed to improve performance.

Measurement requires developing appropriate metrics. The VM concept specifies that each process should be measured on three dimensions—time, quality, and cost—but specific metrics in each performance dimension must be tailored to the specific process. For example, in conjunction with the Army’s stockage determination PIT, RAND developed metrics associated with both responsiveness of support to customers—how long customers wait for an order to be filled—and inventory levels. Metrics need to capture not only the mean performance of each process but also its variability.

A key challenge in measuring process performance is securing access to appropriate data systems and data sources. In selecting process performance metrics, it is important to find metrics that not only reflect the goals of the process improvement initiative but also lend themselves to data collection and analysis. For example, measuring the Army’s current performance in terms of repair cycle time (RCT) proved to be challenging because no single Army data system was established to measure the repair cycle as the velocity group had defined it.

Performance measurements must be reported to help motivate and guide improvement efforts. In fact, improving the performance feedback can produce dramatic improvements in performance without other interventions to change process design. Access to information on process performance in Army logistics has been improved by new OST and RCT “report cards”—posted on the Internet—that provide military commanders as well as technicians with monthly feedback.

Once a process has been defined and metrics are in place to measure and report process performance, then the stage is set to target and monitor improvement efforts. Findings from the analysis of process performance are used
to drive redesign of both core processes and subprocesses. For example, detailed analysis of the causes of poor process performance for the order and ship processes have supported Army installations in strengthening management oversight, simplifying rules, improving the use of new requisitioning systems, reducing the requisition review process, and streamlining the materiel receipt and on-post distribution activities.2

In its third full year of implementation, the velocity management initiative is already beginning to yield some significant performance results. With regard to order and ship processes, the highest performing installations have already achieved approximately a 60 percent reduction in order and ship times. Presented with the very slow and variable performance for repair cycle times, the Deputy Chief of Staff for Logistics called for a 50 percent reduction in repair cycle times across the board for FY97 and progress is being made toward this goal.

Initial success with velocity management has encouraged not only replication within the Army but also the extension of the initiative to the Marine Corps. Precision logistics is the name given to the Marine Corps initiative for improving its logistics processes (Robbins et al., 1996c). The initiative closely emulates the velocity management research agenda in its method and development. Thus far,

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2Although velocity management analysts at RAND are not currently using modeling approaches to assist in the design of improved logistics processes, such approaches are obviously pertinent. For instance, the RAND-developed model Dyna-METRIC (Dynamic Multi-Echelon Technique for Recoverable Item Control), which has been used to evaluate alternative maintenance and supply structures in many RAND studies, is applicable to process improvement efforts (Hillestad, 1982; Boren and Isaacson, 1994). Similarly, decision support tools for logistics managers may play a key role in improving process performance. For instance, the RAND-developed DRIVE (Distribution and Repair in Variable Environments) algorithm helps to prioritize component repairs and allocate assets to locations worldwide to maximize the probability of achieving weapon system availability goals (Abell et al., 1992; Miller and Abell, 1992).
the Marine Corps has applied the process improvement method to on-base order and ship processes and repair processes. The Corps has moved quickly to implement initial improvements, making major changes to the order and ship processes on one major installation. A technological intervention was the creation of a “direct ordering system” that cut out multiple reviews and moved requisitions electronically. The Corps also increased the frequency and synchronicity of batch cycles and consolidated stock in one location. The Marine Corps created an oversight and expediting function for maintenance shops and initiated direct delivery to customers. To improve RCT, the Corps created improve management tools, changed the quality assurance policies, and increased attention to parts identification. In the course of a few months, on-post order and ship times improved dramatically for units using the new direct ordering system. Repair cycle times on-post also declined, due primarily to reductions in awaiting parts time.

A third stream of RAND research aimed at improving the performance of military logistics processes is the Air Force’s lean logistics initiative (Cohen et al., 1994; Ramey, 1995; Pyles and Ramey, 1996). Lean logistics has focused on adapting technological and management innovations that have been used in the commercial world to the Air Force’s repair and logistics processes. In particular, lean logistics replaces reliance on large stocks with reliance on extremely responsive repair and distribution. A lean logistics system is designed to outperform the current system in meeting highly variable and uncertain demands for logistics support with the desired levels of responsiveness, robustness, and affordability. Lean logistics was initially implemented to improve support of the F-16. Repair cycle times for key high-value components were sharply reduced, chiefly through simplifying and streamlining the retrograde
process and reducing awaiting parts times. Inventories of these expensive components were reduced to reflect the shorter pipelines.

**Total Quality Management in Health Care**

In addition to work on military logistics, a second significant RAND research agenda focused on process improvement is research on total quality management (TQM) in RAND's health program. Researchers working in RAND’s health program have spent years investigating the determinants of the quality of care offered by health care providers. Traditionally, this research has focused on aspects of the health care system and health care policy environment.³ Less attention has been given to the role of hospital management and organization in determining quality of care. To fill that gap, RAND researchers have recently begun a series of projects focused on the role of organizational practice in improving the quality of care.⁴

In one on-going study, RAND researchers working in the VA/UCLA/RAND Center for the Study of Healthcare Provider Behavior have been conducting a joint project with doctors and hospital staff at Kaiser and the VA to implement total quality management programs (Parker et al., 1997). In other work on improving the quality of care for depression, a team

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³The three aspects of the health care system and policy environment that have received the greatest attention in RAND research on the determinants of quality of care are patient characteristics (e.g., Sherbourne et al., 1995; Kahn et al., 1994), payment methods (e.g., Wells et al., 1996; Davis et al., 1996), and use of generalists vs. specialists in providing treatment (e.g., Meredith et al., 1996; Sturm et al., 1996).

⁴The importance of additional research on the effect of health care management on the quality of care is suggested by RAND research which found that quality varies significantly from one hospital to the next (Dubois, 1995; Keeler, 1993). This research has identified characteristics of hospitals that provide higher quality of care--urban, large, and teaching hospitals tend to have higher quality--but fails to investigate aspects of management and organizational practices that contribute to quality.
of RAND researchers is working with general medical clinics in three geographic areas within the United States to evaluate the cost-effectiveness of alternative practice strategies and treatments (Wells, 1996).

These quality improvement initiatives are similar to the military reengineering projects in focusing on the role of improved cross-functional coordination in raising process performance. In the TQM project, cross-functional quality improvement (QI) teams are charged with developing systems for increasing the level of quality of care for depression. In the project investigating alternative practice strategies and treatments, interventions related to use of cross-functional expert teams and to changing practice structure to encourage an integration of primary care and psychosocial care are key areas for investigation.

The health quality improvement initiatives are different from the military logistics projects, however, in two important respects. The first is that in health projects there was no need on the part of RAND researchers or hospital managers to develop performance metrics for measuring quality of care. As will be detailed below, there are well established methods for measuring process outputs in health care. These methods involve establishing uniform national “appropriateness” guidelines for the clinical procedures and collecting data on the conformity of individual healthcare providers with these guidelines.

The health improvement initiatives are also different from the military logistics projects in the extent to which they focus on education and training as key interventions for raising the quality of care. The quality improvement teams at Kaiser and the VA were provided a range of informational and educational resource materials by RAND researchers as part of their effort to implement total quality management initiatives. The RAND team studying the effect of alternative practice strategies on the quality of
care has also made education and training a key area of investigation. In the experimental groups for this project, providers are participating in training on the evaluation and treatment of depression. Patients are being educated about their condition and its treatments to allow them to more fully participate in their own care.

Activity-Based Management in the Total Army School System

A final research agenda at RAND in the area of process improvement involves research for the Army on developing an activity-based approach to improve training resource management (Shanley et al., 1997). This research is part of the previously described efforts of Arroyo researchers to consolidate and improve the efficiency of the Total Army School System. Like researchers working on military logistics, this research team concluded that increased consolidations and specialization of purposes can help with efficiency but only if accompanied by a system-wide effort to promote new school organizations and improved resource planning (Winkler et al., 1996a). In the absence of internal reengineering, the efficiency-enhancing effects of consolidation are blunted. As part of the on-going reform of the Army school system, the research team has thus worked to develop tools that improve resource management at the level of the individual school.

The activity-based approach being piloted in different training commands is expected to improve resource management by allowing base commanders to link specific activities to resource expenditures. The activity-based approach presents opportunities to improve performance by identifying the activities that consume the most resources, are most in need of streamlining, and carry the greatest customer value. The steps involved in the activity-based approach are similar to those found in the military reengineering work.
Activities are broken down into their major components. Clearly outlining the steps and processes involved in major activities makes it possible to do a full cost accounting for the resources consumed by an activity. It also sets the stage for process improvement efforts. Once the activity has been clearly broken into sequential steps and processes, then alternative combinations of these steps can be used to raise efficiency. Once an activity has been defined and fully costed out, activity costs are then compared against a set of performance measures. These performance measures focus on cost, quality, and timeliness.

Following the performance comparison, improvement analysis begins. Improvement analysis focuses on ways to reorganize the main steps and processes involved in an activity to reduce cycle times and improve the value added of an activity. A final step is to create an incentive structures and an enabling process to encourage efforts at continuous improvement. The research team applied the activity-based management approach to three key activities within the Army’s training command: (a) activities related to course design and development, (b) activities related to matching of training demands with course offerings, and (c) activities related to implementation of distance learning techniques.

PERFORMANCE MEASUREMENT SYSTEMS AND OPERATIONAL IMPROVEMENT

As suggested by the discussion above, an effective performance measurement system is a key building block of any process redesign or process improvement initiatives. By capturing and reporting information on key indicators of process performance, a performance measurement system supports the type of analysis needed to continually improve processes. The ability of performance measurement systems to systematically capture and report performance information can also play a role in supporting other types of
operational improvement. By allowing an organization to monitor external suppliers and to directly compare the performance of in-house and external providers, performance measurement plays an important role in improving sourcing decisions (Moore et al., 1996c; Chenoweth and Reynolds, 1996).

A well-designed performance measurement system also can help with the realization of organizational goals by more clearly linking operational activities to strategic objectives. While not telling managers and employees in front-line offices how best to organize operational activities, a performance measurement system can reveal whether the existing organization of activities is helping to achieve strategic goals (Kaplan and Norton, 1996). Finally, a performance measurement system can improve the functioning of teams and lead to more efficient cross-functional work. Because team-based work typically cuts across traditional and well-defined reporting relationships, to be effective it requires clear performance standards and demands (Katzenbach and Smith, 1993).

The literature on performance measurement in the private sector suggests that the most effective performance systems share a number of common characteristics (Kaplan and Norton, 1996; Meyer, 1994; Schaffer and Thomson, 1992). First, they focus on a desired improvement in the outputs rather than on the activities that go into producing those outputs. Measuring activities that are supposed to contribute to improved results, e.g., quality training or participation in cross-functional teams, rather than the desired results themselves, is counterproductive. It is often difficult to link participation in activities such as training or team problem-solving to improved performance outcomes. Focusing a performance measurement system on these activities may create incentives to inefficiently squander resources.
A second finding on performance measurement systems is that the most effective systems focus on a few key metrics that effectively balance a number of competing performance demands. Performance measurement systems that collect data on a broad range of metrics can quickly become unwieldy. A third finding is that effective measurement systems are designed to help front-line employees gauge their progress in meeting performance goals. Performance metrics should communicate directly to those responsible for implementing operational and strategic goals. Finally, effective performance measurement systems should be designed in collaboration with those that will be evaluated using the performance criterion. This not only promotes user buy-in but also guarantees a better fit between the metrics and the activities being conducted.

While some of these findings on performance measurement in the private sector can be adapted to the public and nonprofit sectors, others will need to be modified. Researchers who have studied performance measurement in the public sector suggest that in the public sector, activity measures tend to be more important than output measures. Police departments, for instance, measure number of arrests (an activity measure) rather than an outcome measure (the crime rate). Typical outcome measures in the public sector--e.g., crime rates, student performance on educational achievement tests, mortality rates in hospitals--are influenced by a whole range of environmental factors outside the control of a government agency charged with improving these outcomes. This makes it difficult to hold a public sector organization accountable for outcome measures. Activity measures--e.g., arrest rates, use of appropriate clinical interventions--on the other hand, are something that a public sector organization can easily influence. As in the private sector, however, public
sector focus on activity-based measures of performance may be problematic.

RAND researchers have conducted a wide range of projects directly relevant to performance measurement systems. Most of this research has focused on developing performance measurement systems. A smaller amount of this work has focused on issues related to implementing and administering a performance measurement system.

**Developing Performance Measurement Systems**

As previously discussed, there is a considerable body of RAND research related to developing performance measurement systems for the Army, Marine Corps, and Air Force as part of military reengineering projects (Girardini and Miller, 1996; Girardini et al., 1996a; Robbins et al., 1996a and 1996b; Camm et al., 1996). Other RAND research on developing performance measurement systems has focused on measuring the outputs of research organizations, training organizations, and health care providers. In a project for the National Science and Technology Council, a RAND team investigated how to design a performance measurement system for investment in R&D that would allow federal research programs to describe, measure, and assess quantitatively the outcomes of their programs and help them manage these programs more effectively (Lempert et al., 1995). Researchers in the health program have spent more than a decade participating in the development of guidelines for appropriateness of care--guidelines that can be used to evaluate clinical interventions (Brook et al., 1996). The research team working on the performance of the Total Army School System has recently developed a series of high-level performance measures designed to assess overall system performance (Winkler et al., 1996b; Shanley et al., 1996). This body of RAND research incorporates and sheds light on
many of the findings in the broader management literature on performance measurement.

The research on performance measurement in the health program has made a major contribution to the goal of developing performance measurement systems in the public and non-profit sectors by developing strategies for overcoming the disconnect between activity-based and outcome-based performance measures. As in other public sector settings, developing effective outcome measures in health care is a long and difficult process. Given the broad range of factors other than health care provision that affect patient health, developing effective outcome measures involves difficult data collection and manipulation and takes very large samples to determine statistically significant effects.

Health researchers have gotten around difficulties with measuring outcomes by relying on two other performance measurement strategies. The first substitute for clear output measures are interpersonal evaluations of quality that focus on patient satisfaction with care. Interpersonal measures of quality of care are based on survey data responses from patients (McGlynn, 1996). While they do not shed light on the effect of a medical intervention on a patient's health, the interpersonal evaluations of quality highlight and create the potential to improve on the service aspect of health care delivery.

The second and more important substitute for outcome-based measures of quality are technical evaluations of quality. Technical evaluations focus on the appropriateness of health care delivery, i.e., whether patients receive needed services and whether delivered services are necessary, and on the skill with which health care services are delivered. Hospitals and researchers can improve quality of care by developing process measures of quality that are linked to the current state of knowledge about best
practices. In an effort to develop sound technical measures for the quality of care, RAND researchers have been involved for more than a decade in developing and using the appropriateness method to develop guidelines related to appropriate care of a broad range of medical conditions (Brook et al., 1996).5

The appropriateness method involves literature surveys and the use of expert panels to establish explicit guidelines for medical care. These guidelines become national standards that can be used to measure health care provider performance. By drawing on the current state of knowledge about best practices to create a common standard, the appropriateness method can be used to improve the fit between activity-based measures of performance and the realization of desirable outcomes.

RAND researchers working on performance measures for military reengineering and for the Total Army School System have emphasized and worked through issues related to developing a balanced but limited set of metrics (Girardini et al., 1996a; Robbins et al., 1996c; Winkler et al., 1996a, 1996b). The team working for the Army has been able to narrow its performance measurement systems down to three key areas for measurement and monitoring with just two or three measures in each area. The performance measurement work for military logistics has, similarly, focused on developing a robust but parsimonious set of measures of process performance. Most of this research has focused on creating a few straightforward metrics in the areas of time, quality, and cost.

Finally, research on performance measurement related to process reengineering has focused on keeping performance measurement systems close to front-line workers. Because

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5See Brook et al. (1996) for a review of all the medical procedures to which the RAND/UCLA appropriateness method has been applied.
this research has been related to process performance rather than overall organizational performance as in the case of the Army school system, it has been important to design performance measures in conjunction with process improvement teams and front-line workers (Girardini et al., 1996a; Robbins et al., 1996a). The performance measurement systems have also focused on giving front-line workers feedback on how they are performing (Camm et al., 1996b).

Implementing Performance Measurement Systems

In addition to the work on developing performance measurement systems, there has been a smaller amount of RAND research on the issue of implementing performance measurement. This research has focused on evaluating the outcome-based accountability systems for K-12 and vocational education (Stecher et al., 1994, 1995; Koretz et al., 1995). Projects in this area have highlighted a number of technical difficulties involved in effectively implementing performance measurement systems.

One set of difficulties arises from the challenge of finding the right mix of standardization and flexibility in large, complex organizations when trying to determine appropriate metrics. The researchers evaluating performance measurement systems for vocational education found that there was no clear answer to the question of whether measures and standards should be set federally for all states or by each state individually. Granting states flexibility in developing measures allowed them to respond to local conditions but also diluted and slowed the achievement of program goals. The researchers also discovered a number of difficulties related to administering a performance standards system. These difficulties included the challenges arising from inadequate staff preparation and skills, the lack of incentives for implementation of performance measurement systems, and the difficulty of
finding reliable data sources that could be used to evaluate programmatic goals.

**INFORMATION TECHNOLOGY AND OPERATIONAL IMPROVEMENT**

As already indicated, technology plays an important role in both supporting organizational flattening and facilitating process improvement efforts. There are at least three other important ways in which information technology can support raised operational performance. A first is through process automation. Advances in information technology allow many simple and routine work processes to be fully automated. As with process improvement, a major goal of process automation is to reduce the labor intensity of work processes. Beginning with the shift toward back-office automation in the mid-1980s and continuing through reengineering efforts of the early 1990s, organizations have used information technology to achieve cost savings by reducing the labor intensity of major business processes (Hammer and Champy, 1993; Teng et al., 1994). More recently, organizations have begun to use emerging information technologies such as automated telephone programs, Internet technologies, and service delivery kiosks to increase the speed and efficiency of front-office business processes (Venkatraman, 1994; Haynes and Thies, 1991).

A second additional way in which technology can improve operational performance is by supporting more effective group- and team-based work (Mankin et al., 1996; Bikson, 1996; Bikson and Eveland, 1996). Just as network communications and database systems allow senior managers to more directly oversee front-line operations, they can also be used to improve coordination between individuals working horizontally across an organization. A third additional way in which information technology supports improved operational performance is by improving the ability of
knowledge workers to collect and manipulate information. Improved data collection on customers and markets allows front-line employees to tailor and customize products and services more effectively (Sviokla, 1996; Davis and Botkin, 1994). Knowledge-based expert systems improve the ability of knowledge workers to draw on the most current information available when developing technical solutions to problems (Venkatraman, 1994).

**Technology and Teamwork**

RAND researchers have conducted a considerable amount of research on the role of technology in group- and team-based work. RAND project teams working on the transition to high performance in both the Army and transit maintenance organizations have identified a critical role for information technology. According to researchers working on the Army Force XXI, effective use of information is a key characteristic of high-performing Army combat units—defined as those with a higher number of kills than comparison groups (Joe et al., 1996). High-performing units integrate information into operations, and they focus on comprehending the battlefield and sharing a vision across functional lines and echelons. This research team concludes that information-sharing can be made more effective through the use of information technology, leading the researchers to recommend that the Army needs to invest in computer supported collaborative workspace (CSCW) technology.

Another team of RAND researchers working on high-performance organizational practices in transit bus maintenance organizations came to similar conclusions about the role of technology in supporting groupwork (Galway and Robbins, 1995). This team found that by enhancing team communication within organizations and communication between experts across organizations, information technology plays a key role in the transition to high performance.
Other RAND research on the role of information technology in promoting team and group work explored the effect of new information technologies on patterns of communication and interaction in United Nations organizations (Bikson, 1996; Bikson and Law, 1993a, 1993b). These researchers surveyed and reported on types and amount of usage of three electronic media--telex, facsimile, and electronic mail--and investigated the properties of computer-based information exchange among organizations that had introduced electronic mail. The teams also evaluated policies, guidelines, and training programs that UN organizations are implementing with respect to electronic records management issues.

**Technology and Decision-Support for Knowledge Workers**

There are also notable examples of RAND research on the role of expert systems in providing decision support to knowledge workers. The research team working on transit maintenance organizations found that the existence of expert systems that provided information and options on a range of repair procedures played an important role in supporting high performance (Galway et al., 1995). Earlier research on the role of information technology in supporting decisionmaking in the Forest Service suggested a similar link between well-designed expert systems and organizational performance (Stasz et al., 1991). The expert system in this case was a geographic information system (GIS), which allowed graphic and pictorial representation of spatial data to be integrated electronically with numeric and textual data. By integrating all the information used to manage the National Forest land into a single technological system, the GIS technology had the potential to dramatically raise the quality and efficiency of resource information management for the many acres of land under the control of the National Forest Service.
Technology and Process Automation

Finally with regard to technology and the automation of service delivery processes, RAND research has been quite limited. A RAND team has recently explored the role of electronic mail in improving communication between governments and the public (Neu, 1997). The project's aim is to consider the potential costs and benefits of government agencies making more extensive use of e-mail and internet-related communications services using two in-depth case studies. The agencies involved in the case studies are the Health Care Financing Administration, specifically with respect to their Medicare mission, and the California State Employment Development Department and their unemployment insurance mission.

More recently, organizations have begun to use emerging information technologies such as automated telephone programs, Internet technologies, and service delivery kiosks to increase the speed and efficiency of front-office business processes (Venkatraman, 1994; Haynes and Thies, 1991). Front-office automation gives clients or customers of an organization greater freedom in making routine service transactions and allows the organization to reduce the amount of manpower devoted to customer sales and service activities.

Similarly, the use of electronic data interchange (EDI) technologies allows automation of formerly labor-intensive work processes. EDI allows organizations to streamline distribution systems with suppliers and vendors. It allows rate and routing information to be automated, invoices and payments to be made electronically, and shipments to be tracked easily (Venkatraman, 1994). Several years ago, a RAND research team analyzed how to implement EDI in DoD logistics functions so as to increase the readiness and sustainability of U.S. defense forces (Payne and Anderson, 1991).
HUMAN RESOURCE INNOVATIONS AND OPERATIONAL PERFORMANCE

Like the use of performance measurement systems and information technology, the use of innovative human resource techniques can also play a role in raising levels of operational performance. With the demand for flexible and cost-effective work structures, two types of human resource innovations have become increasingly common in innovative public and private sector organizations.

High-Performance Workplace Practices

The first innovation is the adoption of a series of new human resource practices that have been termed “high-performance workplace practices” (Osterman, 1994; Lawler et al., 1992). Chief among these innovations is the use of self-managed work teams that are empowered to design their own work tasks and processes. High-performance workplace practices also include changes to training and competency development systems. Training programs in the high-performance workplace are extensive. They need to ensure sufficiently broad and cross-functional skill development to support work in team-based, process-oriented organizational structures. Innovations in the area of competency development focus on improving the amount of performance feedback that employees and managers receive by introducing multipolar performance appraisals and encouraging continued skill development through the introduction of competency-based pay systems. A final element of the high-performance workplace is the use of performance-based pay systems to align workforce goals with overall organizational goals. Innovations related to pay systems include gainsharing arrangements, use of bonuses, and more variable merit pay increases.

High-performance workplace practices are an integral element of process redesign and process improvement efforts. They have been used extensively by private sector
organizations to support productivity gains, product quality, and cycle time reductions. Firm-level research in the steel and automobile industries among others has led to a substantial body of evidence on the effect of high-performance human resource management techniques (MacDuffie, 1995; Ichinowski and Shaw, 1995; Arthur, 1994). In a series of studies, RAND analysts have explored the potential application of these innovative human resource techniques to military organizations (Robbert et al., 1996; Orvis et al., 1991), to transit maintenance organizations (Finegold et al., 1996), and to city governments (Keltner et al., 1996: 59-65).

**Strategic Human Resource Management**

A second type of human resource innovation that is increasingly common in high-performing companies is the shift toward a strategic human resource management perspective. As the name suggests, the crux of strategic human resource management theory is that organizations can improve their operational performance by aligning human resource management techniques with overall operational and strategic goals (Schuler and Jackson, 1987). The strategic human resource management literature suggests that organizations need to adopt human resource practices that are well-aligned with their overall organizational goals. Organizations primarily interested in cost-reduction, innovation, or quality enhancement each need to adopt a different set of supporting human resource management policies (Peck, 1994; Cowherd and Levine, 1992). There is some evidence in this literature suggesting that adopting policies that are poorly aligned with strategic goals can undermine performance (Gomez-Mejia and Balkin, 1989).

A number of RAND projects have addressed directly or indirectly issues related to strategic human resource management. In recent research for the Office of the
Secretary of Defense, a team of RAND researchers addressed the issue of how to align personnel management systems with the post-Cold War drawdown and with the emerging, more dynamic national security environment (Thie et al., 1995; Thie and Brown, 1994). Rather than develop a single human resource management framework, the research team came up with five alternative career management systems. Each provided the military with a different set of options for addressing issues related to accession, skill development, career flow structures, promotion, and vesting and retirement.

In research for the American Red Cross, RAND analysts evaluated the effectiveness of the Red Cross human resource management and training systems in achieving organizational goals (Rostker et al., 1994). The team found that regional and decentralized structure of training and personnel management led to inconsistent quality. Responsibility for training was diffuse and not always clearly defined. Beyond basic training for compliance, many supervisors viewed training as a hindrance, with most regions giving training, development, and assessment a low priority. The team's recommendations for changes included increased central control of both production and training to raise quality, the alignment of financial and other employee incentives with the goal of raised quality, a focus on managerial skill development, and an increase in the availability of resources to regional managers in implementing new processes.
5. ORGANIZATIONAL CHANGE

Strategic planning, organizational redesign, and operational improvement are all organizational innovations that managers are introducing to improve competitiveness, focus, and flexibility. Research on organizational change is focused on how organizations can most successfully adopt these innovations. This research draws on a multitude of disciplines and techniques (e.g., systems theory, economic modeling, biological metaphors), but only in the behavioral sciences is there a robust literature on organizational change which spans both theory and practice.\(^1\) The main focal point of the literature is on changing expectations, behaviors, and values within an organizational setting. The literature draws on a range of causal explanations and variables to investigate successful organizational change. These variables include leadership, patterns of decisionmaking and communication, and organizational supports, e.g., training and incentives, for innovation and learning. While addressing similar issues and drawing on similar explanatory variables, studies on organizational change vary in the level of change that is being studied.

Research on organizational change falls into three broad categories. The first is implementation analysis or work related to introducing single organizational or technological innovations without challenging the basic structure or values of an organization. The second type of analysis is on transformational or large-scale organizational change. Research of this type focuses on changes that require wholesale organizational restructuring and fundamental changes to beliefs and values. The third

\(^1\)A few key references within this literature include Pombrun (1994), Kanter et al. (1993), Mohrman et al. (1992), and Huber and Glick (1990).
type of research on organizational change is oriented
towards the subject of organizational learning. Research on
organizational learning is a natural outgrowth of work on
transformational change. It involves designing structures,
processes, and policies that enable an organization to
continually adopt and change in response to new
environmental challenges.

IMPLEMENTING NEW TOOLS AND TECHNIQUES

At its simplest level, change involves introducing a
new tool, technique, or technology into a relatively stable
organizational setting. The goal of this type of change is
not to fundamentally change the structure and culture of an
organization but to improve its ability to perform an
existing function or work process better. Academic work on
low-level organizational change is known as implementation
research. This type of research is concerned with
understanding the most effective strategies for effective
implementation, where implementation is defined as the
"translation of any tool or technique, process or method of
doing, from knowledge to practice" (Tornatzky and Johnson,
1982). Implementation suggests a series of events that
begins when an agency decides an objective can be better met
by adopting a new process or product and ends when the
innovation is incorporated into an organization’s regular
work processes (Bikson et al., 1996). The adoption of new
information technologies is a favorite of the implementation
literature (Sviokla, 1996; Markus and Keil, 1994). Other
implementation research focuses on implementation of reforms
that change organizational policies, procedures, and
practices (Kakalik et al., 1996; O’Toole, 1989).

Recent and on-going RAND work related to the
implementation of new tools and techniques has been
conducted for a variety of different client organizations.
One team of researchers recently conducted a study for the
National Cooperative Highway Research Program to determine the critical factors facilitating the adoption of research results by transportation maintenance organizations (Bikson et al., 1995, 1996). A second team of RAND analysts have been working for the New American Schools to evaluate the factors affecting the pace and success of implementation of whole school designs associated with the NAS reform (Bodilly et al., 1996).

A third team of researchers working in the RAND/UCLA/VA Center for the Study of Health Care Provider Behavior has been studying the implementation of quality management techniques in health care organizations. The project, termed the Mental Health Awareness Project (MHAP), tests the efficacy of two team-based approaches to fostering organizational change and innovation in primary care clinics within managed care organizations. A fourth team of RAND researchers has recently completed work on the types of changes needed in the Army’s human resource and personnel management system to support implementation of a range of Army acquisition reform (Dertouzos et al., 1995, 1996).

In conducting these projects, the project teams have been able to draw on a large body of previous RAND research related to implementing new technologies, processes, and techniques into an organizational setting (Zellman et al., 1993; Bikson and Eveland, 1986, 1991; Bikson et al., 1987). This body of research has lead to a number of very consistent lessons about the nature of successful implementations. A first key lesson is that characteristics of the innovation itself affect implementation. Clarity in designing and presenting the new technique or technology make it more likely that it will be adopted by end users.

The team working on implementation of the New American School designs, for example, found that a clear understanding of the core elements of the design was a
critical factor supporting design implementation (Bodilly et al., 1996). User confidence in the effectiveness of a new tool or technique in meeting their work needs also supports implementation. RAND research on the implementation of new technology systems has found that these systems tend to be adopted more readily when users have high levels of confidence in their effectiveness (Bikson and Eveland, 1986). Cooperation between designers and users in the development phase of a new technique or technology is one way to improve clarity and raise user confidence. Collaboration in the design phase enhances the likelihood that the final product will meet user needs (Bikson et al., 1995). The availability of concrete materials describing the new technique and how it can be used in practice can also improve user confidence (Bodilly et al., 1996).

A second key lesson from the RAND implementation literature is that the nature of the implementation process also affects the likelihood of a new technique moving from abstract knowledge to concrete practice. End users are more likely to take up an innovation if they have been involved in planning for the change, have adequate training on using the innovation, and receive on-going technical support. The project team working on acquisition reform, for instance, found that a modest amount of training can lead to a dramatic increase in support for reform (Dertouzos et al., 1996). An important finding from the research on implementation of New American Schools designs is that the availability of on-site technical support from design personnel or a school-based facilitator strongly supports implementation.

A third key lesson of the RAND implementation literature is that characteristics of the organizational setting affect implementation. Organizations that encourage innovation in general and that create incentives to support the adoption of specific innovations will have an easier
time with implementation. Transportation maintenance organizations that changed incentives to reward timely adoption and effective use of research were more likely to see quicker implementation. More successful adopters also redesigned job descriptions and performance evaluations and upgraded the skills of their employees where needed (Bikson et al., 1995, 1996). Schools that used teacher work groups and participatory governance arrangements to promote teacher support of the New American Schools had an easier time with implementation. Participatory governance ensured on-going participation by the teachers, as the end users of the designs.

LARGE-SCALE TRANSFORMATION EFFORTS

More significant in terms of the demands on a change management strategy than efforts to implement a new technology or technique are efforts at large-scale transformation. Large-scale transformation efforts--such as mergers or acquisitions, downsizings, reengineering efforts, or major restructurings--typically involve cross-organizational changes to structures, processes, and values. These large-scale change efforts are referred to as "transformation," e.g., corporate transformation, because they involve a fundamental rethinking of an organization's operations, mission, and identity.\(^2\) Large-scale organizational change has become a commonplace in the last decade.

A range of new forces--including higher levels of economic competition, the increased pace of technological change, shrinking public sector resources, and the growing diversity of consumer tastes and needs--is putting pressure on private and public sector organizations alike to dramatically change themselves. The goals of these

\(^2\)See, for example, Ghoshal and Bartlett (1996).
transformation efforts typically center on cost reduction, responsiveness to markets and customers, and increased internal flexibility. They are typically accompanied by many of the structural changes outlined above in the section on redesigning organizational structures. They also often involve commitment to a new set of organizational or corporate values.

The literature on large-scale organizational transformation is large and broad. The range of topics and subject areas covered makes it very difficult to distill an integrated framework for understanding the phenomenon of large-scale change. The literature does, however, offer a number of compelling lessons on the factors that make it possible to conduct a successful large-scale transformation. First, strong leadership is absolutely essential to successful large-scale transformation (Schein, 1992; Fombrun, 1994). Strong leadership from senior management plays two important roles in the realization of success. It indicates a commitment from the top of the organization to change, signaling a significant shift in organizational values. It also helps to ensure that the change effort receives a sufficient level of resources, minimizing the likelihood that necessary resources will be squandered through internal organizational politicking.

Second, broad-scale change must be accompanied by an articulation of a new set of organizational values. Employees and an organization have reciprocal obligations and mutual commitments, both stated and implied, that define their relationship. These commitments have been called “personal compacts” and typically help answer questions about job expectations, organizational support, performance evaluation, and compensation. Failure to revise these personal compacts can undermine a change effort by leading employees to misunderstand or ignore the implications of change (Strebel, 1996). Third, broad-scale change must be
accompanied by a deliberate and well-thought-out communications strategy. Employees need to be informed about both new organizational goals and new organizational values (Larkin and Larkin, 1994). Existing research suggests that multiple communication strategies are the most effective but face-to-face communication between front-line employees and their supervisors is relied on most heavily. Effective strategies also involve frequent repetition of a clear and concise message.

Fourth, broad-scale changes that involve redesigning organizational structures and processes need to involve employees heavily. While large-scale change efforts are typically initiated by top management in a top-down process, they are likely to fail unless they are accompanied by a bottom-up change process. The large-scale change efforts that are most likely to affect organizational performance are those that involve employees in the design and implementation of new processes and structures (Kanter, 1983; Cooper and Markus, 1995). A fifth and related lesson is that large-scale efforts will lead to sustainable performance improvements only when accompanied by shifts in organizational support systems that structure front-line work. Organizational support systems include performance measurement systems that provide unambiguous performance standards, development systems that provide feedback on performance results, competency development systems that provide training on new technical and cross-functional skills, and compensation systems that offer clear, consistently applied rewards and sanctions (Ghoshal and Bartlett, 1996; Schaffer and Thomson, 1992).

Many of the RAND research agendas described in previous sections involve large-scale organizational transformations. The projects on organizational consolidation in the Air Force, Army, and VA hospitals, the research on outsourcing Air Force support functions, and the work on reengineering
logistics in a range of military services all involve significant changes to organizational structure, practices, and routines. Despite this large body of work on large-scale restructuring, there has been relatively little research at RAND developing change management strategies to accompany large-scale restructuring. Many of these project teams working on organizational consolidation, reengineering, or outsourcing have designed the new structures, processes, or techniques, systematically addressing the issue of how to implement these new structure and processes in client organizations.

The existing RAND research on large-scale change has been limited to a handful of disconnected projects. One project on cultural change was done as part RAND’s “gays in the military” study (Zellman et al., 1993). One part of the project team worked on designing a strategy for implementing a new policy that would allow acknowledged homosexuals to serve in the military. Their recommendations mirrored many of the main findings of the literature on large-scale organizational change. A key recommendation was the need to ensure top leadership support. They also included recommendations for a communications strategy that focused on a simple message communicated in language compatible with military culture. A third set of recommendations focused on involving leaders at all levels of the organization in designing the new policy instrument of the organization to facilitate buy-in. A final set of recommendations suggested the need to change incentives and support systems to ensure institutionalization of the new policy. These recommendations included the need for training, monitoring mechanisms, and clear sanctions for non-compliance.

A second RAND project related to the issue of large-scale organizational change developed a method for identifying barriers to cultural change as part of work on
assumption-based planning (Dewar et al., 1996). Concerned that the culture of the Army would not support a new approach to planning, this research team developed a method for identifying potential significant culture barriers. The method begins by identifying distinctive characteristics of an organization. The distinctive characteristics can be best determined first through comparisons with society as a whole and then with institutions having broadly similar goals and objectives.

Once a set of distinctive characteristics has been derived, the next step is to order them according to their perceived importance in blocking a change effort. Such judgments are necessarily subjective but can be addressed more systematically by using three evaluation criterion: (a) the likelihood that a characteristic will be challenged, (b) consequences to the initiative of a failure to change an inhibiting characteristic, and (c) the difficulty of changing the characteristic. Each characteristic should be rated as “low,” “medium,” or “high” in each category. The method in itself is valuable as a first step in supporting large-scale change. Using this method, analysts can identify the elements of an organization’s culture that are most like to impede an organizational change initiative. The research team, however, did not take the next step of developing strategies for overcoming those cultural elements identified as most likely to create barriers.

ORGANIZATIONAL LEARNING

Moving beyond large-scale organizational transformation, a third level of organizational change is the institutionalization of culture conducive to organizational learning. The phenomenon of organizational learning suggests that change is no longer a discrete phenomenon, but rather becomes an integral and permanent part of the operation of the company. With the acceleration
of social and economic change, organizations no longer have
the luxury to respond to new environmental demands with
periodic restructuring. They are being forced to accelerate
the pace at which they internalize and adapt to new
information and demands (Schein, 1993).

Scholars working on the phenomenon of organizational
learning suggest that there are three major stages in the
learning process (Nevis et al., 1995; Huber, 1991). The
first is knowledge acquisition, which is the process by
which skills, insights, and relationships are developed or
created. The second is knowledge sharing, which involves
the dissemination of what has been learned within an
organization. The third stage is knowledge utilization,
which is the integration of what has been learned into on-
going operations so that it is broadly available and can be
generalized to new situations.

While research on learning suggests that the nature of
learning and the way it occurs are determined by an
organization’s culture, this research also suggests some ten
common factors facilitating the acquisition, dissemination,
and utilization of knowledge (Nevis et al., 1995: 77). The
first of these is information gathering about conditions and
practices outside from units within the same organization or
from other organizations. A second is the shared perception
of a performance gap between actual and desired state of
performance, with the performance gap viewed as an
opportunity for learning. A third is the concern for
measurement, with the effort spent on defining and
quantifying specific metrics used as a learning activity.
The fourth is an experimental mind-set within the
organization. “Failures” are accepted not punished and
changes in work processes, policies, and structures are
viewed as a continuous series of learning opportunities.

A fifth factor favoring organizational learning is a
climate of openness in which problems, errors, and lessons
are shared not hidden. A sixth factor is a commitment to continuous education at all levels of the organization. A seventh support for organizational learning is the existence of operational variety in the methods, procedures, and systems used. An eighth support is having multiple advocates for new ideas and methods. Having multiple advocates ensures that new ideas will not become isolated in certain corners of an organization or fall into disuse with the loss of a single champion. A ninth factor favoring organizational learning is involved leadership. Leaders who are involved in articulating a vision, are engaged in its implementation, and are actively involved in educational programs are more likely to support learning. A tenth and final support for learning is support for a system's perspective on the interdependencies between organizational units and the connection between the unit's needs and goals and the company.

Research on the topic of organizational learning is even more minimal than RAND work on large-scale organizational restructuring. The project team looking at outsourcing in the Air Force has broached the issue of how the Air Force can develop new capabilities designed to support continuous improvement in the outsourcing process (Moore, 1996c). The project team working on integrating the National Security Space Agencies into the Air Force has recognized and intends to address issues related to changing personnel management systems and to developing mechanisms to support integration of disparate organizational cultures. In general, however, there has yet to emerge a clear body of RAND research in this area.
6. TOWARD A RESEARCH PROGRAM ON ORGANIZATIONAL INNOVATION

The introduction to this document suggested that there is a rapidly growing demand for technical assistance and consulting services on organizational innovation and restructuring in the public and non-profit sectors. The body of this document has outlined a large number of RAND research projects and research agendas that touch on some aspect of organizational innovation. We conclude by discussing the issue of scale-up--how to build the existing work on innovation into a corporate-wide research program. We address the question of scale-up through a discussion of three questions related to building a research program:

(a) Does RAND have the capabilities?
(b) Can RAND be competitive?
(c) How can RAND market its capabilities?

BUILDING CAPABILITIES

The length of this document implicitly suggests that RAND possesses the capabilities to do work on organizational innovation and restructuring as well as to support client efforts to implement organizational changes. Recent RAND research has touched on almost all of the types of innovation that continue to transform the public and private sectors. Four areas of research seem particularly robust. These include work on strategic planning, outsourcing and organizational consolidation, process redesign, and innovative human resource management techniques. RAND researchers have a long and rich history of developing planning tools for the military. Assumption-based planning and operations planning (strategy to tasks) are two planning techniques that were used to help military clients improve
the effectiveness of their planning processes. With the development and refinement of exploratory modeling techniques, RAND analysts are developing a planning framework with applications to both military and domestic clients. Researchers working on health and education are also beginning to use strategic planning exercises to help domestic clients improve their operational focus.

RAND research on outsourcing, similarly, has led to the development of tools, techniques, and models for use by military clients. This research has been conducted for a number of military services and defense agencies. Continuing work in this area led to considerable body of knowledge on the steps involved in outsourcing and the development of analytical frameworks to help RAND clients work through these steps. With regard to organizational consolidation, there are at present four current and ongoing RAND research agendas designed to help client organizations improve their operations through streamlining and specialization of missions.

RAND research on process improvement is particularly robust in the area of military logistics. RAND analysts working on military logistics have developed sophisticated analytical tools, performance measurement systems, and technological systems to support process improvements across a number of commands in three different services. Other RAND work on process improvement has focused on the Total Army School System and on introducing total quality management techniques into health care organizations.

Other significant bodies of RAND research on operational performance improvement cover the use of innovative human resource management techniques and the role of information technology in supporting groups and team-based work. Research on the applications of “high-performance workplace techniques” and on the principles of strategic human resource management have been conducted for
a broad range of both military and domestic clients.
Research on the role of information technology in supporting
team-based work has also been conducted in a broad range of
organizational settings.

While RAND has a strong tradition of research and
client assistance in most areas related to organizational
innovation, the internal capabilities could be considerably
enhanced through improved cross-fertilization. Most
importantly, there is a need for cross-fertilization between
the military and domestic sides of the organization.
Research on organizational restructuring has been largely
weighted toward military clients. Of the 70 reports and
memoranda cited, about 75% are from the military side of the
organization. Military work has been particularly strong in
the areas outsourcing, strategic planning, and process
improvement. In all three areas, knowledge, experience, and
techniques could be leveraged from the military side of the
corporation to the domestic. Leveraging this knowledge
will become ever greater with the growing pressure on social
service agencies, schools, and health care to become more
flexible and cost-effective.

There is also a need for cross-fertilization from the
domestic to the military side of RAND. Most of the
significant on-going research related to organizational
change is being conducted by behavioral scientists working
for domestic clients, e.g., the New American Schools, the VA
and Kaiser, and transportation maintenance organizations.
Some of the knowledge has gradually made its way into some
military projects, e.g., "gays in the military" and
acquisition reform. But most military projects that involve
large-scale restructuring--e.g., outsourcing, reengineering,
and organizational consolidation--are moving forward without
drawing on the insights and findings within the existing
RAND research on organizational change. In attempting to
make radical organizational change stick, it would behoove
these projects to draw more systematically on this existing body of research.

Finally, there is also a need for improved cross-fertilization in the research areas related to organizational innovation. Several on-going research projects are addressing the same questions and topics entirely independent of one another. Of the work on strategic planning, we found only one document that referenced reports and memoranda from multiple RAND research agendas related to planning. Most had references only to other documents within the same research agenda. Research on process improvement for the Total Army School System and for health care organizations has been developed largely independent of the benefit of the knowledge and tools developed in project work on military logistics. Much of the work on innovative human resource management techniques has been developed without knowledge or reference to other related projects.

Improved cross-fertilization should not only improve the quality of on-going projects, but should also be a powerful tool for demand generation. With full knowledge about the range of project work going on across all business units and research programs, researchers will be able to develop more compelling proposals and be able to more effectively identify additional organizational issues and problems faced by clients and make appropriate referrals. We have two thoughts on how to improve cross-fertilization. The first is to plan a series of workshops and seminars. The on-going seminar series will support regular interactions between those with common research interests and will create a forum for the sharing of tools and methods. The second is to develop a well-organized and well-indexed database of all RAND work in this area. This document may serve in lieu of a database for a year or more,
but at some point there will be a need for continual electronic updating.

**COMPETITIVE ADVANTAGE**

The second issue to be addressed in outlining a research program related to organizational innovation is RAND’s basis of competitive advantage. Pricing of RAND work will vary from one project the next, based on the number of competitors in the market, RAND’s previous relationship with the client, and the overall structure of the business unit. There are several bases for generating competitive advantage, however, that seem to relate generically to the corporation as a whole.

The first is RAND’s reputation as an honest broker capable of providing a high-quality, customized product. Many of the organizations that RAND will be competing for work related to organizational performance are viewed as producing canned, off-the-shelf products. This is particular true of management consulting firms, who often apply the same generic paradigm from one organization to the next. RAND can market its focus on customized solutions to organizations looking for a unique solution to an organizational problem.

A second source of competitive advantage is RAND’s strengths in developing sophisticated systems for data collection, analysis, and management, crucial to most successful organizational innovation. Process improvement efforts depend on skillfully created performance measurement systems. Outsourcing initiatives depend on having mechanisms that can fully weigh the costs of internal and external provision of services. Strategic planning depends on having the ability to carefully weigh and assess the effect of multiple strategic scenarios. RAND’s core competence in the area of prototype sophisticated data management techniques can be used as a source of competitive
strength in bidding for projects on organizational innovation.

A third source of competitive advantage is RAND’s deep institutional knowledge of the operations and culture of public sector organizations in a variety of policy areas. While there are generic solutions to many organizational problems, to be implemented effectively these solutions need to be adapted to the culture and structure of an organization. RAND’s deep knowledge of the workings of schools, health care providers, social welfare agencies, and military organizations thus should be a strong source of competitive advantage in generating business related to organizational performance.

**MARKETING CAPABILITIES**

The final issue to be addressed in outlining a research program is how to market RAND’s capabilities for research in the area of organizational innovation and restructuring. It is our sense that marketing should be handled through a combination of centralized and decentralized efforts. It is within the research programs and units that institutional relationships with clients have been developed and it is the managers and researchers working within these programs who are best positioned to identify emerging client needs. This suggests that marketing should be handled largely on a decentralized basis through existing business units and programs.

But marketing should not be completely left in the hands of the research programs and units for two reasons. First and most importantly, if RAND is to take advantage of emerging market opportunities in the area of organizational innovation, there will need to be investment by the front-office in building a “brand identity.” To generate additional work in this area, there is a need for general promotion of RAND’s capabilities and experience. A second
and related reason for not leaving marketing to the research units is that such an approach risks missing new opportunities for business generation. Researchers working within specific business units and programs may not have good knowledge about the range of research activities going on in other business units. This may prevent RAND from marketing the full range of its capabilities and from identifying all new market opportunities.
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Designing and Implementing Performance Measurement Systems

A RAND Workshop
June 19, 1997

The central role of performance measurement systems in supporting organizational innovation was a key lesson taken from the January 1997 internal conference. At that conference, several presenters and participants highlighted the importance of performance measurement in supporting quality improvement, reengineering, and outsourcing initiatives.

We decided to convene a half-day workshop devoted to this topic to give the RAND research community an opportunity to share insights and lessons learned about performance measurement. Researchers from six RAND business units (Health, IET, PAF, Special Programs, Arroyo, and Labor and Population) participated.

The workshop featured presentations and discussions of RAND project work in the following areas:

- army logistics (Ken Girardini)
- job training under the JTPA (Mike Cragg)
- vocational training under the Perkins Act (Brian Stecher)
- science and technology R&D (Rob Lempert)
- hospital performance scorecards (Beth McGlynn)

The workshop was videotaped and is available for review from the library.
Two weeks before the workshop, presenters and discussants met to identify the key elements of a well-designed and well-implemented performance measurement system. The elements were presented, discussed, and modified at the workshop.

The first key element of an effective performance measurement system is having well-defined program goals. Workshop participants agreed that before beginning to measure anything, organizational leaders first needed to establish what they are trying to accomplish.

The second key element of well-designed performance measurement system is performance metrics which align with organizational goals. Performance metrics need to be selected which allow senior leaders, line managers, employees and evaluators to gauge their progress in meeting organizational goals.

The third element is the identification of data sources which provide information on organizational performance relative to established performance metrics.

The fourth and final key element of a well designed measurement system is a plan for operation. Even a well-designed performance measurement system may fail without organization changes which support institutionalization.
Developing Well-Defined Program Goals

- Define goals before developing measurement system
- Use measurement to force decisions and prioritization
- Set and map goals at multiple organizational levels

There is a symbiotic relationship between performance measurement and strategic planning. A clear specification of strategic and operational goals typically is a prerequisite for a successful performance measurement.

However, the relationship between strategic goal setting and performance measurement can also work in the reverse direction; performance measurement can be used to force strategic planning. For example, providers of K-12 education are torn between the conflicting goals and objectives of key stakeholders. In developing an accountability system for such organizations, one alternative is to develop a performance measurement system that tracks all competing goals and objectives. Generally, however, organizations use the process of developing a measurement system to clarify and build consensus on key objectives.

A third idea about goal setting which emerged from the workshop is the need to set and map goals at multiple organizational levels. To operationalize a performance measurement system, high level strategic goals need to be broken down into operational goals for line operating
units and individual program offices or shops. Researchers working with the Army, for example, mapped the strategic goal of creating a more responsive Army logistics system into performance goals for logistics facilities and individual repair shops. In the case of the Job Training Partnership Act, the policy goal of transitioning those in federally subsidized training into good jobs was operationalized in developing performance goals related job placement for training providers.
Aligning Metrics with Goals

- Use a small number of balanced measures
- Tailor measures to individual programs and processes
- Create a plan for "rolling up" measures
- Ensure horizontal integration of measures
- Combine process and outcome measures
- Adjust outcome measures for "risk"

A second element of well-designed performance measurement systems is the use of performance metrics which align with strategic goals. Performance metrics that are well-aligned with organizational goals allow managers, employees, customers, and evaluators to track organizational progress in meeting its strategic objectives. The dialogues at the workshop focused on six key considerations which must be kept in mind when developing aligned metrics.

1. Focus on a small number of balanced metrics to keep the measurement program manageable and focused. The military logistics research team focused their performance measurement system foremost on metrics related to cycle times to improve responsiveness but also incorporated measures of the cost and quality of logistics processes. The performance measurement system which accompanied the Job Training Partnership Act focused improving placement by using three simple metrics for training providers -- trainee's placement rates, post-training wages, and post-training employment tenures.

Using a small but balanced set of measures also allows senior managers to dynamically adjust for the unintended consequences of measurement. The early focus on performance measurement in health was highly successful in getting doctors and hospitals to reduce the cost of health care to the exclusion of other considerations. To meet the goal of providing both high-quality and cost-effective health care,
hospitals now have begun to create more balanced performance measurement systems which include metrics for both cost and quality.

2. Tailor performance standards to individual line programs or processes. In most cases tailoring means using the same metrics but varying performance standards. Army repair shops work on a variety of different components and hospitals provide a variety of different health care services. While cost, timeliness, and quality can be used to judge the performance of each type of repair or health care processes, the specific performance expectations for each performance measure must be tailored to the labor intensiveness of the process.

3. Create a plan for “rolling up” performance metrics used at the line unit level for review by senior management. Presenting data to senior management on the performance of all repair processes in a repair facility or health care interventions in a hospital would lead to an overwhelming amount of information. To track an organization’s progress in meeting strategic goals, senior management need a parsimonious set of metrics that help them interpret data on the performance of line units.

Two approaches to rolling up performance metrics were suggested by workshop participants. The first approach -- used by the military logistics project -- involves aggregating performance metrics across repair and maintenance processes to create an overall performance measure for each repair facility. The second approach -- used by health researchers -- involves random sampling from the performance metrics for the various services delivered by a hospital. The health researchers believed that too much valuable information could be lost in simply aggregating performance outcomes.

4. Ensure horizontal integration of performance metrics. Manufacturing, service, and research processes depend on the coordination of a series of interdependent steps. Performance measurement systems that do not encourage integration of all sub-activities in a process make it more difficult to realize strategic goals.

To take an example from federal environmental development in the area of environmental policy, meeting R&D goals in this policy area depends on aligning the outputs of four different programs -- basic science, integrated assessments, technology and data collection. While different performance metrics are needed to measure the performance of each of these programs, the individual set of metrics need to be selected in such a way that they well-aligned with each other and with overall R&D goals.

5. Combine both outcome and process metrics into a measurement system. In areas such as education, health care, and research, it is difficult to establish a link between the organizational efforts and outcomes of interest often because of the long lead times.
In such cases outcome measures can be complemented with process measures that focus on the completion of activities which are strongly associated with improved outcomes.

To take an example from the project work on R&D for science and technology, the outcomes of R&D programs are difficult to predict or assess, but their are certain characteristics of well-managed research programs which are associated with research success that can be used to evaluate program performance. The viability of process measures of performance increases where there are professionally defined and accepted process standards. RAND Health researchers have spent many years developing process measures of performance for health-care interventions (see RAND literature on Appropriateness Method).

While process measures are most helpful in evaluating organizations with “soft” outputs, process measures are also useful in settings such as military logistics which have “harder” outputs and shorter lead-time. In the military logistics project. In these organizational settings, process measures can be used as diagnostics to provide input to those working at an intermediate stage of a larger work process. Process or diagnostic measures in this case can be can be used as a tool to achieve horizontal integration of tasks across an organization.

6. Adjust outcome measures for influences beyond the control of organizational actors. Process measures can help in evaluating performance but are ultimately insufficient. Outcome measures are the only true gauge of whether an organization is meeting its goals. If outcome measures are to be used in a performance measurement system, however, they must be adjusted for environmental influences beyond the control of the agents being evaluated.

Researchers working in the Health area call this adjusting for risk. To accurately compare the performance of hospitals, health care outcomes need to be adjustment for individual and demographic characteristics which impact health risk. The presentation on the JTPA performance measurement system pointed offered another example of the need to adjust for environmental influences. Skill attainment prior to enrollment in federally subsidized training offered through the JTPA is an important determinant of post-training job placement, wage rates, and job tenures. By not adjusting for pre-training skill attainment, the JTPA performance measurement system created incentives for “creaming” the best applicants from the available applicant pool. Rather than rewarding training providers for providing quality training services, the performance measurement system rewards providers for identifying already placeable applicants.
Identifying Appropriate Data Sources

- Look to existing data first

- Be ready to develop new data sources

- Be aware that control of data often politically sensitive

In addition to well-defined goals and aligned metrics, a third element of an effective performance measurement system is the availability of data on performance which can be used to gauge performance. Operationalizing performance measurement at the level of the line units depends on having data sources which can be used to collect and analyze data on performance relative to established performance metrics.

Workshop participants were agreed that in developing performance metrics it was easiest to draw on existing sources of data, but that it was important not to rely too heavily on data sources that were presently available. Developing a robust performance measurement system often requires developing new data sources that can be used to support additional metrics.

Another point made on finding appropriate data sources was that control of data within organizations is often politically sensitive. Those who control the data which the analyst needs to build a performance measurement system will be adverse to making that data available if they feel the measurement system presents a threat.
Creating a Plan for Operation

- Align measurement with organizational structures
- Involve those that are measured
- Create a feedback plan
- Address the issue of incentives
- Develop a plan for transferring capacity to the "client" organization

The final element of a well-designed performance measurement system is a plan for operation. A technically sophisticated performance measurement system with aligned goals, metrics, and data sources will do little to support improved performance if it is not effectively implemented into the operating environment of an organization.

Workshop participants outlined a number of issues that needed to be addressed in creating a plan for operation. The first is making sure that the measurement system is well-aligned with existing organizational structures. RAND researchers working on performance measurement in military logistics, vocational education and federal research and development highlighted the need to align performance reporting with the traditional reporting relationships within and between organizations.

It is helpful to involve those who are the subject of measurement in developing the performance measurement system itself. Involving employees and line managers in developing a performance measurement system can be an important tool in generating consensus around a set of metrics and in gaining "buy-in" for a measurement system.

It is also necessary to create a plan for feedback. Regular feedback on performance in meeting both process and outcome goals can help employees and managers
make real-time adjustments that better align their actions with the overall strategic goals of an organization. The performance measurement system which accompanies the Job Training Partnership Act reports performance to training providers only once a year as part of the annual cycle for making performance awards. Several workshop participants suggested that annual reporting was too limited. It did not allow managers and employees to make adjustments on an on-going basis. They suggested that quarterly reporting would lead to sufficient but not overwhelming amount of information.

In developing performance measurement systems, organizational leaders need to decide whether they want to link performance measurement to compensation. While linking performance to incentive pay is becoming increasingly common in the Health area, workshop participants working in other areas suggested this linking can create incentives for gaming the system. They also suggested that performance results are themselves a strong incentive that encourages competition for recognition.

A final issue is the need to enable the “client” organization to itself operate its performance measurement system. Workshop participants described how external “change agents” -- whether they be consultants or contractors -- can help generate momentum for creating a performance measurement systems. However, for the performance measurement system to become institutionalized, individuals within the organization need to develop expertise in the areas of measurement design and data collection and analysis. Drawing on examples from vocational education, Army logistics and Air force contracting, conference participants recounted how organizations often failed to develop the skills and competencies internally necessary to run and operate a performance measurement system. Creating a plan for developing these new skills and competencies from the outset increases the speed with which primary responsibility for the measurement system can be transferred from the “consultant” to the client organization.