

ESTABLISHING A CHANGE INFRASTRUCTURE THROUGH TEAMS

Tim Kotnour and Jean Matkovich, University of Central Florida
Rob Ellison, P.E., Kennedy Space Center

Abstract

This article describes an infrastructure to implement a large-scale organizational transformation. Successful large-scale organizational transformations require leadership, project management, learning, and systematic change actions. The Kennedy Space Center is used as a transformation case example to understand teams use to overcome resource challenges. Resource challenges result from the need to meet multiple responsibilities with constrained resources and to balance involvement throughout the organization. From this case study, it is proposed that an organization needs to use: both formal and informal teams, a systematic process to integrate team efforts, and a "quick start study" program. Managers can use the findings to help design and use teams to drive their transformational efforts.

Introduction

Increasingly organizations are undergoing large-scale performance improvement and change efforts such as total quality management, reengineering, and downsizing. An organizational transformation redefines an organization's business (e.g., mission and products/services) and the way the business is operated (e.g., processes, technology, people, and culture) (Davidson, 1993). A fundamental innovation and change problem is to ensure successful implementation of a performance improvement approach by overcoming barriers to change (Grover, 1999). Other authors have identified critical success factors necessary for successful large-scale changes (Applebaum, Simpson, and Shapiro, 1987; Cameron, Freeman, and Mishra, 1993; Kanter, Stein, and Jick, 1992; Marshall and Yorks, 1994; National Academy of Public Administration, 1996). Their findings highlight the need for an organization to: 1) clearly understand the change's forces or drivers and 2) design actions that produce positive and minimize negative results.

We found that 1) strategic, systematic actions lead to more positive results; 2) a change without planning leads to negative results for the organization; and 3) the potential positive and negative results from an action must be understood before action is taken. An integrated change approach can help ensure the positive results are achieved. Sink and Morris (1995) offer 9 integrated "fronts" for successful change to ensure positive results are achieved. We group these fronts with other research findings to define 4 groups of action an organization can take to enable successful change. The four groups are: leadership, project management, learning, and systematic change. These four groups are necessary to support complex and organizational-wide improvement efforts.

Refereed case study. Accepted by Diane Bailey and Eileen Van Aken, special issue editors.

Leadership focuses on providing the initial and sustaining driving force for the transformation. Kotter (1996) outlines leadership actions to include developing and sharing the organization's strategic direction and communicating with the organization. Sink and Morris's (1995) actions of understanding and managing culture; sharing information; maintaining motivational support for the change; and managing internal and external politics to gain support and remove obstacles or barriers are all leadership actions.

Project management has been defined as a critical success factor to ensure successful change (Grover, 1999). Project management actions help ensure the transformation's goals and objectives are being met in a timely fashion. Planning the transformation involves defining transformation goals and objectives, stakeholders, and risks; integrating tasks, responsibilities, and timelines; and establishing an infrastructure (Kaufman, 1992; Sink and Morris, 1995). Empowering change teams in a systematic fashion supports organizing and directing. Control involves using standards, measures, and feedback mechanisms (Whitney and Pavett, 1998).

Learning is creating, sharing, and applying knowledge

About the Authors

Tim Kotnour is an assistant professor of industrial engineering. His research interests include engineering organizational performance improvement, organizational learning, and strategic and project management. He received his M.S. and Ph.D. from Virginia Tech. He has been actively engaged with the Kennedy Space Center since 1996 in conducting research, education, and technical assistance in large-scale transformations.

Jean Matkovich is a graduate student who received her B.S. in industrial engineering from Texas A&M. She is currently conducting research and technical assistance in developing and utilizing customer focus to drive organizational performance improvement.

Rob Ellison, P.E. is the Corrective and Preventive Action Manager at NASA's John F. Kennedy Center. He has 17 years of experience in engineering and quality systems. He is responsible for using various quality tools and techniques for systematic problem solving and process documentation, measurement and control. He works in the Business Innovation Group which achieved ISO 9001 certification for Kennedy Space Center.

Contact: Dr. Tim Kotnour, University of Central Florida, Industrial Engineering and Management Systems Department, Orlando, Florida 32816-2450, phone: 407-823-5645, fax: 407-823-3413, e-mail: tkotnour@mail.ucf.edu.

(Huber, 1991). Learning provides the real-time knowledge needed by the organization to adjust to the changing environment. Learning includes the activities to: develop leadership (Kotter, 1996), learn from other organizations; learn from the organization's own experience (Argyris and Schon, 1978), continuously improve the transformation approach; and educate/train the workforce in successful transformations (Sink and Morris, 1995).

Systematic change actions align customers, products/services, processes/tools, structure, and skill mix. Systematic change involves a set of processes and tools to improve performance (Sink and Morris, 1995). Given the different types of change needed (Davidson, 1993) the organization must match the improvement initiatives (e.g., continuous improvement or reengineering) with the need (Gadd and Oakland, 1996; Lawler, Mohrman, and Ledford, 1998). Systematic change actions help the organization understand existing processes, define requirements for new processes, and evaluate the existing processes against the requirements (Brynjolfsson, Renshaw, and Van Alstyne, 1997).

One issue facing the organization is how to provide the resources to take the above actions. Sink and Morris (1995) highlight the need for establishing a change infrastructure. We discuss the infrastructure for driving change, not the overall organizational structure. What is missing in the literature is a set of specific recommendations on how to provide the human resources to successfully lead, project manage, learn about, and make the systemic change throughout the organization. This article addresses these issues by answering the question: What are the human resource elements, how are they organized, and how do they relate to each other to successfully conduct a large-scale transformation?

The ongoing large-scale transformation of the Kennedy Space Center (KSC) is used to understand the use of teams for a change infrastructure. We collected the case study data as active participants in the transformation. The data was collected through a historical analysis of team activities associated with three change initiatives within KSC's transformation. We selected these three initiatives because they represent recent, center-wide improvement initiatives.

Challenges for Large-Scale Change at KSC

As described by Kotnour, Barton, Jennings, and Bridges (1998), KSC as part of the National Aeronautics and Space Association's (NASA) efforts to perform "better, faster, cheaper" began a large-scale organizational transformation effort in 1996. Their effort is similar to the other private, public, and government organizations that have attempted efforts such as downsizing to meet performance requirements.

The drivers for KSC's transformation include: reductions in NASA's budget, development of a single flight operations contractor for shuttle processing, and a re-definition of KSC's roles based on NASA's plans. NASA is re-establishing itself as a research-focused organization and is moving out of the operations role — KSC's traditional focus. These drivers are changing the KSC civil service employees' role and possibly reducing their number. This transformation leads to two infrastructure-related challenges for KSC.

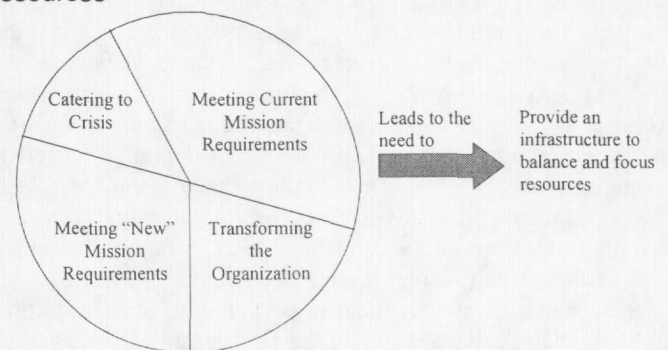
Meeting Multiple Responsibilities with Constrained Resources. As a result of this transformation effort, KSC personnel must meet diverse needs. We adapt a model (see Exhibit 1) developed by Kurstedt (1993) to describe these efforts. First, KSC must continue to meet its mission to ensure the space shuttle's safe, reliable, and cost effective launching. KSC must also transition the operational work to a contractor.

Second, KSC must transform itself. KSC has completed developing and communicating a strategic direction — to provide its capabilities and expertise anytime, anywhere to advance space exploration and commerce. KSC's core business is to provide space systems processes, test, and launch techniques, and to develop associated technologies. They have also achieved ISO 9001 certification. These efforts consume resources to lead, project manage, and implement.

Third, KSC must deliver on the "new mission" of being a development center. For example, KSC is using its unique operational knowledge to help develop a new checkout and launch control system for the Space Shuttle and a new generation of vehicles such as the X-34.

Fourth, KSC must respond to the normal crises associated with any organization. For example, an unplanned report or submission to an external agency is a crisis that takes time and resources. These four responsibilities can drive an organization to overload. Given the declining number of total KSC civil service employees, KSC must focus these resources in the most effective way. KSC's resource challenge is to balance the infrastructure for change with the skills and people needed to meet the current and new mission requirements.

Exhibit 1. Balancing organizational responsibilities and resources



Balancing Involvement throughout the Organization. For a successful change, an organization needs to disperse involvement and leadership throughout the organization (Dotlich and Noel, 1998). Involvement down throughout the hierarchy ensures multiple, diverse perspectives are integrated into the change process. Horizontal involvement across functions helps ensure the change process is conducted from a holistic perspective and not an individual sub-organization perspective. Furthermore by having people involved, resistance to change will be decreased through buy-in to a shared vision. The challenge is to provide an infrastructure to allow people throughout the organization to be involved in the change process.

Designing the Transformation Infrastructure

To meet these two challenges, KSC is using an infrastructure containing both formal and informal teams, a systematic process to integrate efforts across teams, and a "quick start study" program. We use three change initiatives (strategic management, ISO 9001 certification, and customer satisfaction process) within KSC's transformation to describe the change infrastructure. These three initiatives evolved as result of external requirements place on KSC. The Federal government had mandated agencies to engage in a strategic planning process, and NASA headquarters had flowed that requirement into the centers such as KSC. Secondly, NASA headquarters had also mandated applying ISO certification. The customer satisfaction initiative was a response to customer comments indicating the need.

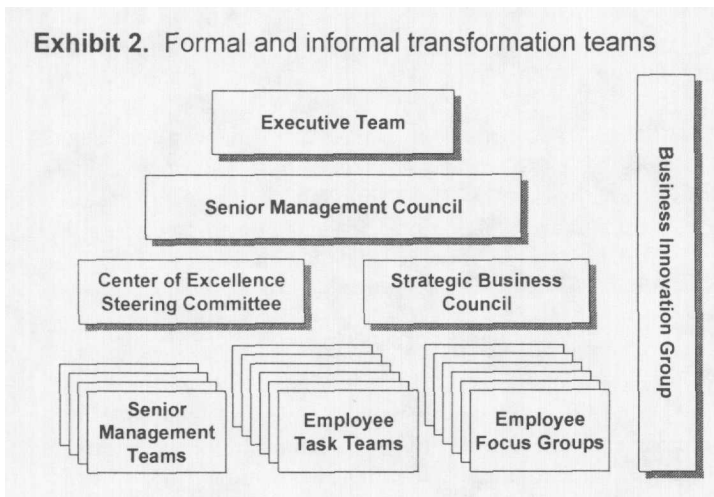
Include Both Formal and Informal Teams. Formal teams are created permanently for on-going functions and are part of the formal organizational structure. Informal, ad hoc teams are created to complete a task and then dissolve. Exhibit 2 graphically depicts the infrastructure KSC is using, which contains 5 ongoing formal teams and 3 informal team types.

implementing world class management and business processes. The current center director established the business innovation group (BIG) to support KSC's innovation. BIG is a resource to learn about and develop new concepts, approaches, and tools to lead and project manage the organization's systematic change. BIG's charter is to integrate the various improvement processes and tools. For example, BIG led the effort to successfully achieve ISO 9001 certification and is implementing an integrated management system.

These formal teams provide the mechanism for leading, project managing, and learning. The executive team and senior management council provide on-going leadership for the center. The center of excellence and strategic business council provide the leadership and project management for their specific areas. BIG provides project management and learning for improvement initiatives.

The ad hoc teams fall into 3 groups. The informal senior management teams work on a specific task that is of significant importance to the center and requires senior leadership. For example, during KSC's strategic planning efforts, the senior management team identified the need to improve the customer interface issues. The executive team chartered a senior management task team to work with senior management from the USAF, 45th Space Wing to establish a joint base operations and support contract to improve cost efficiencies and customer satisfaction. Two KSC senior managers worked on the task team full-time along with numerous civil service employees. Employee task teams are employee groups who complete work defined by the senior management teams to implement the transformation efforts. Employee focus groups provide concerns associated with the organization and the transformation. BIG typically coordinates and facilitates the focus groups. These informal teams provide the resources for systematic change and the information to help the executive team lead and manage the transformation

Exhibit 2. Formal and informal transformation teams



The formal teams are the executive team, senior management council, the center of excellence steering committee, the strategic business council, and the business innovation group. At KSC, the executive team consists of the center director, the deputy director for business operations, the deputy director for launch and payload processing, and the associate director for advanced development and shuttle upgrades. This group serves as KSC's senior leadership group. The senior management council consists of over 40 individuals including the executive team, directors, and direct reports to the executive team. This group typically functions as the senior management council focusing on KSC's day-to-day activities. For driving a large-scale change, KSC is developing this senior management council into a team that focuses on the center as a whole and not on individual directorates. The senior management council provides leadership, identifies center-wide issues, and commits resources.

The center of excellence steering committee is chartered with promoting and defining the technology development and operational issues associated with launch and payload processing systems. The strategic business council is chartered to provide leadership and direction in developing and

Formal and Informal Teams Case Example: Deploying a Strategic Management Process. Three years ago KSC began a strategic management effort with recognition of the need for strategy by a senior manager. An employee task team from BIG conducted employee focus groups and interviews with senior management over a three-month period. The study results identified the need for a formal strategic management process and immediate strategic direction products such as a vision, mission, guiding principles, and goals. The strategic management process provides an on-going driving process. The strategic direction products provide a common framework.

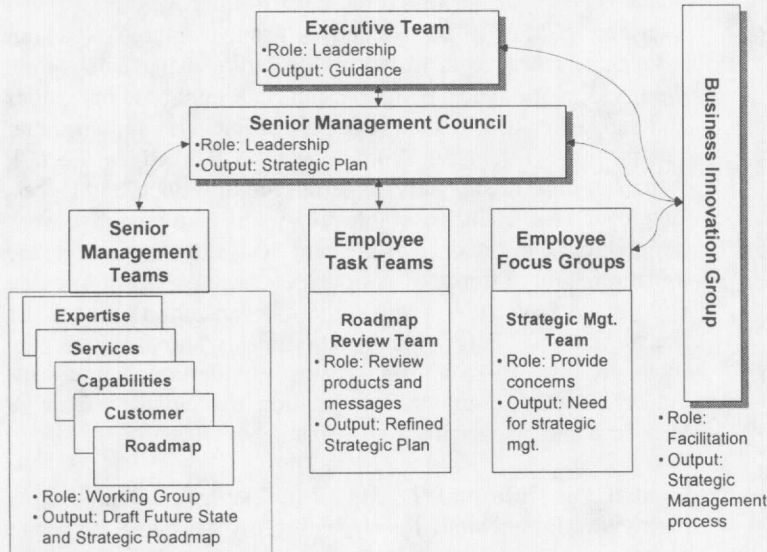
BIG and the executive team designed four senior management retreats to build the senior management council and establish KSC's strategic direction. Based on the second retreat, the senior management council established 4 ad hoc senior management task teams. The first team, comprised of both senior managers and select employees, produced a description of what customers liked and disliked about doing business at KSC. The other 3 teams produced statements of KSC's ideal future state for its infrastructure/capabilities, expertise, and services. The 3 teams completed their tasks and decided to combine into 1 team before the next retreat.

Following the sharing of the ideal future state by the ad-hoc senior management task teams, the senior management council developed an initial strategic planning roadmap

containing the goals, objectives, and strategies. A subsequent senior management task team further refined the goals and objectives. The senior management council refined and accepted the roadmap. Next, the executive team chartered an employee task team to understand the strategic management products and to develop a strategic plan document for distribution to KSC's stakeholders. This ensured that everyone could easily understand the message. The executive team established other senior management and employee tasks teams to develop center-wide performance measures.

Through informal senior management teams, the formal senior management council was forming into a cohesive team focused on KSC's future. Throughout this effort, BIG members supported the executive and task teams by providing processes and tools for systematic change. Employee focus groups and task teams allowed the organization to be involved in the process. Exhibit 3 summarizes the relationship of the teams in strategic management.

Exhibit 3. Teams in the strategic management process



Integrate Team Efforts with a Systematic Process. Exhibit 4 describes the relationship between a team and a function in an organizational change process, which was developed by the first two authors for KSC. The process was developed to help KSC balance the multiple teams that were being started. The intent is to systematically define and integrate different teams throughout the transformation.

Working around the circle. 1) The organization identifies the change needs and issues. All teams play a role by supplying their perspective of needs and issues. Employee focus groups facilitated by a group such as BIG provides insight into the issues facing the organization. 2) Priorities to ensure that the important needs are addressed and the appropriate efforts defined are set by the executive team and formal senior management teams (senior management council, center of excellence steering committee, and strategic business council). 3) Task teams can then further define the problem and identify potential solutions.

For example, 4 senior management task teams defined various elements of KSC's strategic plan, and an employee task team refined an initial set of center-wide performance metrics developed by a senior management task team. 4) The task team then provides recommendations to the executive and/or senior management teams. 5) & 6) The task team implements and assesses the recommendation. Given a transformation is a complex effort, the organization needs to integrate and manage the diverse change initiatives.

Moving into the circle's center, 7) provides integration by the executive team with support of BIG for the transformation efforts. 8) The executive team with support of the senior management teams continuously communicates expectations and reviews throughout the organization. The BIG provides support throughout the change effort by completing its charter to be the innovation group at KSC.

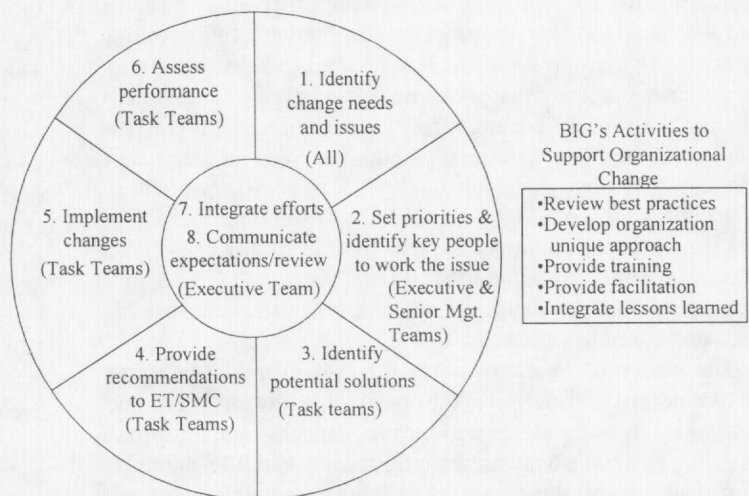
This process extends the plan-do-study-act cycle from quality management. Steps 1 & 2 are planning; steps 3 – 5 are doing; step 6 is studying; and steps 7 & 8 are acting. The process supports work on specific initiatives or projects within a strategic management or transformation process.

Systematic Process Case Example: Implementing ISO 9001.

KSC used formal and ad-hoc teams in a systematic fashion to achieve ISO 9001 certification. While chartered with long-term goals in mind, BIG's first task was to gain ISO 9001 certification. BIG worked with the senior management team and formed an informal employee task team called the ISO 9001 implementation team. Retreats were held with the senior management team to discuss ISO 9001 benefits and how certification supports KSC's goals. BIG also visited directorate and organizational all-hands meetings in order to facilitate question and answer sessions with employees. BIG led monthly status reviews with the senior management team to bring problems and issues before the senior management team for resolution. Senior management team involvement demonstrated to employees KSC's commitment to the ISO certification.

The ISO 9001 implementation team had 1 member from each of KSC's 19 directorates and organizations. The ISO 9001 implementation team was chartered to build an

Exhibit 4. Integrating team roles and responsibilities



ISO compliant management system. Team members distributed lessons learned, program decisions, and documented procedures for real-time dissemination of information to each directorate and organization. The informal task team met bi-weekly for the first 12 months, and weekly for the six months prior to certification. KSC dissolved the team immediately following certification. NASA's administrator and KSC's center director presented each team member with an award.

Develop a "Quick Start Study" Program. Large-scale organizational change requires a new skill set that organizational members may not have (Dotlich and Noel, 1998). As part of the "3. identify potential solutions" and "5. implement changes" steps shown in Exhibit 4, the task team should undergo a "quick start study" program. This training can be peer taught within the team and utilize outside collaborators as needed. Its intent is to disseminate a breadth and depth of knowledge as rapidly as possible and to get team members to a consistent knowledge level. Concepts include the issue or problem's history, government or legal issues, current literature, and best practices.

Quick Start Study Case Example: Deploying a Customer Feedback Process. KSC has used an informal task team to develop and deploy a customer feedback process. A critical success factor in KSC's transformation is retaining and attracting new customers. With this in mind, KSC defined four major strategies focusing on managing and measuring customer satisfaction. The assistant director of business operations identified the need to charter a team to address these strategies. With the organization being more of a technology industry, the team's customer satisfaction experience was limited. Thus, the second author provided a "quick start study program."

This task team developed tools and processes, and then deployed a customer feedback process. KSC used this feedback to drive organizational improvement projects with results being reported back to the customers. The quick start study program provided a common framework and understanding for all team members. Program elements included the basis of customer satisfaction, importance of developing customer knowledge, feedback methods, and relationship management. Other elements included critical issues of organizational leadership and culture and performance measurements. In weeks, the 12 active team members had developed a high level of competence in a new area. The team is still developing leading-edge approaches, processes, and tools for KSC to become customer focused.

Conclusions

KSC's change infrastructure has helped KSC lead, project manage, learn, and systematically change to a development center. For example, KSC is playing a major role in developing a new checkout and launch control system for the Space Shuttle and new generation vehicles such as the X-34. Over 125 civil service employees are working on the project either full-time or part-time. KSC also has approximately 50 civil service employees working on other advanced development initiatives. KSC has also achieved ISO 9001 certification.

Given the time and energy needed to ensure a successful organizational transformation, organizations need to establish the proper change infrastructure. Using both formal and

informal teams allows the organization to balance multiple responsibilities during the transformation. Formal teams such as executive teams or business councils provide leadership. A formal business innovation team provides project management and learning support to the rest of the organization. Informal task teams provide resources to implement the transformation and involvement throughout the organization. A systematic process for integrating teams helps ensure the right sources are completing the necessary efforts at the right time. Quick start study programs help increase a team's and the organization's knowledge.

These findings can be generalized to other organizations by the nature of the challenges and the actions for leading, project managing, and learning about systematic change. The specific implementation of the concepts will need to be tailored for each organization. We are continuing to conduct applied research on the critical success factors for successful transformations.

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