# Considerations in Change Management Related to Technology

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**Objective:** *The authors describe the complexity of social processes for implementing technological change. Once a new technology is available, information about its availability and benefits must be made available to the community of users, with opportunities to try the innovations and find them worthwhile, despite organizational resistances.*

**Method:** *The authors reviewed the literature from psychiatry, psychology, sociology, business, and technology to distill common denominators for success and failure related to implementing technology.*

**Results:** *Beneficial technological innovations that are simple to use and obviously save everyone time and effort are easy to inaugurate. However, innovations that primarily serve management rather than subordinates or front-line utilizers may fail, despite considerable institutional effort. This article reviews and outlines several of the more prominent theoretical models governing successful institutional change.*

**Conclusions:** *Successful implementation of difficult technological changes requires visionary leadership that has carefully considered the benefits, consulted with influence leaders at all organizational levels to spot unintended consequences and sources of resistance, and developed a detailed plan and continuous quality assurance process to foster implementation over time.*

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Today's society has entered the information age, where technologies have been developed and implemented to enhance the access, dissemination, and storage of information. To illustrate, the computer-based patient record (CPR) or electronic medical record (EMR) has been touted with great promise to revolutionize the practice of medicine. It has been credited with improving the practice of medicine through ease of access and retrieval, improved documentation, decision support systems with reminders and alerts, links to medical knowledge (e.g., clinical guidelines), efficiency, and data collection for outcome measurement. Tang et al. (1) studied 50 progress notes by physicians using a CPR versus handwritten notes and determined that those who used a CPR produced more complete documentation and documented more appropriate clinical decisions (1).

Despite these advances, many health care systems have struggled to implement such systems. For example, in the late 1980s, the County of Los Angeles, California, purchased the IBAX system and wasted considerable time and effort before it ultimately failed due to cost overruns and a lack of physician support and utilization. At Cedars-Sinai Medical Center in Los Angeles, for example, a computerized physician order entry (CPOE) system was suspended when physicians complained that the new system slowed down the process of filling and checking the accuracy of prescription orders and even lost orders in the system. Cedars-Sinai plans to eventually reinstall the CPOE system when problems are resolved (2).

Several barriers may interfere with the successful implementation of electronic medical records. For example, costs for computer equipment, software, and support staff can be prohibitively expensive. Menu-based user interfaces have been cumbersome and unforgiving but are evolving into more intuitive graphical interfaces. Whether or not physician time is preserved through the use of a CPR is controversial. Integrated voice-recognition software may

be time-saving, but only after the initial investment of time to learn and train on these systems. For CPRs that require physician typing, patient practice patterns are often altered, reflecting a decreased percentage of eye contact between patients and their physicians (3). Older physicians who trained prior to the widespread use of computers are accustomed to dictating their reports for an assistant to transcribe for placement into a paper medical record. The new expectation to personally type the report can be problematic for these physicians and nontypists, who may feel demeaned by the new duty and consequently strongly resist change. The structured EMR may force doctors to enter more data and to enter data online (4). Final barriers include challenges of integration with legacy systems, billing systems, and practice management systems, as well as communication with physicians still using paper records (4, 5).

In spite of the plethora of possibilities for improved patient care through the use of technology, human factors present the greatest impediment to the implementation of new systems. Success depends upon a blend of both technical and strong organizational skills to manage these changes. This ability requires understanding how innovations diffuse through groups (6), assessing the group's readiness for change (7), the role and impact of organizational culture, recognizing and planning for resistance to change, having leadership and communication skills, and a clear, strategic plan for effective transformation. Without attention to these psychological aspects of change, failure of implementation is likely due to "lack of foresight and planning, poorly executed interventions, and insufficient attention to how change is experienced by the people who do most of the changing" (6, 8).

This article will briefly review these aspects of culture change, focusing on attempts to introduce new technologies into medical communities where those in leadership may find themselves wondering whether "old dogs are capable of learning new tricks."

## Diffusion of Innovation Theory

In 1962, Everett Rogers (6) outlined four elements in the diffusion of innovations: the innovation itself, communication channels, time, and the social system. He defined diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system" and described diffusion as a special form of communication with the message of a new idea in order to bring about social change, a process by which changes occur within the structure and function of a social system.

The innovation represents a potential efficacy in solving a perceived need or problem. Individuals with intrinsic curiosity and comfort with technological innovations experiment with a new innovational product or process. If the experiment shows promise, influential individuals excitedly share the new approach with a group of "early adopters" who, in turn, attempt the new innovation. Once enough individuals join in utilizing an innovative process, the group reaches a "tipping point," where adoption of the innovation evolves rapidly. Innovations with clear advantages diffuse rapidly; for example, the telephone, fax machine, e-mail, Internet, Google search engine, and Apple iPod. When an innovation is compatible with existing values, past experiences, and needs of potential adopters, appears to make things "faster, cheaper and better," and requires little skill or training, it will be quickly diffused and assimilated. However, when one or more of these elements are experienced as problematic, diffusion will be much slower and may, ultimately, fail.

If a group's opinion-leaders profess to like something—because in their personal experience the innovations are useful—the group will follow the leader. However, if the respected opinion-leaders find fault, the rest of the group may reject outright initial explorations.

## Assessment and Enhancing Readiness for Change

Successful change requires both individuals at all levels and organizations to change. The more complicated the innovations, the more the "rank and file" must be involved in change processes. Complicated processes may seem wonderful to leadership, but can be perceived as burdensome, overly complicated, and ineffective by those in middle management and on the front-lines. Unless each level perceives the intended changes to be in their own interests, they may not cooperate with implementation. When objections to innovation are not adequately addressed or assessed, those affected may refuse to participate or, in subtler fashion, may engage in passive-aggressive behavior, such as delay, which sabotages the implementation plan. All sorts of unintended consequences may occur.

Assessing how ready to change a group of individuals and organizations may be is complex. Readiness is associated with people's perceptions of whether they have financial support, a well-defined mission, leadership structure, a cohesive work team, the technical skills needed to adopt an innovation, and the extent to which they see their own needs for safety, security, and autonomy protected. Armenakis et al. (9) defined a model for enhancing change readiness in organizations, which involves 1) assessing, 2)

contextualizing, and 3) enhancing readiness. In this model, assessment includes the use of survey instruments, focus groups, clinical interviews, site visits, and community profiles. Strategic planning for such assessment of change requires first identifying types of information about the individuals and institutions involved, providing a framework for planning the campaign and understanding how it works and what it may achieve, and providing a framework for integrating related theoretical constructs. Contextualizing readiness involves helping individuals to develop attitudes and beliefs that provide the "big picture," to understand the larger context in which the new innovation will be implemented. The personal attributes of the "change agent," the person implementing the plan, such as perceived credibility, trustworthiness, sincerity, and expertise, also affect the development of readiness to change. Internal change agents who are mid-range authority figures are often the most successful in assessing and developing readiness.

Individual differences, social differences (in role, status, power, and authority), and social relationships all have important implications for increasing organizational readiness for change and implementing change programs. Most importantly, active participation by individuals at all levels, particularly those who enjoy positions of influence with their peers, subordinates, and superiors, enhances readiness because people trust what they learn through their own experiences and from those they respect (6).

Andrea Soldano at Symmetrix Consulting created a checklist of factors to help organizations measure readiness for change (Appendix 1) (10).

### Resistance to Change

Implementing innovations often meets resistance to change. Many senior managers forget a critical principle of change management: organizations do not change; people do (11). Three points about resistance are useful to consider: (10)

- Resistance is inevitable, to the extent that the intended changes will cause some individuals loss of control
- The degree of resistance hinges on the extent to which people like the change
- Resistance can be overt or covert. Both are equally damaging

Stages of resistance to organizational change, likened to Kubler-Ross's stages of grief in "On Death and Dying," have been characterized as follows: (11).

- Stability—the status quo
- Immobilization—the initial shock reaction to a negatively perceived change
- Denial—the person hopes that the change project is not real
- Anger—characterized with frustration often directed toward others
- Bargaining—an attempt to minimize the impact of change
- Depression—the sentiment experienced when bargaining has failed, also representing the beginning of acceptance
- Testing—similar to bargaining, but now the person accepts the change and figures out how to succeed under the new conditions
- Acceptance—completion of change

An outside organizational consultant who facilitates workers' grief processes may help (12). Such consultants may provide a safe, nonpunitive environment—a transitional space—in which employees may safely explore the implications of the imposed changes. The consultants may explore how anxieties and uncertainty, the introduction of additional complications in the form of new procedures, red tape, regulations, and other factors appear to take precedence over problem-solving, provision of services, and addressing worker concerns.

### Leadership

Leadership is crucial in the implementation of change. Continuous, committed, and active leadership that sets direction and develops vision and strategies is required for organizational change to succeed (13). Effective change leaders employ the following behaviors: (13)

- Embrace change when needed and take initiative
- Develop a vision for change and communicate its urgency
- Communicate with managers and employees, individually and through mass media, with feedback options
- Stay actively involved
- Direct and review change management planning and implementation

Most importantly, leadership can set into motion the processes to determine if the intended changes really make sense to those closest to implementing them and to those who are going to be affected by them. Several approaches, such as those of Deming (14, 15) and of Nadler et al. (16), describe detailed tactics for working through problems and change in large organizations that are likely to spot problems and unintended consequences before they occur and increase the likelihood that innovations that make sense will be implemented successfully.

John Kotter, Professor of Leadership at Harvard Business School, highlighted eight essential factors for trans-

formation efforts (Appendix 2) (17). Transformation takes time, and a renewal effort will lose momentum if there are no short-term goals to meet and celebrate. Without visible reward, such as recognition, promotion, or bonus, many people will give up or join the resisting group. These performance improvements must be planned and actively created and achieved. This tenet is important when major change takes a long time, as urgency levels can drop. Thus short-term wins keep the urgency level up and force detailed analytical thinking to clarify or revise the vision.

Implementing change is hard work, and there is a temptation to celebrate wins early. "Celebrating a win is fine; declaring the war won is catastrophic." New changes are fragile and subject to regression, so until they sink deeply into the culture, which can take 5 to 10 years, the effort must continue. A premature victory celebration kills momentum and allows the force of tradition and complacency to take over. Leaders of successful change efforts should use the credibility of short-term wins to tackle new and bigger problems. They should change systems, structures, and policies that do not fit the vision, continue to hire, promote, and develop employees who can continue the vision, and reinvigorate the process with new themes, ideas, projects, and change agents.

Finally, the sign of acceptance of change is when it becomes the established process. Implementations rooted in social norms and shared values will succeed if they clearly and continuously make things better for those responsible for implementing them on a day-to-day basis, and when leadership, including opinion-leaders at all levels, backs these changes in deed as well as in word.

### Six Questions for Starting the Change Process

Prior to initiating a change process, management, together with clear-minded representatives and influencial leaders of those closest to and most heavily affected by the envisioned changes, should carefully revisit the following questions: (16)

- Exactly what problem are we trying to solve with this rule/regulation/innovation?
- Is this really the best way to approach it?
- What unintended consequences can be anticipated?
- What alternative approaches might work better?
- What is the "value added" of the innovation? Is it easily evident to those who carry it out as well as to those for whose benefit the innovations have been introduced?
- Can you actually demonstrate the added value?

## Conclusions

The key to successful change management involves the ability to integrate the various considerations outlined above. This complex task requires technical, organizational, and communication skills, as well as an understanding of group dynamics and individual human behavior. When utilizing these frameworks with the right initial vision, leadership skills, and a continual quality improvement process, successful change can be implemented and, in many instances, achieved.

### APPENDIX 1. Checklist of Factors to Help Organizations Measure Readiness for Change

Sponsorship (endorsement of change from the top)
Leadership (day-to-day support for change)
Motivation (urgency from top management to implement change)
Direction (clear vision of what should result from change)
Measurements (ways of determining achievement of change)
Organizational context (relation to other actions or changes)
Processes/functions (staff willingness to change for the good of the organization)
Competitor benchmarking (how other competitors are doing with similar changes)
Customer focus (knowledge and understanding of customers and about the anticipated change)
Rewards (what managers and employees get for changing)
Organizational structure (balance between flexibility to encourage change and sufficient stability to allow change to unfold over time)
Communication (open, two-way communication at all levels about the change program)
Organizational hierarchy (number of levels in the organization, the fewer the better)
Prior experience with change (and degree of success)
Morale (spirit and trust in the workforce)
Innovation (encouragement for innovation in the organization)
Decision-making (degree of staff involvement in decision-making, combined with rapid turnaround when decision is needed)

### APPENDIX 2. Eight Essential Factors for Transformation Efforts

1. Establishing a sense of urgency
2. Forming a powerful guiding coalition
3. Creating a vision
4. Communicating a vision
5. Empowering others to act on the vision
6. Planning for and creating short-term wins
7. Consolidating improvements and producing still more change
8. Institutionalizing new approaches

**APPENDIX 3. Web Resources**

| Resource | Web Site |
|---|---|
| Change Management 101: A Primer | http://home.att.net/~nickols/change.htm |
| Change Management Learning Center | http://www.change-management.com |
| Change Management Tool Book | http://www.change-management-toolbook.com/index.html |
| Management Science: Change Management | http://www.bpubs.com/Management_Science/Change_Management |
| Change Management | http://en.wikipedia.org/wiki/Change_management |

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