

Technology Adoption: Managing Change

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Even in a practice of only one physician, any change in the technology used in the office will have some impact due to adjustments needed to be made by the staff or problems due to connecting with and compatibility to other electronic systems. It may appear to be a simple process to implement a technological change such as an upgrade in the medical billing software or to add use of an electronic medical record, but this process can be more complex and frustrating. Especially in the context of a large organization, new computer systems affect more heterogeneous groups of people and organizational areas, thus creating a challenge that is more behavioral than technical.¹ Therefore, successful change depends upon a blend of technical and strong organizational skills to manage this technology change.

Successful change involves managing change. This ability requires the understanding of the difference between change and change management, insight from diffusion of innovation theory, ability to assess readiness and build support for change, recognizing and planning for resistance to change, leadership and communication skills, and a clear strategic plan for effective transformation. With attention to these issues in change management—which incorporates various theories from disciplines including management, social psychology, and organizational studies—the process of organizational change will be smooth and effective.

CHANGE VERSUS CHANGE MANAGEMENT

The distinction between change and change management is subtle yet important. Change is part of daily life, both personal and professional. The human body is cued in to changes via the senses such as sound and vision. Subtle changes in sound frequency, direction, or even a flash of light trigger pathways in

the brain that invoke an immediate response to turn the head toward the source before the event has registered in the cognitive process. With the complex demands of daily life, human behavior often gravitates against change, such as selecting the same seat in a recurring meeting without seat assignments.

Change management refers to the process by which an organization gets to its future state.¹ This concept differs from mere planning in that while planning defines the steps to take, change management facilitates the process. Creation of change demands that the goal for change is clear and mutual among the various stakeholders, and the process empowers these individuals to act as change agents to attain that goal. These individuals need realistic plans with a systems approach to achieve the goal. Change management includes the strategies and programs necessary for the change agents to accomplish the task at hand.

DIFFUSION OF INNOVATION THEORY

Rogers² outlines four elements in the diffusion of innovations, which include the innovation itself, communication

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channels, time, and the social system. He defines diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system. Communication is defined as a process in which participants create and share information with one another in order to reach a mutual understanding. Diffusion is 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 in the structure and function in a social system.

An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption.² The key is not its first use or discovery, but rather the perception of newness, as this affects a person's reaction to it. This newness gives the innovation a special character of uncertainty. Rogers² describes a technologic innovation as one that creates uncertainty in the minds of potential adopters about its expected consequences; it also represents an opportunity to reduce uncertainty of information embodied in the innovation itself. In other words, the innovation represents a potential efficacy in solving an individual's perceived need or problem. It is this advantage that stimulates and motivates an individual to learn more about the innovation.

Once this process of information-seeking activity has reduced the uncertainty to an acceptable level, a decision concerning adoption or rejection will be made. There are two types of information; namely, software information and innovation-evaluation information. Software information is inherent in the technology and serves to reduce uncertainty about the cause-effect relationship in achieving desired outcome. This is represented by questions such as, "What is the innovation?" and "How does it work?" Innovation-evaluation information is the reduction in uncertainty about an innovation's expected outcome. This is represented by questions such as, "What are the innovation's consequences?" and "What will its advantages and disadvantages be in my situation?"

Innovations have characteristics that are perceived by individuals that impact their rate of adoption. Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes. The objective advantage does not matter as much as the perceived advantage of the individual. It is positively related to the rate of adoption. Compatibility is the degree to which an innovation is perceived as being consistent with existing values, past experiences, and needs of potential adopters. It is also positively related to the rate of adoption. An idea that fits within the present values and norms will be more readily adopted, and an incompatible innovation will require a change or new value system. Complexity is the degree to which an innova-

tion is perceived as difficult to understand and use. New ideas that are simpler to understand will be adopted more readily than innovations that require the adopted to develop new skills. The complexity of an innovation as perceived by members of a social system is negatively related to its rate of adoption. Trialability is the degree to which an innovation may be experimented with on a limited basis, and is positively related to the rate of adoption. Hence, new ideas that are tried in installments or stages will generally be adopted more quickly than those which are not divisible, because the former represents less uncertainty. Observability is the degree to which the results of an innovation are visible to others. Such visibility stimulates peer discussion and diminishes uncertainty.

Communication channels are the means by which messages are exchanged from one individual to another. Mass media are more effective in transmitting knowledge of innovation to the organization, whereas interpersonal communication or channels are more effective in forming and changing attitudes to influence adoption of innovation. Interpersonal channels are more effective when the individuals are near-peers. In particular, transfer of ideas occurs more frequently when individuals are more homophilous, which is the degree to which they are similar in certain attributes. However, most communication in innovations involves heterophilous or different participants such as a change agent and client, which may diminish the efficacy of the information transfer.

Time is an important element of the diffusion process. It is involved in the innovation-decision process, the innovativeness and adopter categories, and the rate of adoption. The innovation-decision process is the process through which an individual passes from first knowledge of an innovation; to forming an attitude toward it; to a decision to adopt, reject, or implement an idea; and confirmation of this decision. The five main steps in this process are knowledge, persuasion, decision, implementation, and confirmation. Knowledge occurs when an individual is exposed to the innovation's existence and gains understanding of its functions. Persuasion occurs when an individual forms a favorable or unfavorable attitude. Decision occurs when an individual engages in activities that lead to choice of adoption or rejection. Implementation occurs when the innovation is put to use. This stage may involve re-invention, where the innovation is modified in the process of adoption. Confirmation occurs when an individual seeks reinforcement of an innovation decision that has been made, which may reverse the decision.

Innovativeness is the degree to which an individual is relatively earlier in adopting new ideas versus other members. This element categorizes individuals into adopter categories, which are innovators, early adopters, early majority, late majority, and laggards. Innovators are active information seekers, and have a high degree of mass media exposure and extensive interpersonal networks. They are usually able to cope with higher levels of uncertainty, and do not depend upon the subjective evaluation of other members of their system. The rate of adoption is the relative speed with which members of a social system adopt an innovation. Most innovations have an S-shaped curve of adoption over time.

A social system is defined as the set of interrelated units that are engaged in joint problem solving to accomplish a common goal. All members cooperate to some extent to solve a common problem in order to reach a mutual goal. Structure is defined as the patterned arrangements of the system, which give it stability and regularity to individual behavior in the system. The social structure of the system affects the innovation's diffusion by setting a boundary within which it diffuses. Norms are the established behavior patterns of the units within a social structure. They define a range of tolerable behavior and serve as a guide for members of the system. These are usually exemplified in the behavior of the opinion leaders in the system. Individuals within the system who are the most innovative are often perceived as deviant, and therefore have low credibility and status. Opinion leadership is the degree to which an individual is able to influence others attitudes or behavior informally in a desired manner with relative frequency. This level is earned and maintained by an individual's technical competence, social accessibility, and conformity to the system norm. This person differs from a change agent, who is an individual who attempts to influence others' innovation-decisions in a desired direction. Change agents rely upon opinion leaders within a social system to effect the desired change.

TYPES OF CHANGE

Lorenzi and Riley¹ define four types of change in an organization, including operational, strategic, cultural, and political change. Operational changes affect the way the ongoing operations of a business are conducted, such as physician order entry. Strategic changes occur in the strategic business direction, such as shifting from inpatient to outpatient work. Cultural changes affect the basic organizational philosophies by which the business is conducted, as exemplified by implementing an ongoing peer-review system. Political changes in staffing occur for political reasons such as those in government agencies.

These types of changes have an impact at different levels of the organization. Upper-level management may not be impacted by strategic change, whereas entry level staff may be impacted greatly by operational changes. Cultural changes may have ramifications throughout the organization, but political changes impact those at higher levels of the organization, usually due to power struggles or change in leadership.

BUILDING SUPPORT FOR CHANGE

The change process requires steps to build support for change. Maurer³ highlights a 12-step checklist to facilitate support for change (Table 1). Support for change is a continual process that requires surveillance of progress and/or resistance, education of stakeholders on the goal, keeping the urgency of change at the forefront, and maintaining visibility of the project throughout the life cycle.

TABLE 1
SUPPORT FOR CHANGE CHECKLIST³

- Identify the stakeholders and determine what you need from each stakeholder as well as what support you are likely to get.
- Make a case for change. Demonstrate the need for something to change that has both intellectual and emotional impact.
- Determine strategies that will help you continue to make the case for change throughout the life of the project. Keep reminders going on why change is critical.
- Determine who will lead and who will take part in planning this change.
- Look for potential resistance. For example, watch for trust in change leaders, do not move ahead before demonstrating how change is urgent, address fears of people who are afraid of change.
- Undertake all subsequent actions in a way that allows you to mitigate problems. Focus on both technical and human elements of change.
- Create a vision that lets people know where you are headed.
- Develop a plan for reaching the vision. Ensure proper stakeholders are involved in the planning process to ensure their support of the change.
- Create measures of success and timelines.
- Keep the change alive. For example, ensure publicity of milestones, spotlight accomplishments, keep focus on goal, maintain project priority.
- Develop contingency plans. Identify resistance and turn opposition into support.
- Celebrate and learn from this change. Highlight successes but also debrief failures.

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RESISTANCE TO CHANGE

Resistance to change is a continual problem that affects organizations on both individual and system-wide levels. Organizational resistance to change is a critical issue, but individual resistance to change can become a groundswell that leads to organizational resistance. Cedars-Sinai Hospital in Los Angeles, California abandoned their computerized physician order entry program in January 2003 when 400 physicians complained that it was difficult, time-consuming, and posed risks to patient safety.⁴ Resistance to change may be conceptualized by Kübler-Ross.⁵ The stages of grief she identified has been adapted to organizational change (Table 2).⁶ To address resistance, change management must incorporate effective communication and leadership as well as continue to build support for change.

LEADERSHIP

Leadership is crucial in the implementation of change. Continuous, committed, and active leadership is required for organizational change to succeed.⁷ Leaders must set direction and develop vision and strategies. They must align people toward change by communicating the vision as an empowering action. Creation of a sense of urgency

TABLE 2
RESISTANCE TO CHANGE⁵

Phase	Description
Stability	This phase represents the status quo
Immobilization	This phase is the initial shock reaction to a negatively perceived change
Denial	In this phase, the person hopes that the change project is not real
Anger	This phase is characterized with frustration that is often directed toward others
Bargaining	This phase represents an attempt to minimize the impact of change
Depression	This phase represents the sentiment when bargaining has failed, but also represents the beginning of acceptance
Testing	This phase is similar to bargaining, except now the person is accepting the change and figuring out how to succeed under these new conditions
Acceptance	This phase marks the completion of change

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or compelling need is vitally important to build consensus and momentum. Successful change management requires leaders to be actively involved as champions, role models, and overseers of change. Successful leaders lead both change and change management.

Carr and colleagues⁷ describe how leadership must define specific roles for change leaders, and must develop an infrastructure to support and facilitate the change implementation throughout the organization. Four key roles are change sponsors, change agents, change advocates, and change targets. Everyone working under the new system is a change target. Change sponsors are leaders responsible for starting the change process and maintaining it. Change advocates are allies of the leadership with the specific task of deploying the vision throughout the organization. Change agents are responsible for making the major decision of working through existing structures or creating new ones. They devise strategies and tactics to positively influence sponsor commitment, target resistance, and measure the readiness of the culture to change.

CONCLUSION

Successful change management involves an understanding of how technology is adopted, supporting the change management process, and having effective leadership and communication. It is a complex task in large organizations, requiring technic, organizational, and communication skills, in addition to understanding of human behavior. *PP*

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