“Innovation is what distinguishes between a leader and a follower” is a statement often attributed to Apple cofounder Steve Jobs. Nowhere is this saying truer than in the realm of information technology (IT), where the blistering pace of change can make even casual observers dizzy. Yet IT innovation can be a two-edged sword. It can empower a health care organization to leapfrog its competitors and delight its customers, or it can weigh on that organization like a millstone around the neck.

How does one reconcile the rapid emergence of technologies with the slower, more deliberate response time of a large organization? One answer is to ignore disruptive technologies, letting nimbler competitors exploit them first. That is a good way to get blindsided or left behind.

Perhaps a better answer is to identify, investigate, and understand new technologies much earlier in their life cycle—months to years before they hit the mainstream—so that organizations have time to get ready. This has been the task of a new group within Kaiser Permanente (KP) Information Technology (KP-IT): the Innovation & Advanced Technology Group (IAT). Only two years old, IAT is a forward-looking group of clinicians, engineers, and business analysts that identifies and investigates the clinical information technologies that are likely to hit the mainstream in the next two to five years. The goal is to develop realistic, objective, and informed recommendations for KP leadership and stakeholders that reduce the risk inherent in new technologies.

IAT is affiliated with KP’s Sidney R Garfield Center for Health Care Innovation, a 37,000-square foot care delivery simulation laboratory located in San Leandro, CA, sponsored by KP-IT, National Facilities Services, and Patient Care Services. Within this facility is a full-sized medical-surgical ward from KP’s template hospital, critical care and special needs patient rooms, operating room, labor and delivery suite, Emergency Department patient room, ambulatory clinic, home care environment, IT lab, and conference space, as well as a test version of KP’s electronic medical record. This unique resource allows KP to analyze technologies, care delivery workflows, furniture, and facility designs in a mock environment that is as close to live as possible without the disruption in patient care that live testing would cause.

Unlike most other health care organizations, KP now has a structure and resources in place to investigate technology vendor claims, markets, and trends independently and without bias. This is very much in the spirit of KP’s approach to pharmaceuticals and gives KP an unquestionable edge in managing a growing health care IT portfolio.

**Hype to Reality**

The first benefit of such a proactive approach is organizational wisdom. Using objective analysis similar to how best practices are defined in medicine, we sift through the hype to discover the truth. IAT develops an accurate picture of benefits, costs, and risks not only...
in the contexts of technology, vendor, industry, market, and time horizon, but in the more specialized contexts of health care and KP.

Unlike pharmaceuticals, IAT’s analysis factors in not just clinical trials and industry studies, but also the important impact of technology on our patients, from ease of use, convenience, and care personalization to seamless care environment transition to emerging trends in consumer technology. Though not strictly clinical, these factors significantly affect the consumer experience and can create meaningful differentiation between competing health plans in an extremely tight market.

Ear to the Ground

Organizational preparedness is a second benefit of this future sensing activity. In some cases, it is better to wait for technologies, vendors, and industries to mature; in other cases, waiting too long results in unnecessarily expensive and wasteful remediation. The future is never entirely predictable, but as we keep our ears to the ground, what we hear may tell us how far away it is and how fast it’s approaching. Wrong turns and detours will occur, but successful organizations correct course quickly and look forward rather than backward.

Competency and Capability

Next is organizational competence. Skilled nurture and management of innovation—itself a sign of innovation in a large company—is a competitive advantage that will grow as IT’s footprint grows and IT matures as a strategic lever in health care. This is a journey we are just beginning to take as an organization.

Core competencies are the production skills an organization develops over time. A sustainable competitive advantage occurs when a group of competencies are integrated with each other into a capability, a broader-based strategic expertise that aligns the value chain to make an organization more effective. A new organizational capability takes time to develop—years or even decades—whether it is the organization or its competitors who are pursuing it.

Over time KP will develop a core expertise—a capability—in how to best manage clinical IT innovation given KP’s strengths, weaknesses, traditions, processes, and complexities. Such expertise can only come from blending the insights of our engineers, clinicians, and business managers with the best insights of outside analysts and academicians. Not only will KP’s decisions be better informed, but KP will avoid the opportunity costs of not fully leveraging its IT investments or failing to recognize when an investment has outlived its usefulness.

This will clearly take time and serious collaboration given the number of silos and agendas in a large organization. Nevertheless, if KP stays the course and visionary leadership continues, such a capability will become a valuable strategic asset that is rare among health care organizations.

Focused Creativity

Organizational creativity is yet another benefit. Innovations are typically built upon prior innovations. It takes an open and creative mind to look at an array of diverse old and new technologies and determine value through adoption, synergy, repurposing, or scope change. The distinction between the “not invented here” syndrome and outsourcing quickly becomes artificial. Such intentional creativity is shaped by technology, processes, resources, capabilities, business priorities, and culture and could be termed focused creativity because the operational objective is topmost in mind.

The Ultimate Goal

Last but not least, superior organizational performance is the ultimate mark of successful IT innovation. In the short term, it may be reflected in improved quality of care, service, cost savings, revenues, or member and professional satisfaction. However, the real litmus test for an organization that claims to be innovative is its willingness to invest further into the future in order to reap advantages that are more strategic in nature—advantages that have the power to change the game itself.

Long-term thinking has not been a traditional strength in health care, but is quickly becoming a top priority as health care organizations recognize the mounting investment they must make in IT to meet strategic business objectives. A 2007 survey of Chief Information Officers found an increasing percentage (79.6%) who felt their roles had become more strategic compared to previous years.

High-Priority Technologies

With KP’s strategic needs in mind, IAT has focused primarily on the following areas in 2008:

- Telehealth: health care beyond the walls of our facilities
- Mobility and wireless: the delivery of health care over mobile devices
• Time and cost savings: use of communication systems to increase efficiency
• Chronic care management: caring for resource-intensive patients
• New forms of care: genomics, robotics, and other disruptive technologies.

Telehealth

Telehealth is the delivery of health care to Health Plan members at a distance. Communication technologies and physiologic monitoring devices are used to extend care and communicate with patients who can be appropriately managed with this modality. Vital signs, weight, and even some chemistries can be tracked remotely through wireless devices. Patients connect with their care team using two-way videoconferencing, voice over IP, or other means. The fundamental guiding principle is that health care should be patient-centric and the hub of care should be where the member is, whether at home or elsewhere.

IAT has engaged many disciplines and groups across the program in a substantial yearlong effort to evaluate and make recommendations on telehealth. The outcome includes reviews of external and internal telehealth programs and their results, a telehealth strategy document, and toolkits for specific telehealth programs.

Telehealth is suitable for chronic illnesses. Patients with diabetes can look forward to products like the GlucoPhone, a convenient integrated cell phone-glucometer that replaces the conventional glucometer with real-time remote management of diabetes through 24/7 measurement and transmission of glucose levels.

Health Hero Network’s Health Buddy is one example of a home-monitoring system that asks personalized questions of a patient through a simple interface, takes in vital signs or weight data from other home devices, and relays this information to the clinical team as part of a two-way communication process.

Motiva from Philips is a TV-based remote patient monitoring system that also provides patient education content for a number of chronic diseases. This system and others like it can be programmed to deliver KP-specific educational activities and recommendations to patients in the home setting.

Mobility and Wireless

Mobility and wireless is an area of focus that recognizes the recent global explosion in the use of mobile devices. These include cell phones, smart phones, ultraportable notebooks and tablets, and handheld entertainment/gaming systems in which features and applications like context-aware user interfaces, voice and text communications, biometric authentication, location tracking, and other capabilities are converging.

Radianse and Sonitor are two companies offering an indoor positioning system, also known as a real-time locating system. They use radio frequency identification and ultrasound tags and sensors, respectively, to
track biomedical equipment, staff, and patients as they change locations in real time, making it possible to track equipment, reduce wait times, optimize workflows, and flag security violations.

**Time and Cost Savings**

Another area of opportunity is time and cost savings based on communication technologies. Some examples are physician social networking, real-time intelligent patient scheduling, and self-service kiosks located in hospital and clinic settings. A time-saving self-registration kiosk has been well received by patients in the Southern California Region, generating broad interest in further pilot studies.

**Chronic Care Management**

Chronic care management is a top priority for most health care organizations due to the disproportionate resources consumed by patients with chronic illnesses. One approach is to deliver care in less intensive settings like the home wherever possible. Thus many of the technologies in this area overlap with those in telehealth. Glucoband is a wristband device from Calisto Medical that continuously and noninvasively measures glucose levels using a proprietary technology called bio-electric impedance spectroscopy. It also meets Food and Drug Administration (FDA) standards for sampling accuracy.

CardioPocket is a 1-lead ECG rhythm strip transmitter in the form of a wallet that tracks cardiac rhythm disturbances while eliminating the need for a bulky, intrusive conventional monitor. The wallet is connected to a cell or regular phone and placed against the chest. Within seconds a real-time ECG strip is sent to a remote monitoring station.

**New Forms of Care**

New forms of care include digital pathology, genomics, robotics, virtual world technology, brain fitness, and many other technologies that are forging new fields of innovation. The Aethion Tug is a hospital courier robot that can pull standard hospital carts from station to station following a digital map, automating the delivery of linens, meals, medications, and lab samples. Tug augurs the growing presence of assistive robots in health care and society.

Forterra and Second Life are two companies that provide online reality simulations. As part of a successful pilot, KP Patient Care Services partnered with Forterra in 2007 to build a virtual replica of a KP hospital ward online. The result was a powerful and cost-effective tool for live collaborative nursing education. Nurses assumed avatars—symbolic representations of themselves—as they worked with other clinical staff in immersive real-time training scenarios.

On the basis of current theories about brain plasticity, PositScience software targets dementia and promotes brain fitness through specially designed interactive games. The company is the first to apply for FDA certification of a brain fitness product as therapeutically effective.
Operating Room of the Future

Another major IAT initiative is KP's Operating Room of the Future (ORF), a collaboration between KP-IT, National Facilities Services, and Clinical Technology to assess future technology needs of ORs by taking a broad view of systems and infrastructure, defining device interoperability, supporting new workflows, identifying issues, and creating a new facility template.

Located at the Garfield Center, ORF will produce greater efficiency in perioperative services, better regulatory compliance, improved quality and patient safety, lower medical-legal liability, greater professional and patient satisfaction, and purchasing decisions that support technology integration and planned infrastructure.

Creating a Culture of Innovation

Other key initiatives include the new KP-IT Innovation Fund to foster internal innovation, and KP’s first user-oriented software development environment, which will support Innovation Fund projects as well as other IT projects. Both are generating organization-wide interest as they round out KP’s approach to IT innovation.

What tidal waves of change will wash over KP in the next decade? Rupert Murdoch is purported to have said, “The world is changing very fast. Big will not beat small anymore. It will be the fast beating the slow.” As technology refresh rates accelerate and hype cycles shorten, a world-class capability in managing health care IT innovation will become mission-critical in order to sustain the organization’s competitive advantage and open green-field opportunities for pioneering leadership. For our patients, IT innovation will create attractive and affordable new ways to access high-quality health care, to stay in touch, and to stay healthy. ◊

Disclosure Statement

The author(s) have no conflicts of interest to disclose.

References


To get more information on IAT or to download technology reports and white papers: http://kpnet.kp.org/iat/
To find out more about the Garfield Center: www.kp.org/innovationcenter/
To contact IAT about job/work opportunities or other matters: iat@kp.org

Kaiser Permanente Operating Room of the Future.
Source: Kaiser Permanente photo

Invent It

The best way to predict the future is to invent it.
— Alan Kay, b 1940, American computer scientist