
Information Technology-Enabled Knowledge Sharing

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INFORMATION TECHNOLOGY OPTIMIZERS

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Table of Contents

NOTICE	2
TABLE OF CONTENTS	3
INTRODUCTION	4
<i>PURPOSE & USE OF THIS DOCUMENT</i>	4
THE STRUCTURE OF KNOWLEDGE	5
<i>KNOWLEDGE SHARING DEFINED</i>	5
<i>BUILDING ORGANIZATIONAL KNOWLEDGE</i>	6
<i>MANAGING ORGANIZATIONAL KNOWLEDGE</i>	7
THE IMPORTANCE OF SHARING KNOWLEDGE	8
<i>CASE STUDY #1: THE ESTES PARK INSTITUTE</i>	8
THE IT-ENABLED KNOWLEDGE SHARING PROCESS	9
IT-ENABLED KNOWLEDGE SHARING IN HEALTH CARE	10
<i>CASE STUDY #2: SCOTTSDALE HEALTH CENTER</i>	10
<i>KNOWLEDGE SHARING VENDORS & PRODUCTS</i>	11
<i>CASE STUDY #3: PARTNERS HEALTH CARE</i>	12
RECOMMENDATIONS FOR HEALTH CARE ORGANIZATIONS	13



Introduction

Knowledge Sharing is capturing significant attention both within and outside health care development circles as intellectual capital is being recognized as an organization's most valuable asset. More than the latest passing management fad, knowledge sharing is becoming a core competency in the corporate world today as organizations are relying upon knowledge to gain or maintain a competitive advantage. Developing a knowledge sharing culture is a primary focus of many top-level managers and executives, and may very well be the key to an organization's success.

This document is an educational briefing about knowledge sharing; specifically, how knowledge is captured and shared, how it can be used to develop and sustain organizational competencies, and how knowledge can be utilized to gain a competitive edge.

Purpose & Use of This Document

This briefing is intended to explore the relationship between knowledge sharing and information technology in the unique health care environment by discussing several issues:

- Knowledge and knowledge sharing defined
- The importance of knowledge sharing
- The need for knowledge sharing capabilities in the health care environment
- Utilizing information technology to create a knowledge sharing environment
- Knowledge sharing tools to meet the needs of unique health care organizations
- Recommendations for health care organizations



The Structure of Knowledge

Knowledge can be categorized as explicit, tacit, structured, or unstructured. Structured knowledge encompasses not only data and information, but also the meaning that such data and information holds for unique organizations. The goal of the health care organization should be to develop structured knowledge - easily adopted and shared by its members - captured in a way that is accessible, understandable, and applicable to their job activities.

Type of Knowledge	Definition	Source
Explicit	<ul style="list-style-type: none"> ▪ Event-specific, discrete knowledge ▪ Conveyed through generic means such as written reports ▪ “What data do I have” 	<ul style="list-style-type: none"> ▪ Patient/consumer ▪ Clinician ▪ Publications ▪ Personal experience
Tacit	<ul style="list-style-type: none"> ▪ Subjective knowledge such as experience, intuition, interpretation ▪ “Tribal” knowledge ▪ “What I <u>believe</u> based on explicit data, my experience, and my goals.” 	<ul style="list-style-type: none"> ▪ Organizational knowledge sharing systems ▪ Individual experiences, encounters deemed valuable to the organization
Structured	<ul style="list-style-type: none"> ▪ Standards, policies, procedures 	<ul style="list-style-type: none"> ▪ Treatment protocols ▪ Policy manuals
Unstructured	<ul style="list-style-type: none"> ▪ Management intuition ▪ Tacit knowledge not shared with organization 	<ul style="list-style-type: none"> ▪ Messages ▪ Memos ▪ Reports

Knowledge does not necessarily fall into one of these distinct “types.” There is some degree of overlap among the different categories of knowledge (as shown in the table below):

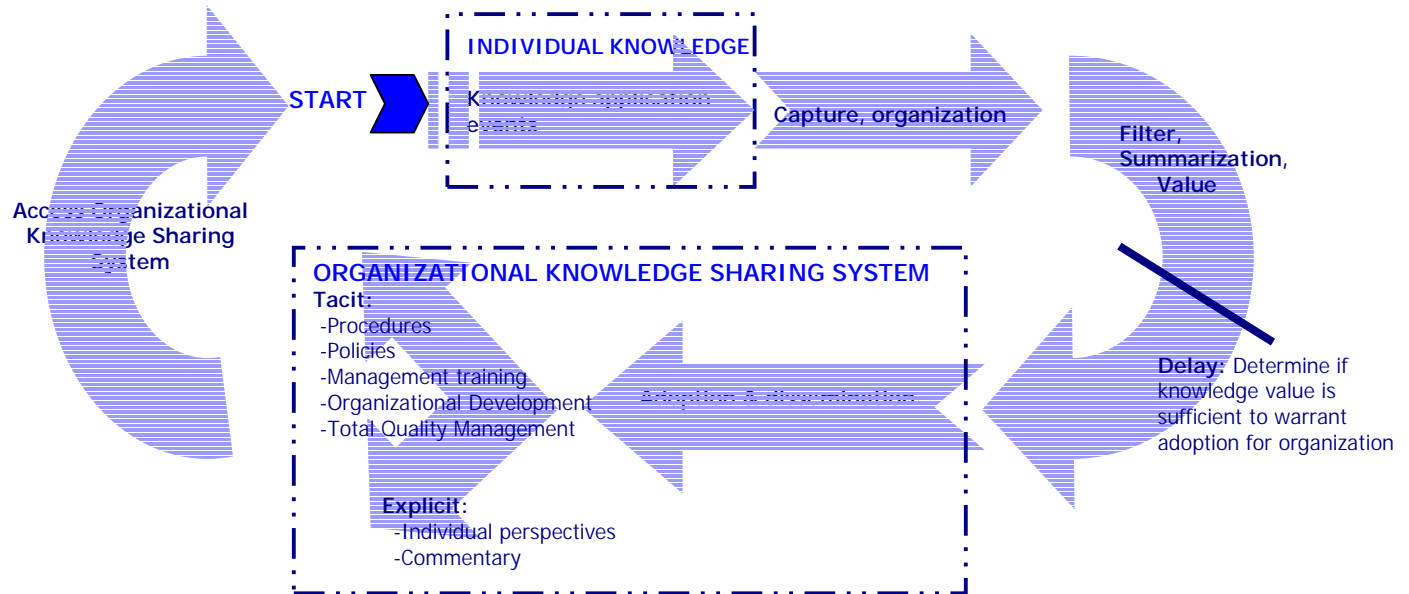
Examples	Structured	Unstructured
Tacit	<ul style="list-style-type: none"> ▪ Treatment protocols ▪ Policy manuals ▪ Disease management systems 	<ul style="list-style-type: none"> ▪ Opinions ▪ Perspectives ▪ Experiences
Explicit	<ul style="list-style-type: none"> ▪ Data sets ▪ Information of value to individuals, but not organization as a whole 	<ul style="list-style-type: none"> ▪ Memos ▪ Documents ▪ Reports

Knowledge Sharing Defined

Knowledge sharing is the ability for an organization to capture, organize, share, store, and retrieve disparate information that is otherwise fragmented, and convert it into enterprise knowledge.



Building Organizational Knowledge



The organizational knowledge building process describes the methodology behind capturing intellectual capital and utilizing it to create a knowledge enterprise. It is a continuous cycle of events that includes several components or stages.

- **Individual Knowledge Application Events – starting point**
 - Experiences
 - Encounters
 - News
 - Marketplace trends
 - Explicit Data
 - Organizational goals
- **Capture & Organization**
 - Retrievable, searchable format
 - Databases, data warehouses
- **Filtration, Summarization, and Determination of Value**
 - Information reviewed by executives, management
 - Valuable information identified
 - Comparison of new information with existing processes, goals
 - Period of delay while this process takes place
- **Adoption & Dissemination**
 - Knowledge determined to be of value is adopted



- Valuable knowledge is made available for use for the organization
 - Explicit knowledge will be used to form individual opinions or perspectives
 - Tacit knowledge will be used to update policies & procedures, contribute to training & development, and total quality management
- **Access Organizational Knowledge Sharing System**
- Updates and changes are implemented into organizational system

Managing Organizational Knowledge

The complexity and importance of developing a knowledge-oriented environment has led to a growing number of organizations implementing the position of Chief Knowledge Officer (CKO). This executive must have the vision to view knowledge as a core component of a strategic business plan, as knowledge is constantly evolving to meet the changing needs of an expanding community. The CKO must encourage and support open communication, which in many cases is driven by information technology.

In organizations without an appointed CKO, it is up to the management and executive team to meet the goal of structured organizational knowledge. This process involves several steps, and integrates explicit, tacit, structured, and unstructured data as knowledge is adopted and disseminated throughout an organization.



The Importance of Sharing Knowledge

Quality health care thrives in collaborative environments. Knowledge derived from shared ideas or experiences between peers, counterparts, partners, and the community can have a profound impact on patient care. Leading organizations enable and foster this culture of knowledge sharing to promote:

- Development of a management team & consistent culture
- Quality management and cost reduction
- Improved customer service
- Reduction of employee training costs and learning curves
- Consistent, quality health care through use of guidelines
- Effective patient management processes
- Framework development for evidence-based medical care

Health care organizations can learn from each other as they strive to meet a common goal: quality, cost-effective patient care. The following example describes one method for sharing knowledge among health care organizations.

Case Study #1: The Estes Park Institute

The Estes Park Institute (EPI) is a health care organization that provides unique opportunities for learning by transcending traditional organizational barriers. EPI regularly sponsors forums, which attract board members, medical staff leaders, practitioners, and health care executives across the nation, allowing them to discuss and explore health care issues affecting their own communities. These professionals are then able to take back what they have learned and apply that knowledge appropriately to meet their community's unique needs and the specific business objectives of their health care organizations.

Professional organizations frequently hold meetings to discuss industry trends, or to develop solutions for community health issues. However such meetings commonly segregate groups of people by function. Executives may attend one such event, while clinical nurses may all convene at another. EPI offers their forums to health care workers of all levels to maximize the depth of experience and knowledge that can be shared.



The IT-Enabled Knowledge Sharing Process

The information technology tools needed for knowledge sharing vary depending upon the depth and breadth of the knowledge an organization requires as they make decisions about business goals and processes. Those that are able to process valuable information into knowledge more rapidly will enjoy a competitive advantage.

The following table lists the basic information technologies for building enterprise knowledge, as well as some of the characteristics of those technologies.

Technology	Characteristics
Collaborative Systems	<ul style="list-style-type: none">▪ Email▪ Shared drives▪ Intranet▪ Topic & content posting, review▪ Chat groups▪ Policy, procedure, guideline databases▪ Exception management, automated work queues
Data Access & Visualization	<ul style="list-style-type: none">▪ Software for document creation & viewing▪ Document management
Databases	<ul style="list-style-type: none">▪ Structured & unstructured▪ Searchable by keyword, topic▪ Indexed by organization topic, policy, procedure, and process
Decision Support Systems	<ul style="list-style-type: none">▪ Artificial intelligence▪ Drug interactions▪ Patient care protocols▪ Practice pattern evaluation
External Search Engine	<ul style="list-style-type: none">▪ Internet/web access▪ Library▪ Links to affiliated organizations▪ Consumer access
Intelligent Transaction Systems	<ul style="list-style-type: none">▪ Clinical order-entry capability<ul style="list-style-type: none">-feedback/alternative treatments▪ Exception management<ul style="list-style-type: none">-procedure authorization-identification of errors or omissions▪ Heuristic/interactive processing
Security	<ul style="list-style-type: none">▪ Password protection▪ Tiered authorization, control parameters



IT-Enabled Knowledge Sharing in Health Care

The challenge faced by the health care industry today is the delivery of high-quality, cost-effective care to patients in response to the driving forces of managed care and changing consumer behavior. In order to meet this challenge, health care organizations must recognize that knowledge is a valuable asset, which includes the concatenation of information from many sources: provider, patient, laboratory, insurance carrier, and competitor to name a few. Information technology drives knowledge sharing, which effectively is the key to clinical decision making, total quality management, and cost effectiveness.

The knowledge base of a health care organization is continuously refreshing and updating itself as new data emerges or becomes available. Information technology can enable the consistent provision of quality health care by keeping the organization's knowledge base updated and accessible to all who can benefit from it.

Outside of the clinical or hospital setting, health care organizations also must reach out the community to interactively share information. Technologies such as consumer health networks or personal health profiles can be another way for health care providers to care for their communities. An example of information technology-enabled knowledge sharing in community outreach is the DC Ranch project partially sponsored by Scottsdale Health Center.

Case Study #2: Scottsdale Health Center

Scottsdale Health Center in Arizona has found a method of reaching out to its community by integrating its services and creating a health and wellness center. They employed McKesson/HBOC to provide networking systems and software to build a foundation for the integration of their services so that at any point of entry in the SHC system, a patient's entire history and profile can be accessed. SHC then partnered with developers of DC Ranch, which is a master-planned community of 4,500 homes. They became the preferred health care provider for this community by providing HealthDesk Online personal health and care management software to each health care consumer. In addition, the SHC intranet was extended to the community via virtual kiosks and on-line links from consumer to health care provider, and through school programs and a centrally located Health Resource Center. Residents of DC Ranch have the ability, through the services provided by SHC, to participate in disease management protocols from home, access online libraries of medical information, conduct video teleconference with health care providers, schedule medical appointments through the Health Resource Center, attend health education and fitness classes, and get health information from touch-screen kiosks.



Knowledge Sharing Vendors & Products

There are many vendors offering knowledge sharing technology products, but there are few that truly have a focused vision or knowledge sharing strategy. Although there are not any knowledge sharing products designed specifically to meet the needs of the health care industry, many available products can be sufficiently adapted to do so.

Vendor	Product(s)	Vision
<p>Hyperknowledge Cambridge, MA</p>	<p>Hyperknowledge®: an index to organizational information</p>	<ul style="list-style-type: none"> ▪ “A discovery about the structure of knowledge”™ ▪ Allows presentation of knowledge in terms of how, what, and why ▪ Combines information from various systems
<p>grapeVine San Francisco, CA</p>	<p>grapeVine: uses organization-specific taxonomy or category tree to classify new documents against established categories</p> <p>Uses gV Wizard to create categories</p>	<ul style="list-style-type: none"> ▪ Monitors designated places (websites, file servers, Lotus Notes databases, etc) for useful information ▪ Users create interest profiles, or lists of topics ▪ grapeVine alerts users of information that matches their specific interest profile via email
<p>Fulcrum/PCDOCS Burlington, MA</p>	<p>DOCSFulcrum™: knowledge retrieval and analysis capability</p> <p>SearchServer®: information retrieval engine</p>	<ul style="list-style-type: none"> ▪ Enterprise-wide view of information sources from single point of access ▪ Integrates content from diverse sources ▪ Leverages power of Web ▪ Deploys knowledge through intranet, extranet, and internet ▪ Security features for data storage ▪ Integrated with Web browsers, Microsoft Outlook or Exchange ▪ Advanced search tools ▪ ProActive Agents allow users to define what information to search for ▪ Web crawler ▪ High-fidelity viewing or HTML rendering ▪ Email & attachments – searches not limited to structured data ▪ Customizable ▪ Integrated with Microsoft Windows NT, designed for Microsoft BackOffice
<p>Lotus Cambridge, MA</p>	<p>Lotus Notes®: client software for automating communications & administrative processes</p> <p>Lotus Domino®: server for creating web-based applications</p>	<ul style="list-style-type: none"> ▪ Communicate across departments & facilities ▪ Integrate disparate systems with unified front-end ▪ Schedule patients, procedures, staff and resources ▪ Share real time treatment information ▪ Manage inventory and materials ▪ Route claim forms to payers ▪ Establish websites for access by consumers ▪ Security features to protect confidentiality



Vendor	Product(s)	Vision
<p>Intraspect Los Altos, CA</p>	<p>Intraspect Knowledge Server 2.5</p>	<ul style="list-style-type: none"> ▪ Information collection – users can import objects from web browsers, upload files, send emails with attachments ▪ Information sharing – online workspaces for collecting & organizing information with versioning and access control ▪ Information organization – hierarchical organization of information ▪ Integrated discussion – enables discussions to be held within workspaces where documents are shared ▪ Discovery & search – indexes automatically for full text search of all collected documents
<p>Verity Sunnyvale, CA</p>	<p>Verity® product suite:</p> <ul style="list-style-type: none"> ▪ Verity Information Server ▪ Verity Developer Kit ▪ Topics® ▪ Verity Profiler ▪ Verity Internet Spider ▪ Verity K2™ Toolkit ▪ Verity's Agent Server 	<ul style="list-style-type: none"> ▪ Index & classify information ▪ Search & retrieve ▪ Organize & navigate ▪ Notify & disseminate ▪ Publish & view

As more and more health care organizations are moving toward the Integrated Delivery System (IDS) model for the provisions of their services, knowledge sharing becomes an important component to incorporate into their information systems. Since the IDS is a combination of several disparate health care entities, they commonly must integrate disparate computer systems as well.

Case Study #3: Partners Health Care

The Chief Information Officer at Partners Healthcare in Boston describes his knowledge sharing concept in terms of “constellations” – draw a line around any facility within this healthcare system and you will capture 80-99% of all relevant activity. It is important that higher levels of cooperation and integration exist within each constellation rather than within the healthcare system as a whole. Affiliates of Partners are separate entities, and do not standardize on their systems unless there is good business reason to do so. As long as communication and knowledge sharing is integrated within each constellation, each entity can exist independently at a fully functional level.

Individual health care entities or systems can utilize any combination of information technology tools to create a knowledge sharing environment to meet their unique business objectives. Integrating a strategy for sharing knowledge, then building or implementing information systems to complement this strategy is the key to achieving enterprise knowledge, and can then facilitate the provision of quality, cost-effective patient care.



Recommendations for Health Care Organizations

Based on our understanding of the structure and application of knowledge sharing to the health care environment, we are recommending that health care organizations take the following steps:

- 1) Identify knowledge sharing as an organizational priority, and incorporate it into the strategic planning process;
- 2) Develop and implement knowledge sharing principles, policies & procedures;
- 3) Commit to an IT-enabled knowledge sharing policy by:
 - Establishing a knowledge sharing cost center and budget;
 - Building a uniform intranet and toolset;
 - Consolidating research, PI, and grants databases;
 - Storing and indexing policies and procedures on a database;
 - Facilitating document production and sharing;
 - Integrating knowledge sharing products (such as those identified herein) yet to be determined;
 - Consolidating email, communication functions;
- 4) Appoint a Chief Knowledge Officer who will be responsible for the above.