

*Knowledge Management and  
Knowledge Exploration:  
Some Thoughts for NIH*

© Dr. Ramon C. Barquin

**Knowledge Management Symposium  
National Institutes of Health (NIH)**

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# AGENDA

- **Introduction**
- **What is knowledge management?**
- **Why do enterprises need it?**
- **Why does NIH need it?**
- **Knowledge management and knowledge exploration: the relationship**
- **The Knowledge Exploration Workbench**
- **A Case Study: Avian Flu**
- **Conclusion**

# What is the problem?

- **Losing institutional memory due to changing workforce (Need to retain knowledge independent of people)**
- **Functional stovepipes including non-interoperable data domains prevent enterprise-level integration**
- **We're drowning in data but no intelligence, let alone knowledge (Need for content management)**
- **Unwillingness to share information and "NIH" syndrome**
- **Resistance to change and cultural problems**

# PROBLEM

- **K-workers spend 15%-35% of their time searching for information**
- **50% are successful in finding what they want**
- **40% of corporate users reported cannot find info they need on their intranets**
- **K-Workers spend more time recreating existing information than producing new info.**

# PROBLEM ...

- **Close to 50,000 Federal employees retired in 2000**
- **Roughly 50 percent of the federal workforce is eligible to retire by 2006**

# PROBLEM ...

- **Number of documents on the web: Over 1 trillion**
- **E-mails sent in 2002: 31 billion**
- **Total new information in 2003:  $\approx$  5 exabytes**
  - **Equivalent to half a million new libraries of Congress**
  - **Enough to capture every word ever spoken by all humans**
- **Amount of new information doubled in 3 years**
- **Electronic information flow in 2002:  $\approx$  18 exabytes**
  - **Telephone: 17.3 exabytes**
  - **Email: 668 terabytes**

# PROBLEM...

- **Analysis is changing everywhere**
- **Data warehouses alone cannot provide adequate business intelligence**
- **Must go beyond structured data in relational data bases and use all intelligence sources**
- **But unmanageable volumes/complexity**
- **Too much data, too many sources, too many formats, too many tools, too little integration**

# Problem: The Data

- **Statistics**
- **Text**
- **Internal**
- **External**
- **Secret**
- **Confidential**
- **Electronic**
- **Paper**
- **On-line**
- **Off-line**
- **Geospatial**
- **RFID**
- **Internet/WWW**
- **Intranet**
- **ASCII**
- **EBCDIC**
- **HTML**
- **Images**
- **Video**
- **Audio**



# What is the solution?

## Knowledge Management

- Right hand should *know* what left hand is doing
- Identify/nurture *communities of practice*
- Pay attention to *customer* knowledge
- Automate *content* and *document management*
- Identify and disseminate *best practices* whenever possible

# **What is the solution?**

## **Knowledge Management**

- **Deliver knowledge through *Enterprise Portals***
- ***Change* culture to reward sharing/*collaboration***
- **Utilize *storytelling* to capture share of attention**
- **Implement *data warehousing* environments, enterprise-level integration, and *business intelligence* solutions**
- **Provide *leadership* to accomplish objectives**

# So What Exactly Is Knowledge Management?

- A set of tools and processes
- Used by knowledge workers
- In an architected environment
- Created through an enterprise initiative
- To obtain maximum returns
- From its data, information, intelligence and knowledge

# **Knowledge Management**

**The process through which an enterprise uses its collective intelligence to accomplish its strategic objectives.**

**Ramon Barquin**

# Knowledge

**Understanding gained  
through experience,  
observation or study**

*Knowledge comes from  
working minds, but...*



# Not all knowledge is in our brain...

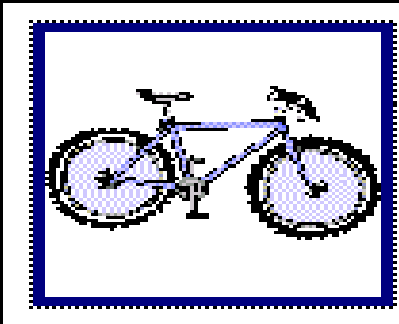
- **Electronic**
- **Document**
- **Organization**

Source: T. Beckman, IRS

# Categories of Knowledge



**Explicit:** Books, videos,  
paper, databases, etc.



**Implicit:** In  
people's heads but  
they can explain it.

**Tacit:** In people's  
heads and difficult  
to elicit



**Unknown:**  
Unavailable until  
discovered



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Knowledge becomes  
more valuable to  
organizations when it is  
made explicit

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# **Is KM the same as IT?**

**KM is much more than IT, but you  
cannot do KM without IT**

# Who Owns Knowledge Management?

- **Philosophers**
- **Cognitive psychologists**
- **Educators**
- **Librarians**
- **Management Scientists**
- **Computer Scientists**

# The Barquin Framework for Knowledge Management

- 1. Capture of tacit knowledge and its conversion to explicit knowledge**
- 2. Identification and operations of communities of practice**
- 3. Discovery, vetting and dissemination of “best practices”**
- 4. Collaboration tools and resources**
- 5. Locators of both experts and expertise**
- 6. Taxonomies for major knowledge domains**

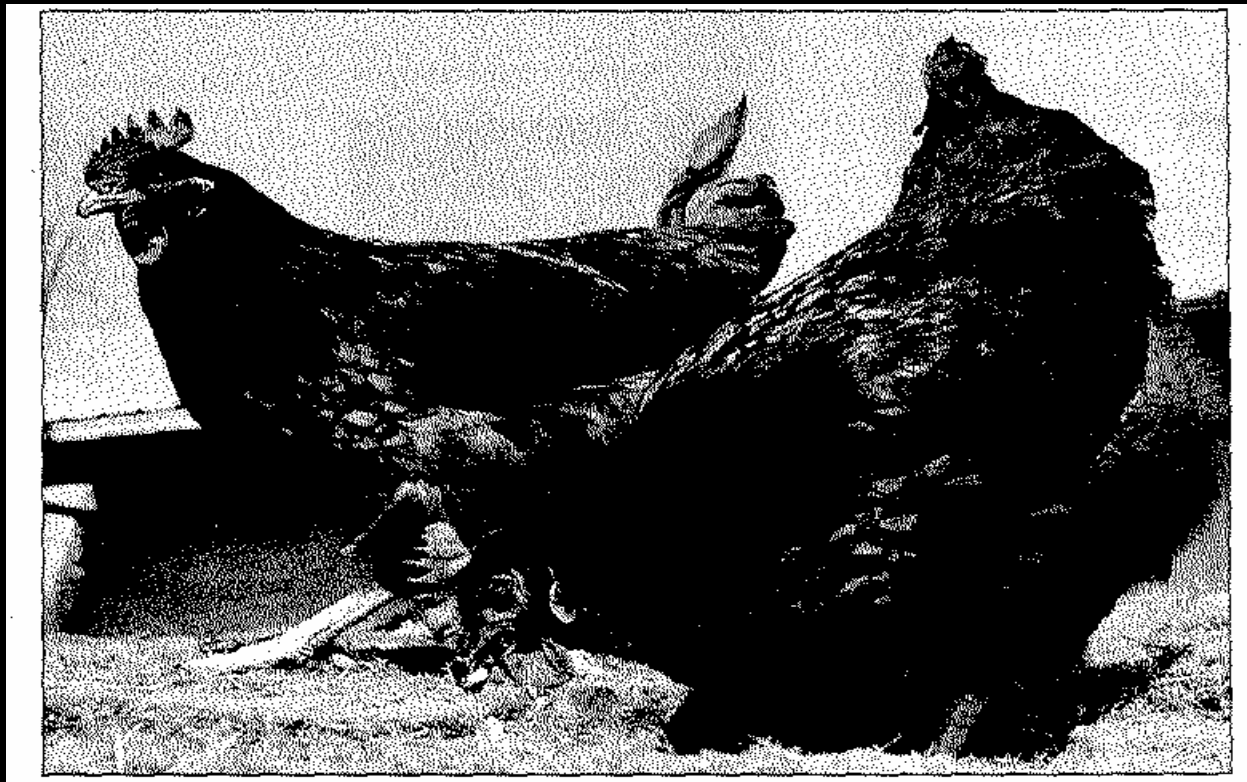
# The Barquin Framework for Knowledge Management

- 6. Implementation of enterprise portals**
- 7. Enterprise IT architectures**
- 8. Data warehousing, data mining and business intelligence architectures**
- 9. Customer relationship management**
- 10. Use of success stories**
- 11. Corporate culture that rewards knowledge sharing**
- 12. Learning and e-Learning**
- 13. IT/KM Leadership**

**How does this all work  
together?**

**Let's look at a case study  
in knowledge exploration**

# *The Tale of Avian Flu*



*THE WASHINGTON POST -- APRIL 6, 2004*  
*Canada to kill Millions of Birds as Flu Spreads*

# **NECKS: National Emergency Center for Knowledge Sharing**

**Responsible for disseminating accurate  
and timely knowledge to all agencies  
involved in addressing emergency  
situations**



# *NECKS*

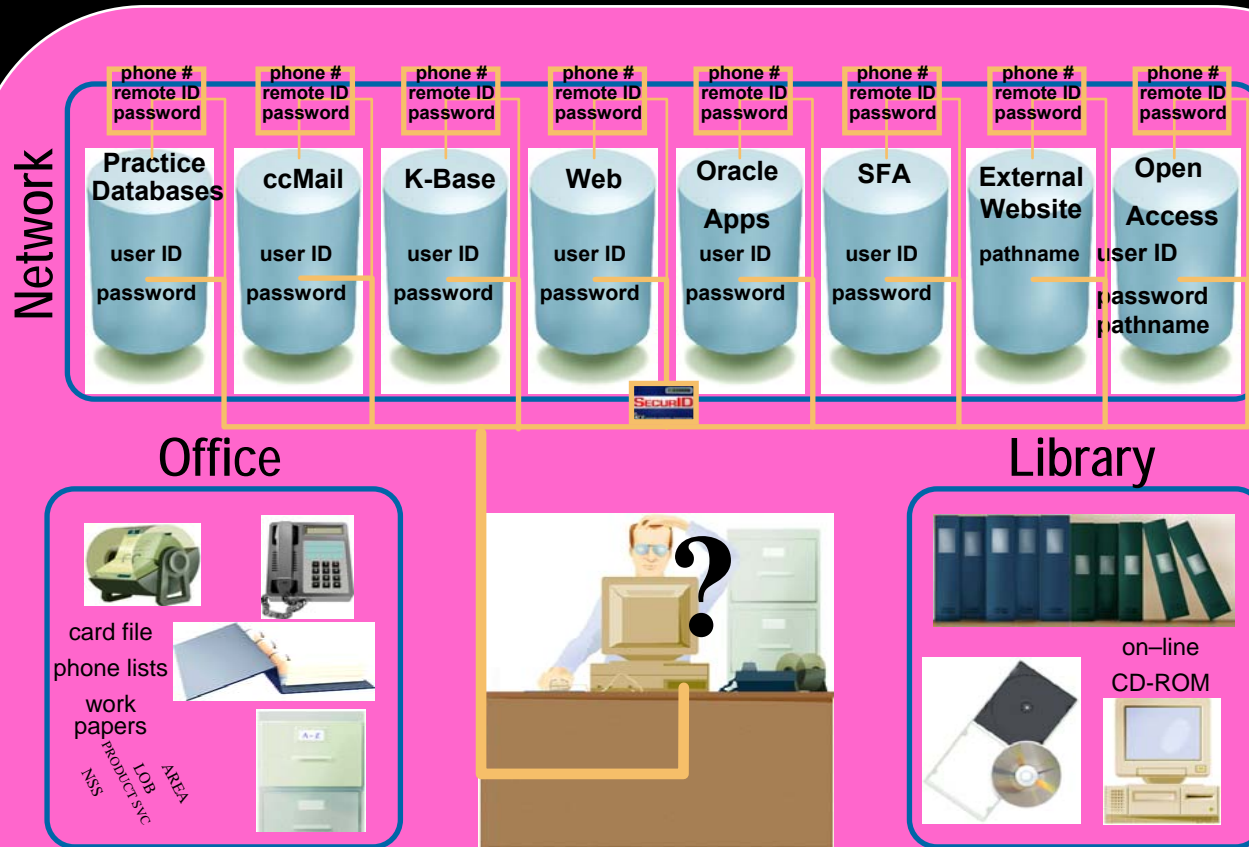


*“Saving our necks together by sharing our  
common knowledge”*

# **“Yes, Mr. President. We’ll get right on it!”**

- **What do we know about avian flu?**
- **Who are the experts?**
- **What are the populations at-risk?**
- **Where are they?**
- **What measures need to be taken?**
- **What might be the economic impact?**
- **How do we identify and contact the necessary authorities in the at-risk locations?**

# The Classic Fragmented Information Landscape



**Complex, Multi-Interface Environment**

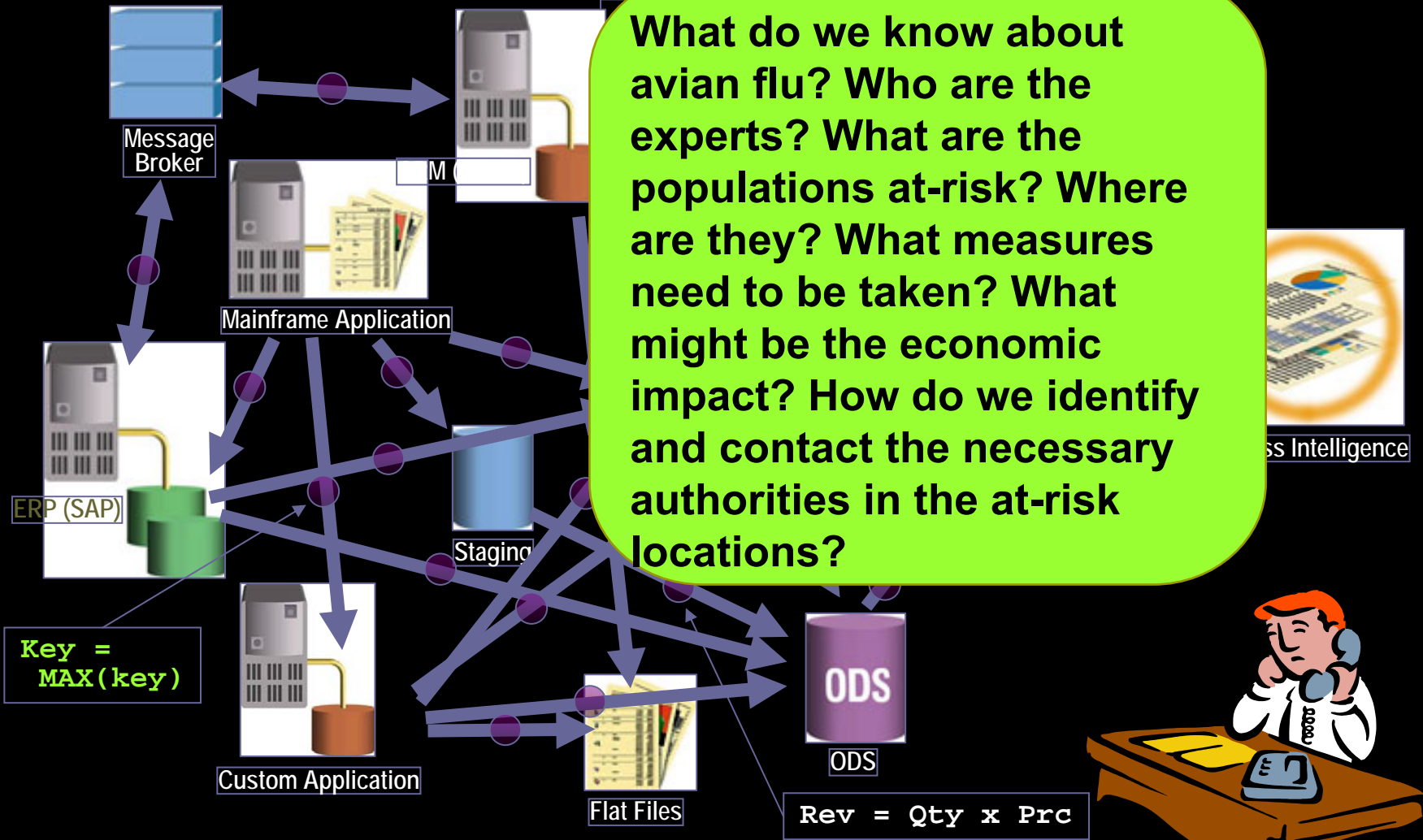


**What do we know about avian flu? Who are the experts? What are the populations at-risk? Where are they? What measures need to be taken? What might be the economic impact? How do we identify and contact the necessary authorities in the at-risk locations?**

**Complex, Multi-Interface Environment**



# Current Approach?





**Today's  
Analyst**

# The Solution

- Knowledge environments
- To get the right knowledge to the right person at the right time
- ...But a new workbench is needed

# What does an analyst need to do?

4. Analyze (OLAP)
  - a. Compute/Estimate
  - b. Drill down
  - c. Track
  - d. Compare
  - e. Link/Relate
  - f. Trends
  - g. Dashboards



# What does an analyst need to do?

## 5. Display/visualize

a. Crosstabs

b. Graphs

c. Maps

## 6. Interpret the results

a. Context

b. Inference

c. Certitude

d. Synthesis

# Knowledge Space

**Collection of searchable content of potential relevance to the analyst's interest. **It is what you explore!****

# **The Knowledge Exploration Workbench**

# The Workbench-1

- **Data Collection** Tools (Crawlers/spiders)
- **Data Organization** Tools (Gamma Site/Ontologies/Taxonomies)
- **Data Cleansing** Tools (Trillium/Group 1)
- **Data Integration** Tools (ETL, Informatica, Data Stage)
- **Metadata** Tools (Platinum/Oracle DER)
- **Content Update** Tools (Connect, Google Alert)
- **Document Finders** (Browsers/Search Engines/Google/Yahoo)
- **Concept Selectors** (Concept Search/Autonomy/Verity)

# The Workbench-2

- **Document Analyzers/Navigators** (Jump! Eclipse)
- **Summarizers/Abstractors** (Summarize!, Autonomy)
- **Multiple Document Navigators** (Jump!)
- **Data Manipulation Tools**
- **Analytic Processing Tools (OLAP)** – Structured Data (Cognos, Business Objects, Microstrategy, Hyperion)
- **Visualization Tools**

# **The Knowledge Exploration Process**

# Knowledge Exploration Process

1. Select a knowledge domain
2. Create a knowledge space
3. Prepare the knowledge space for exploration
4. Navigate the knowledge space
5. Operate on the knowledge space
6. Analyze the knowledge space
7. Visualize the results
8. Interpret the results

# The Move to Action

DATA



INFORMATION



INTELLIGENCE



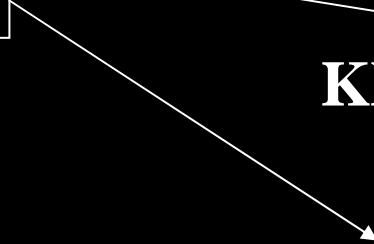
KNOWLEDGE



WISDOM

Decisions?

Actions?





**And remember...  
we're not ready to  
take humans out of  
the equation**

# The Nature of Human Knowledge and Expertise

- The ability to find high priority problems
- Solve the problems
- Explain the results
- Learn from mistakes
- Restructure appropriate knowledge
- Use common sense
- Occasionally break rules
- Degrade gracefully

**?** *Questions* **?**

