



# MERGER OF KNOWLEDGE MANAGEMENT AND INFORMATION TECHNOLOGY IN HEALTHCARE: OPPORTUNITIES AND CHALLENGES



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## Economic Evolutions

Economic structures	Industrial	Service	Knowledge
Time frame	1850-1900	1920-1990	> 2000
Major Factor of Production	Land Labour	Capital Human Capital	Information
Dominant Factor of Production	Capital	Technology, Information	Knowledge
Major Innovations	Steam Engine Railroad	Automobiles Microchip	Internet

Adapted from Drucker

## The Genetic Engineering (un)revolution

- Advances in modern day genetic sciences → potential drug compositions from a mere 400 to over 4,000
- Human Genome project → In near future genetics → propel a new wave of healthcare discoveries
- Majority of practicing physicians in US community hospitals not able to understand the impact of biomolecular sciences as → trained in the germ theory of disease, not molecular medicine
- Incidents of advice on genetics given by primary care physicians, the advice was wrong 85 % of the time

## Knowledge Management (KM) Cycle



Adapted from Skyma

## Impact of IT on Healthcare

- Healthcare has been unalterably changed in the last fifty → traced to the coming together of the twin revolutions of Information Technology and Telecommunications
- Moore's Law which states that computing power
  - Doubled every two years from the 1950s to the 1970s
  - Doubled every 18 months in the 1980s
  - Currently doubling every year
- 1997-2000 → 85% of healthcare organizations have gone through some sort of transformation

## Changes in IT

Evolutionary Stage	Business question	Enabling Technologies	Features
Data Collection (1960s)	Breast Cancer worldwide ?	Computers, tapes, disks	Retrospective Static data delivery
Data Access (1980s)	Breast Cancer in UK from 1980 ?	Relational databases Structured Query Language	Retrospective Dynamic data delivery at record level
Data Warehousing & Decision support systems (early 1990s)	Breast Cancer in West Midlands from 1990 ?	Online analytic processing Multidimensional databases	Retrospective Dynamic data delivery at multiple levels
Intelligent Data Mining (late 1990s)	Incidence of Breast Cancer in Coventry next year ? Why?	Advanced algorithms, Multiprocessor computers	Prospective Proactive information delivery

Adapted from Pilot Software Inc

## Technological pedigree of KM



## Biomedical Knowledge: untapped potential

- Biomedical Knowledge, Genetic Engineering and m-health → will be the driving forces in healthcare
- Innovations in biomedical sciences → advances in healthcare
- 10,000 known diseases, 3,000 drugs, 1,100 lab tests, 300 radiology procedures, 1,000 new drugs and biotechnology medicines in development and 2,000 individual risk factors
- Organ and tissue scanning speed is doubling every 26 months, making tests both faster and cheaper
- Image resolution is doubling every 12 months
- Increase in computer power within the availability of inexpensive bandwidth

## M-health

- The aim behind any m-health application is to transfer the expertise of the caregiver from one location to another
- With advances in technologies, (telecommunications, multimedia and IT healthcare applications) m-health has the potential to transform the delivery of healthcare permanently.
- Estimates for worldwide telemedicine services suggests that the market is valued at \$2.5 billion a year. Other estimates for 2002 project the US market alone to be around \$3 billion – a big leap from \$65 million in 1997

## Conclusion

- Future → synergistic interaction between health systems → knowledge recycling of previous healthcare practices
- 21<sup>st</sup> century clinical practitioners → acquire proficiency in understanding and interpreting large amounts of clinical data and information
- Any solution domain must support all the three integral healthcare system components (people, processes and technology)
- KM domain → potential paradigm for both successful introduction and acceptance of these healthcare precepts