

What are Integrated Enterprise Information Systems?

- **Enterprise**
 - A business, an industrious effort, especially one directed toward making money
- **Information System**
 - A set of interconnected channels for communicating knowledge of specific events or situations
- **Integrated**
 - Joined together, united, made into a whole by having brought all parts together

Degrees of Integration

- How can we use both of these toy trains to carry the same toy freight? (note the differences in connectors – we can't simply unhook the freight car from one and attach it to the other)
 - Unload freight from one train, re-load onto the other
 - Too much work!
 - Tie freight car from one to the other with string
 - Unstable connection!
 - Use special building block with Lego connector on one end, K'nex connector on other end
 - Buy two special building blocks
 - one with Lego connector on one end and generic connector on the other end
 - One with K'nex connector on one end and generic connector on the other end

Aren't all enterprise systems integrated? No! why not?

- Enterprise "stove pipes" or "silos"
 - As enterprises grow, they typically become divided based on functional areas
 - Each functional area typically has its own system
 - Even within functional areas, enterprises often develop different systems for different information needs
 - If existing systems lack functionality, additional systems are built to satisfy new needs

Common Integration Attempts

- **Integrate the end results**
 - Let each functional area have its own system and require them to submit end results in a standardized format that can be merged with results from other areas
- **Integrate similar types of systems**
 - All financial areas use same system
 - All manufacturing areas use same system
 - All areas associated with human resources use same system
 - Etc.....
 - **However, each of those systems are different from each other**
- **Enterprise Systems**
 - May be created from scratch
 - May be based on packaged software (e.g. OracleApps, PeopleSoft, SAP)

Breaking Down Stovepipes by Re-engineering Business Processes

- **Reengineering Work: Don't Automate, Obliterate**
 - Michael Hammer, Harvard Business Review July/August 1990
 - "It is time to stop paving the cowpaths. Instead of embedding outdated processes in silicon and software, we should obliterate them and start over.....use the power of modern information technology to radically redesign our business processes in order to achieve dramatic improvements in their performance." (p. 104)

Ford Motor Company

- **Decision Situation**
 - Needed to cut costs
 - Thought A/P dept. might be a good candidate if they automated parts of it
 - Had 500 clerks, wanted to cut by 20%
 - Looked at Mazda
 - Mazda only had 5 clerks!!!!
 - Mazda was smaller than Ford, but not THAT much smaller!!!!
 - Ford realized A/P should probably be cut to 100 clerks (80% reduction)
- **Existing System**
 - Purchasing department created purchase order (PO), sent original to supplier and sent a copy to Accounts Payable (A/P)
 - Material control department received goods, prepared receiving document, sent copy to A/P
 - Supplier sent invoice to A/P
 - A/P matched PO to receiving document and invoice (this process is called a 3-way match); if they matched (on 14 different data items), then A/P issued payment to supplier
 - Most A/P time was spent on investigating and reconciling mismatches
- **Approach taken**
 - If Ford wanted to "pave the cowpaths" they could have attempted to facilitate the A/P investigation process
 - Ford chose to re-engineer by questioning why the 3-way match was necessary to begin with, and how mismatches could be prevented from the start
- **What was the goal of Ford's 3-way match?**
 - To make sure Ford didn't pay for things it hadn't ordered and/or it hadn't received
- **Re-engineered solution that meets the above goal more efficiently and effectively**
 - Enter purchase order into automated, integrated system
 - On receipt of goods, clerk enters receipt information and has computer check to see that part number, unit of measure, and supplier code match order; if not, deny acceptance of shipment
 - If there is a match, the enterprise accepts shipment and the computer flags the purchase record as ready for payment
 - Accounts Payable issues payment based on receipt of goods, not on receipt of invoices Vendors were asked not to even send invoices!
- **Was this only a re-engineering of Accounts Payable?**
 - NO! Ford re-engineered the goods acquisition process, which included purchasing, receiving and accounts payable
- **How did this affect Ford's suppliers?**
 - They liked getting prompt payment

- They had difficulty getting used to not sending invoices, because their systems forced them to produce invoices
- Ford pointed out that the suppliers could produce the invoices without wasting money to mail them to Ford, which would just throw them away if the suppliers sent them.
- **End Result of Re-engineering Effort**
 - 75% reduction in head count (to 125 clerks)
 - No discrepancies between financial record and physical record (theoretically, at least), so material control is simpler and financial information is more accurate

Mutual Benefit Life

- **Decision Situation**
 - Applications for life insurance took much too long
 - MBL wanted to improve customer service
 - President demanded 60% improvement in productivity
- **Existing System**
 - Application went through 30 steps, spanned 5 departments, involved 19 people
 - Best turnaround = 24 hours
 - Typical turnaround = 5 to 25 days
 - (actual work done estimated at 17 minutes, rest was “in-transit” time)
- **Approach**
 - If MBL had wanted to “pave the cowpaths” they probably would have tried to use technology to simply speed the applications along the existing transit route
 - Instead, MBL re-engineered the business processes
 - MBL created a “case manager” position who performed all tasks associated with the application supported by an expert system on a computer network (with help available from a senior underwriter or physician as needed)
- **End Result of Re-engineering Effort**
 - Eliminated 100 field office positions
 - Can now process twice as many new applications as they previously could process
 - Best turnaround decreased to 4 hours
 - Typical turnaround decreased to 2-5 days

Re-engineering Accounting Systems

- Most advances in accounting systems have focused on providing the same information faster and more accurately
 - General structure is still based on the double-entry bookkeeping equation $\text{Assets} = \text{Liabilities} + \text{Owners' Equity}$
 - Software forces each journal entry to “balance” (i.e., have equal debits and credits) before each entry is accepted, thus increasing accuracy
 - Software automatically posts journal entries to the general and/or subsidiary ledgers, thus increasing accuracy and speed
- In 1982, Bill McCarthy published a research article explaining his ideas for re-engineering accounting systems
 - He didn't call it re-engineering, but it was
 - He focused on natural phenomena common to most enterprises for various types of transactions.
 - He recommended eliminating artifacts such as debits, credits, and accounts
 - Artifacts are manufactured, not naturally occurring

- Accounting artifacts obscure details of business transactions needed for non-accounting purposes
- This textbook explains and discusses McCarthy's ideas for developing integrated enterprise systems that can satisfy accounting needs while also satisfying needs of other business areas

Knowledge needed for integrated ES

- **Knowledge to create integrated ES**
 - Representation in general
 - Enterprise operations, general and specific
 - Conceptual modeling tools
- **Knowledge to effectively use integrated ES (i.e., to be a power user)**
 - All of the above PLUS
 - Information retrieval (querying) tools
- **Knowledge to effectively audit integrated ES**
 - All of the above PLUS
 - Audit objectives, techniques, tools
- **Creativity and critical thinking! (for all of the above)**

SUMMARY

- Systems in enterprises are not integrated very well, for a variety of reasons
- There are many obstacles to overcome in integrating existing systems
- An integrated database is the central component of an integrated system, and thus should be our focal point
- An integrated database must support all functional areas within an enterprise
- To design, use, and audit integrated enterprise systems, we must understand
 - Businesses (all functional areas)
 - Representation (in general)
 - Conceptual modeling
 - Information Retrieval tools
 - Audit objectives and techniques