Chapter -1

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

Common Integration Attempts

1) **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
2) **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.
3) **Enterprise Systems**

The essence of what you do does not change; you simply changed the resources used to perform work.
   – May be created from scratch
   – May be based on packaged software

What is the deference between Reengineering and Automation?

Reengineering: use the power of modern information technology to radically to the redesign of business processes or systems to achieve a dramatic improvement in enterprise performance.

Automation: implies replicating or replacing traditional processes using computer hardware and software.

Chapter -2

What is a model?

A model is a simplification of something in reality

- Created for a specific purpose
- Hides details that are not needed for that purpose
- Examples: model car, architect's models – paper-based and 3-dimensional

Why do we build models of enterprise systems?

We build models so that we can better understand the system we are developing.

Most enterprise systems are too large and complex for the average person to comprehend in entirety.

Object Patterns

In conceptual modeling, an object pattern is called a "stereotypical constellation of entities"

What is an "ontology"?

An attempt to define what things exist in the world in general; a branch of metaphysics dealing with the nature of being

What is an "enterprise ontology"?

An attempt to define what kinds of things in enterprises need to be represented

Why do we need ontologies?

Ontologies improve communication, sharing, and reuse of information

For current information systems and e-business, these three concepts are very important!

REA Ontology Levels (مهم ارجعوا لرسمة كُل مستوى لفهم الفكرة)

1. Value System Level (object-based pattern)
2. Value Chain Level (script-based pattern)
3. Business Process Level (object-based pattern)
4. Task Level (script-based pattern)

Value System Level (object-based pattern):Examines enterprise in context of its external business partners

Value Chain Level (script-based pattern): Connects business processes of an enterprise via the resource flows between the processes

Business Process Level (object-based pattern): A pattern to which the reality of most (perhaps all) enterprises conform

Entities Resources - Economic Events - Agents (internal and external)

Relationships: Stockflow (relationships between resources and events – increase or decrease)

Duality (relationships between increment and decrement economic events)

Control (relationships between events and the agents that participate in them)
- Object Patterns are stereotypical constellations of things and relationships between them
- Script Patterns are stereotypical sequences of events, and can be thought of in terms of scenes,

Chapter -3

Porter's Value Chain:

1-Primary value activities

– **Inbound logistics** - activities associated with receiving, storing, and disseminating inputs to the products or services
– **Operations-** activities associated with transforming inputs into the final products or services
– **Outbound logistics** - activities associated with collecting, storing, and physically distributing the products or services
– **Marketing and sales** - activities associated with providing a means by which customers can buy produce and the means for inducing them to buy
– **Service** - activities associated with providing service to enhance or maintain the value of the products or services

2-Support value activities

– **Procurement -** the function of purchasing inputs to firm's value chain
– **Technology Development** - the know-how, procedures, or technology embedded in processes that are intended to improve the product, services, and/or process
– **Human Resource Management** - activities involved in recruiting, hiring, training, developing, and compensating all types of personnel
– **Firm Infrastructure** - activities that support the entire value chain (e.g. general management, planning, finance, accounting, legal, government affairs, quality management, etc.)

Importance of Studying Value System and Value Chain Levels in REA

• Understanding an enterprise's activities at the value system and value chain levels in the REA ontology
– Helps keep perspective (gives the ability to "see the forest" without getting mired in the detail of the trees)
– Provides the structure to guide lower levels of analysis
– Requires consideration of the enterprise's mission and strategy, which should ensure that business processes and activities are constructed in a manner consistent with the mission and strategy

Value Chain Level طريقة وخطوات رسمها من سلايد ١٧ الى سلايد ٢٣

Duality relationships consist of paired increment economic events and decrement economic events
– Increment economic events increase resources (stock in-flows)
– Decrement economic events decrease resources (stock out-flows)

Chapter -4

Conceptual Modeling Constructs:

Entities Sets of real world objects – things that have a separate existence, either physical or conceptual - **Note SETS**
Relationships Sets of associations between entities - Again, note SETS Degrees of relationships
Attributes Characteristics or elementary properties of entities and/or relationships
– Primary key attribute uniquely and universally identifies each instance of an entity or relationship set

Type of Attributes

1) Simple versus composite attributes
2) Derivable attributes

Type of Derivable attributes

- **Static –** will not change if new data is entered into system
- **Volatile** – will change if new data is entered into system

Abstraction Mechanisms

1) **Typification** **Specification of a relationship between a set of objects and a category** to which the objects could be assigned on the basis of shared characteristics
– Allows storage of characteristics that apply at the category level of detail
– E.g. for student category, characteristics such as tuition rate per hour and maximum number of credits allowed per semester
2) **Generalization** **Specification of subclass-superclass relationships**, I.e., "Is-A" relationships

Subclass entities include contain more specific instances of superclass entities

Entity-Relationship (ER) Diagram Notation

- The **ER Diagram is** an alternative means for representing the same constructs as in the **ER Grammar**
- Most conceptual models are created with some version of the ER Diagram

Several variations exist, and notation (especially for cardinalities) differs between the variations

REA business process level with extensions:

Entities: Resources and Resource Types

Events:

Instigation Event: An event that initiates activities in the business process; may be internally instigated (e.g. a marketing event) or externally instigated (call from supplier's salesperson)

Mutual Commitment Event: An event in which commitments are made by the enterprise and one of its external business partners for a future economic exchange

Economic Exchange Event: An event in which a resource is either given up or taken Increment economic event results in resource inflow Decrement economic event results in resource outflow

Agents

- Internal agents act on behalf of the enterprise
- External agents are external business partners

Relationships:

Event-Event relationships

- Duality (link increment and decrement economic events)
- Reciprocal (link increment and decrement commitment events)

Is the commitment equivalent of duality

- Fulfillment (link commitment and economic events)

Event-Resource relationships

- Stock flow (link economic events and resources or resource types)
- Reservation (link commitment events and resources or resource types)

REA business process pattern

- **Relationships**

Event-Agent relationships

- Participation (link events and the agents that participate in the events)

Agent-Agent relationships

- Assignment (link internal agent to external agent)

Use only when relationship between internal agent and external agent exists independently of their mutual participation in an event

- Responsibility (link internal agent to internal agent)

Use when one internal agent is responsible for another, independent of their mutual participation in an event

Resource-Agent relationships: Custody (link resource and internal agent)

Use when an internal agent's responsibility for a resource needs to be tracked independently of any event

Resource-Resource relationships: Linkage (link two resources) Use to identify resource made up of another resource

Typification: Each resource, event, or agent can be related to a resource type, event type, or agent type

Generalization: Each resource, event, agent, and commitment can also participate in a relationship with a sub-class or super-class via a generalization relationship.

Chapter -5

System Flowcharts

- Graphically document information systems
- Summarize pages of narrative in diagrammatic format
- Focus on the physical aspects of information flows
- Arrows are used when the documents or information flow is not left-to-right or top-to-bottom

System Flowchart Summary

The Good

- Flowcharts are relatively easy for information customers and managers to understand
- Flowcharts help auditors understand business and systems controls

The Not-So-Good

- Flowcharts are tied to physical information flows and system characteristics that hide procedural essence of
- Flowcharts may be artifactual and tied to outdated information technology

File Types

Master files Contain the balance or status of entities E.g. vendors, credit customers, inventory, assets, employees

Transaction files Contain activity data. E.g. orders, sales, payments History or archive files Contain inactive past or historical data

Reference files Contain information needed for reference purposes e.g., rates, prices, zip codes, chart of accounts

Suspense files Contain items awaiting action, errors, missing information

Storage and Access of Data

Sequential Storage and Sequential Access

- Records are stored in order
- To access a record, the access device must read through all records that are stored previous to the desired record
- Tape cartridges and open reel tapes require sequential storage and sequential access of data

Random Storage and Direct Access

- Records are stored in any order
- Any record can be retrieved directly regardless of physical position on the media; the access device need not read all the records prior to the desired record
- Computer hard disks, floppy disks, zip disks, CD-ROMs, and DVD-ROMs allow random storage and direct access of data

Media

1) **Paper**

- Most common form of media | Most easily used by people | Doesn't depend on electricity to access
- **Disadvantages** Bulk (for storage) **and** Lack of search and automated processing capability **and** Susceptibility to destruction
- Sequential storage (may be indexed for indexed-sequential access)

2) **Magnetic tape**

- Audiocassette tapes, VHS videotapes, and 8mm video camera cassettes use magnetic tape
- Sequential storage and sequential access
- Sorting is important for processing (transaction file must be sorted to match the order of
- the master file)
- Separate physical media must be used for input and output in an update process and Easy backups

3) **Digital (Disk) media**

- Computer hard disks, floppy disks, zip disks, CDs, DVDs, and memory cards
- Random storage Information may be stored anywhere on the media; may be broken up (fragmented) and stored in multiple places
- Direct access From index, hardware can jump directly to the desired information and proceed with processing
- Same physical media may be used for input and output in an update process (unless disk is full) and Easy backups
- Dependent on electricity and on hardware and cannot be read or processed directly by a person

Processing Methods

- **Batch:** accumulates transaction data for a period of time. Then all of the transactions in the transaction file are posted to the master file in one processing run. (Tape processing is always batch)
- **Online:** means the computer-input device is connected to the CPU so that master files are updated as transaction data are entered
- **Real-time**: denotes immediate response to an information user; transaction data are entered and processed to update the relevant master files and a response is provided to the person conducting the business event fast enough to affect the outcome of the event
- **Report-time**: the data used to generate the requested report is processed as the report is created

Data Flow Diagram Symbols

Process: Circles are used to represent processes that take data inflows

Data Sources and Sinks : Rectangles (or squares) represent data (inflow) sources

Data Flow Lines: Data flow lines display the route of data inflow and information outflow

Data Stores Two parallel straight lines are used to display a store or collection of data

Context Level DFD: The context diagram shows one process (representing the entire system) and the sources/sinks that represent the boundaries of the system.

Chapter -6

Database Model Levels

1. **A Conceptual model** represents reality in an abstracted form that can be used in developing an information system in a wide variety of formats (e.g. relational, object-oriented, flat-file, etc.)
   a. It is hardware and software independent
   b. It is independent of any logical model type
2. **A Logical model** represents reality in the format required by a particular database model (e.g. relational or object-oriented)
   a. Is still hardware and software independent
   b. Depends on the chosen logical model type

3. A Physical model is created specifically for a particular database software package
   a. Is dependent on hardware, software, and on the chosen logical model type

Relational Database Model

- The relational model is a type of logical database model that was conceived by E.F.
- The relational model is based on set theory and predicate logic
- It is well formalized, so its behavior is predictable
- A relational database consists of tables (relations) that are linked together via the use of primary and foreign keys
- A FOREIGN KEY in a table is a primary key from a different table that has been posted into the table to create a link between the two tables

Relational database tables are made up of rows and columns

- Rows are called the table extension or tuples (The ordering of rows in a table does not matter)
- Columns are called the table intension or schema the ordering of columns in a table does not matter

• Redundancy = one fact in multiple places or multiple facts in one place
• Load = the percentage of non-null values in a column
– Participation Cardinalities communicate some of the information regarding redundancy and load

Relationship Conversion

• Maximum Cardinalities
– The general rule is to post into a "1" entity table. This avoids "repeating groups" redundancy
– You can NEVER post into an "N" entity. This causes "repeating groups" redundancy
• Minimum Cardinalities The general rule is to post into a "1" (mandatory) entity table. This avoids null values in the foreign key column
This rule should be violated in some circumstances (to be discussed soon)

Write the three steps of creating value chain model (ch3)
Step 1: Write RSWS entrepreneurial script, based on narrative and value system model
Step2: Connect scenes with resource flows
Step 3: Specify economic exchange events for each scene

Chapter -7

What is Querying?

It is asking questions about the data in the database and manipulating or combining the data in different ways

Several ingredients are necessary for effective querying

1. A database that is well-designed
2. A query developer who understands the table structures and the nature of the data in the tables
3. A query developer who understands the desired query output
4. A query developer who has good logic and reasoning skills
5. A query developer who knows the querying language used to retrieve information from the enterprise database

الجداول الموجودة بالشابتر مهمة جداً جداً جداً ومتكررة بفاينل سابق لونق انسر

Three Query Languages

Relational Algebra Three operators: Select, Project, Join and Provides the conceptual basis for SQL and QBE
Structured Query Language (SQL) The user enters commands according to a pre-defined syntax to retrieve desired data.
Query By Example (QBE) The user starts with a sample of the table(s) columns and marks the fields he or she wants to include in the answer. Defaults are available for summarizing and manipulating the data.

Relational Algebra

- **Select** includes only certain rows from a database table in its "answer".
- **Project** includes only certain columns from a database table in its "answer"
- **Join** combines two or more database tables based on one or more common attributes

Join Types

- **Inner join** includes only the records from both tables that have the exact same values in the fields that are joined
- **Outer join** includes all records from one table and matches those records from the other table for which values in the joined fields are equal.

SQL (Structured Query Language) SELECT attribute name(s) | FROM table name(s) | WHERE criteria is met

Mathematical Comparison Operators = equal to | < less than | <= less than or equal to | > greater than | >= greater than or equal to | <> not equal to (or != in some software)

Queries with Logical Operators

- **Queries may include logical operators AND, OR, and NOT**

AND accomplishes a set intersection – answer includes all instances that meet BOTH conditions
OR accomplishes a set union – answer includes all instances that meet one condition and all instances that meet the other condition
NOT identifies instances that do not meet one or more conditions

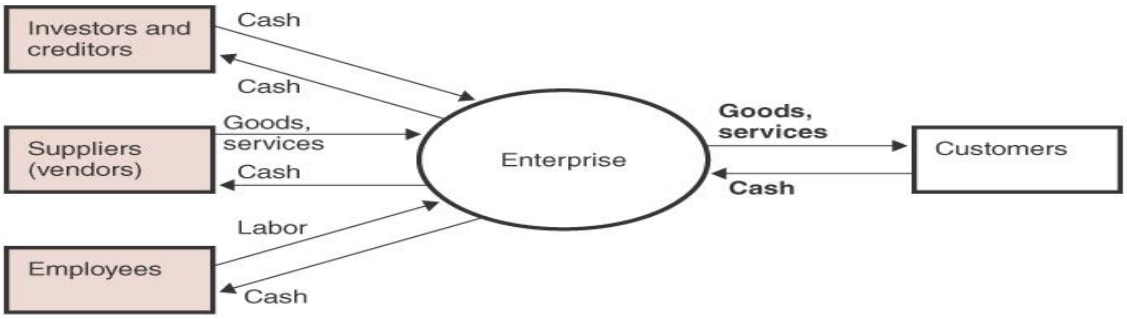
Aggregation Functions in Queries

COUNT summarizes the number of rows that contain a given value in the field
AVERAGE computes the arithmetic mean value of all rows included in the answer
SUM computes the arithmetic sum of all rows included in the answer
MIN identifies the minimum (lowest) attribute value for the field
MAX identifies the maximum (greatest) attribute value for the field

Chapter -8

Explain how the sales/collection process is showing in the value system. With drawing. Ch.8

At the value system level, the sales/collection process is the point of contact between the customer and the enterprise. Goods and/or services flow from the enterprise to the customer: cash flows from the customer to the enterprise. From the value system we sum1ise that to exchange goods and services for cash with the customers, we must attract customers, then help those customers select goods and services, deliver the goods and services requested, and collect payments for the goods and services.



How is the acquisition/payment process related to the conversion process and the sales/collection process? Ch.8

The interaction between the sales/collection process and other business processes is straightforward. Inventory made available by the conversion and acquisition/payment processes is sold in the sales/collection process. The cash receipts generated by the sales/collection process are made available to the financing process. The number of units expected to be sold in the sales/collection process, adjusted for desired changes in inventory balances, determines the number of units that an organization should plan to produce in the conversion process. Planned production drives the amount of materials and other resources to be acquired in the acquisition/payment process, as well as personnel resources used and paid for through the human resource process. This planning determines the financial resources that an organization must secure and manage through the financing process.

Sales/Collection Process Events (وضعت كل تعاريف الايفنت من اجل التمييز بينهُم)

- **Instigation Events in the Revenue Cycle**

May be internally instigated (marketing events such as sales calls, advertising campaigns, or promotions)
May be externally instigated (customer inquiries)
Internal agents sales/marketing personnel or customer service representatives
External agent's customers

Customer Inquiry Event a customer contacting the enterprise, either via telephone, e-mail, or in person, to inquire as to the pricing and availability of products or services

Sales Call Event a sales representative calling on a customer, either via telephone or in person, to describe the features of one or more products or services

Sales/Collection Process Events enterprise and an external business partner agreeing to exchange resources at a defined future time

Sale Order Event enterprise agrees to deliver goods to a customer and that customer agrees to pay an ascertained price for those goods

Rental Contract Event enterprise agrees to transfer possession of a product to a customer for a defined time period and bestows on that customer the right to use the product for a prescribed purpose and in exchange the customer agrees to pay an ascertained price

Service Contract Event enterprise agrees to perform one or more services for a customer during a defined time period for an agreed upon price and in exchange the customer agrees to pay an ascertained price

Economic Decrement Events the giving up of one or more resources in order to get some other resource (usually cash)

Sale Event which title (ownership) of one or more products is transferred from the enterprise to a customer.

Rental Event in which possession of one or more products is transferred from an enterprise to a customer for an agreed upon length of time for an agreed upon purpose and price

Service Engagement Event in which one or more agents of the enterprise provide one or more types of service to a customer

Almost always is a Cash Receipt Event **An economic increment event** in which an external agent transfers ownership of cash (or a cash equivalent) to the enterprise

Economic Decrement Reversal Events Events in which previous economic decrement events are reversed or negated

Sale Return Event An economic event in which title (ownership) for products that were previously transferred from seller to buyer is transferred back from buyer to seller

Process name	Events	Type	Document	Internal agent	External agent	Resource
Sales/collection/**revenue cycle** (with customer)	1-Customer inquiry	External Instigation	Data not captured	-Sales /marketing personnel customer service representative	customer	Good or service inventory type
	Marketing activity: 2-**Sales call** Such as call customer	Internal instigation	**Sales call report**	-Sales /marketing personnel -customer service representative	customer	Good or service inventory type
	3-**order** for revenue generating activity 1-sales order 2-rental contract 3- Service contract	Contract/ Mutual **commitment**	1-Sales order document 2- Rental contract 3- Services contract document	-**Sales or customer service representative** -**order entry clerk**: who help customer and collect the order data	customer	Good or service inventory type
	4- cash receipt	Economic increment event	-customer statement with Remittance advice document وثيقه تحويل النقود -deposit slips	-Cashier -account receivable clerk - finance personnel	customer	**Cash** it is type level so it is contain the cash accounts owned by the enterprise

	5- **revenue** generating activity: 1- sales event 2- rental event 3- service engagement	**Economic** decrement event	Bill of sales/ sales invoice 1-Bill of sales -sales invoice In case of **transit** " - packing list -Picking list - bill of lading -sales invoice" 2-rental invoice 3- service invoice	1-Sales people -shipping clerk -delivery clerk 3-service engagement personnel	Customer	-Good or service inventory type -labor(Service type) -temporary use of asset as in a rental
	6-**Seles** return ارجاع المشتريات من العميل	Economic decrement reversal event	-Sales return authorization -receiving report -credit memorandum	- Sales people -shipping clerk -delivery clerk -service engagement personnel	Customer	Good or service inventory type

Sales/Collection Process Relationships

- **Fulfillment relationships** Between Marketing, Sales Call, or Customer Inquiry and Sale Order events and Between Sale Order and Sale (or Rental or Service engagement) events
- **Duality relationships** Between Sale (or Rental or Service engagement) and Cash Receipt (or Receipt of Bartered Goods/Services) events
- **Reversal relationships** Between Sale and Sale Return events
- **Participation relationships** Between each event and each internal and external agent
- **Proposition relationships** Between Marketing, Sales Call, or Customer Inquiry event and Inventory (or Inventory Type or Service Type)
- **Reservation relationships** Between Sale Order, Rental Contract, or Service Contract and Inventory (or Inventory Type or Service Type) Also between Sale Order, Rental Contract, or Service Contract and Cash
- **Stock flow relationships** Between Sale (or Rental or Service Engagement) and Inventory (or Inventory Type or Service Type) and Between Sale Return and Inventory (or Inventory Type) | Between Cash and Cash Receipt

Chapter -9

Acquisition/Payment Process Events(وضعت كل تعاريف الايفنت من اجل التمييز بينهُم)

- **Instigation Events in the Expenditures**

– Are usually **internally instigated**; triggered by an identified need **and External instigation** is possible, e.g. need may be identified as result of supplier visit
– **Internal agents** involved in acquisition cycle instigation events usually are department supervisors (who identify the need and who authorize the eventual expenditure) and purchasing agents (who process the requisitions)
– **External agents** involved in acquisition cycle instigation events usually are suppliers

Purchase Requisition Event An instigation event that is entirely internal; typically involves a department supervisor identifying a need for a type of good or service and communicating that need to the purchasing department

Purchase Order Event A mutual commitment event whereby a supplier agrees to provide goods to the enterprise and the enterprise agrees to pay an ascertained price for those goods

Rental Order Event A mutual commitment event whereby a supplier agrees to transfer possession of some goods to the enterprise for a defined time period and bestows on the enterprise the right to use the goods for a prescribed purpose; the enterprise agrees to pay an ascertained price

Service Order Event A mutual commitment event whereby a supplier agrees to perform one or more services for the enterprise during a defined time period for an agreed upon price to be paid by the enterprise

Economic Increment Events in the Acquisition Cycle Represent the receipt of goods or services for which the enterprise will give up some other resource (usually cash)

Purchase (aka Acquisition) Event Economic increment event in which title (ownership) of one or more products is transferred from a supplier to the enterprise.

Rental Acquisition Event Economic increment event in which possession of goods is transferred to the enterprise by a supplier for an agreed upon length of time for an agreed upon purpose and price

Service Acquisition Event Economic increment event in which a supplier performs one or more types of service for the enterprise

Economic Decrement Events Almost always is a Cash Disbursement event
An economic decrement event whereby the enterprise transfers ownership of cash (or equivalent) to a supplier

Economic Increment Reversal Events Events in which previous economic increment events are reversed or negated

Purchase Return Event Economic event in which title (ownership) for goods previously transferred from a supplier to the enterprise are transferred back from the enterprise to the supplier

Process name	Events	Type	Document	Internal agent	External agent	Resource
Acquisition payment (it is with supplier)	1-**purcahse requisition** طلب	Internal Instigation	**Purchase requisition**	-Department supervisor , purchasing agent (process the requisition)	Supplier	Good or services inventory type
	2-pruchase **order** تم الموافقه على الطلب 1- Purchase order 2- rental order 3- Service order	Mutual **commitment**	1-Purchase order 2-rental contract 3-service contract	Purchasing agent	supplier	-Good or service inventory type -cash
	3-**purchase** تمت علميه الشراء include: 1- purchase (aka acquisition) 2-Rental acquisition 3-Service acquisition	Economic increment	1-reciving report 2- document of data entry screen 3- receipt of service	-Purchasing agent -receiving clerk	Supplier , vendor	**Good or services inventory type**
	4- cash disbursement انفاق المال	Economic decrement	-Checks -Disbursement voucher قسيمه الصرف	-Cashier -account payable clerks -financing personnel	Supplier , vendors	Cash
	5-**purchase** return ارجاع المشتريات من الشركه للمورد	Economic increment reversal لان لما ارجع البضاعه هيزيد المال عندي اذا بحدد الزياده او النقص على حسب تاثيرها على مال الشركه	-Authorized request to return -packing list -Debit memorandum	-Purchasing agent -receiving clerk	Supplier , vendors	Good or services inventory type

Acquisition/Payment Process Relationships

- **Fulfillment relationships** Between Purchase Requisition and Purchase Order events **and** Between Purchase Order and Purchase (or Rental or Service Acquisition) events
- **Duality relationships** Between Purchase (or Rental or Service Acquisition) and Cash Disbursement (or Disbursement of Bartered Goods/Services) events
- **Reversal relationships** Between Purchase and Purchase Return events
- **Participation relationships** Between each event and each internal and external agent
- **Proposition relationships** Between Purchase Requisition event and Inventory (or Inventory Type or Service Type)
- **Reservation relationships** Between Purchase Order, Rental Contract, or Service Contract and Inventory (or Inventory Type or Service Type) Also between Purchase Order, Rental Contract, or Service Contract and Cash
- **Stock flow relationships** Between Purchase (or Rental or Service Acquisition) and Inventory (or Inventory Type or Service Type) **and** Between Purchase Return and Inventory (or Inventory Type) **and**Between Cash and Cash Disbursement

Chapter -10

View Integration

- **Step 1: Identify the common entities in two conceptual level views**

Each pair of cycles that is connected in the value chain shares at least one common resource.
Many cycles have at least one agent in common.
Cash receipt events and Cash disbursement events exist in multiple cycles.

- **Step 2: Merge the common entities, resolving entity and attribute conflicts**

Entity name conflicts

- Synonyms: two or more different entity names used to represent the same entity
- Homonyms: one entity name used to represent two or more different entities

Attribute conflicts

- Different attributes used to describe the same entity in various views
- Include all attributes needed for all transaction cycles as attributes for the entity in the integrated model

- **Step 3: Resolve relationship conflicts, including name conflicts and structural conflicts**

Ensure each relationship has a unique name
Ensure cardinalities are appropriate for relationships once common entities are merged

Implementation Compromises

- **Conceptual Level Compromises**

Exclusion of an entity (usually a resource) because of inadequate measurement tools
Exclusion of a relationship because of inadequate traceability or because no decision information is needed regarding that relationship
Consolidate conceptually congruent entities
Materialization of tasks as entities

- **Logical Level Compromises**

Posting keys of similar entities in combination to avoid null values OR Combination of similar entities without a generalization relationship

- **Physical Level Compromises**

Storage of derivable attributes

- Static derivable attribute storage is advised if it facilitates querying; volatile derivable attribute storage should be done only if software is capable of triggers (stored formulae rather than stored data values for the volatile derivable attributes)

Event History Roll-up

- A benefit of databases is the "virtual close" – that is, the ability to produce financial statements without actually closing the books.
- The disadvantage of this is that the database can get too large to allow efficient processing
- Solution: once event data is no longer needed in disaggregated format, "roll" it up into a single event.

- **Many information needs combine data from multiple transaction cycles**
  - Cash balance
  - Inventory total cost value
  - Many others
  - Quantity on Hand of Inventory Types
  - Cost of Goods Sold

Chapter -11

Conversion Cycle Events(وضعت كل تعاريف الايفنت من اجل التمييز بينهم)

Economic Increment Event Production Run; the event that produces a finished product resource

Economic Decrement Event Materials Issuance Represents the using up of raw materials in the production process.

Economic Decrement Event Labor Operation Represents the performance of a particular activity in the conversion process by a production employee, thereby using up that person's labor

Economic Decrement Event Machine Operation Represents the performance of a particular activity in the conversion process by a machine, thereby consuming part of the machine's useful life

Increment Commitment Event Production (Job) Order A commitment event that schedules a work-in-process job, committing to a future increase in finished products

Decrement Commitment Event Raw Materials (or Labor or Machine) Requisition Is a Commitment event whereby the production commits to transfer materials from the materials warehouse to the production floor, thus it commits to a future decrease in materials (or labor or machinery).

Process name	Events	Type	Document	Internal agent	External agent	Resource
Conversion business process Eternally process	**1-Production run**	Economic increment		Production employee, production supervisor		**-Finished product resource** **(inflow :produce)** **It is similar to the event 3 in acquisition cycle**
	2-Row material or labor or machine **requisition**	Decrement commitment	material or labor or machine **requisition**	Inventory clerk		-Reservation row material
	3-**Production (**job**) order**	Increment commitment	**Production order**	Production employee		Reservation finished order
	4-**Economic decrement:** **1**-Material issuance **2**-labor operation **3**-machine operation	Economic decrement	1-move ticket 2-job time ticket, time track form 3-entry on WIP (work in progress) job ticket	1-inventory clerk (for executing), production supervisor (for authorization) For 2,3 of them: - Production employee(for executing), production superviso r(for authorization		1-row material (outflow : use) 2-labor (outflow :use) 3-machin (outflow :consume useful life because it is partially used)

Conversion Cycle Relationships

- **Duality**

Transformations are more complex than transfers found in other processes

Involve materials use, labor use, and equipment consumption

- Often compromised such that only materials use is tracked directly, with labor and equipment consumption costs assigned via some allocation scheme

Often labor operations and machine operations are not maintained separately from work-in-process job because they are subsumed into the job; relationships of the production run to the labor type and machine resources are often maintained

- **Stock-flow**

Materials and labor are typically used up completely in the material issuances and labor operations; such stock flows are called Use
Machines are typically only partially used up in machine operations, such a stock flow is called Consume
Finished goods are produced by the production run (similar to inventory being purchased in acquisition cycle)

- **Fulfillment**

Material issuances fulfill raw material requisitions
Production runs fulfill production orders

- **Reservations**

Raw materials are reserved for use via the requisition event
Finished Goods are reserved for availability via the production order

- **Participation relationships**

Typically, all agents in the conversion cycle are internal agents
Usually includes a direct association relationship (responsibility) between production supervisors and employees

- **Linkages**

Between Materials and Finished Goods

- Contains information needed for Bill of Materials, I.e., a finished good is composed of what raw material items (in what quantities)

Between Labor (type) and Finished Goods

- Contains information needed for Operations List, I.e., a what labor operations are needed to produce a finished good

- **Reciprocal**

Production orders trigger the requisitioning of materials; this reciprocal relationship represents a schedule of what is to be produced and what will need to be used and consumed to accomplish the production.

- **Custody**

Companies often give custody of materials (and possibly finished goods) to a set of inventory clerks to protect the goods from theft or other misappropriation

Chapter -12

Scope Activities associated with acquiring and paying for employee labor, skills, and knowledge

Consists of two functions

1. Personnel function recruits, hires, trains, evaluates, and terminates employees
2. Payroll function pays employees

Payroll Cycle Resources

Labor

– Labor type usually substitutes for actual labor due to the intangible nature of labor
– Attributes captured usually include a labor type identifier, a description of the labor type, a standard cost per unit of the labor type

Cash

– Cash accounts usually substitute for actual cash due to measurement constraints
– Cash for the payroll cycle is usually stored in either a regular checking account or in an impress checking account

Labor Requisition

– An instigation event that identifies the need for and requests the acquisition of employee labor, skills, and knowledge
– May be documented in various ways, including verbal communication or memorandum
– Data that should be captured include date of request, date labor needed, “quantity” of labor needed, identity of the requestor

Employee Schedule

– A commitment event that specifies the agreement between the enterprise and an employee for the exchange of labor for cash

Labor Acquisition

An economic increment event that identifies the provision of labor by an employee to the enterprise

Cash Disbursement

– An economic decrement event that represents the distribution of cash to the employee from whom labor was acquired

Process name	Events	Type	Document	Internal agent	External agent	Resource
Human resource "**payroll process** " **(with employee)** Ch 12	1-Labor requisition	Instigation	-Memorandum مذكره -verbal communication - **staffing plan**: contain quantity of labor but not assign specific employee	-Personnel representative -supervisor	Employee	Proposition Labor type
	2-Labor schedule	Mutual commitment	labor schedule	-Personnel representative -supervisor	Employee	- Reservation Cash receipt -Reservation labor type
	3-Labor acquisition	Economic increment	Time card	-supervisor	Employee	Labor type
	4-Cash disbarment	Economic decrement	-Paycheck -direct deposit notification إشعار الإيداع المباشر	-payroll clerk	Employee	Cash receipt

Chapter – 13

Financing Cycle Events

Cash Requisition Is an instigation event whereby a request is made to obtain additional cash from external sources, usually on the basis of a cash flow budget

Financing Agreement – Debt Is a mutual commitment event that obligates the external creditor to provide a certain amount of cash to the enterprise and obligates the enterprise to provide a certain amount of cash in a specified time to the external creditor

Financing Agreement – Equity Is a Commitment Event that obligates the external investor to provide a certain amount of cash to the enterprise. Implicitly obligates the enterprise to provide cash in exchange to the investor; however, amount and timing are not specific nor guaranteed

Dividend Declaration – Equity Is a Commitment Event that obligates the enterprise to provide cash or other resource to the external investor; amount and timing are specific and are a legal obligation

Cash Receipt Event An economic increment event that represents the receipt of cash from an external investor or creditor in fulfillment of a debt or equity financing agreement

Cash Disbursement An economic decrement event that represents the payment of cash by the enterprise to investors or creditors in fulfillment of a debt financing agreement or an equity dividend declaration (or stock re-purchase)

Process name	Events	Type	Document	Internal agent	External agent	Resource
Financing business process (with investor and creditor)	1-Cash **requisition**	Instigation	a cash **requisition** number that identified **requisition document**	-Financing officer -board of director	Creditor or investor دائن مستثمر	cash

	2-**Financing agreement -debt** has different name: -**loan agreement -mortgage** ارتجاج -**promissory note** -**bond**	Mutual commitment	-Debt Financing Agreement: Promissory Note - Debt Financing Agreement: Bond Certificate	-Financing officer -board of director	Creditor دائن	cash	Take cash from external creditor and obligates to return this cash in certain amount and in specific time
	3- finance agreement –**equity**	commitment	Equity Financing Agreement: Stock Certificate	-Financing officer -board of director	Investor مستثمر	cash	Take cash from external investor and obligates to return this cash but the time and amount are **not** specific
	4-dividend declaration –**equity**	Commitment		-Financing officer -board of director	investor	cash	Enterprise obligates to provide cash to investors and the amount, time are specific and are a legal obligation
	5-cash receipt	Economic increment	deposit slip قسيمه ايداع	Cashier	Creditor or investor	Cash	
	6-cash disbursement	Economic decrement	-check -disbursement voucher قسيمة الصرف	-Cashier -finance clerk - account payable clerk	Creditor or investor	Cash	

Difference

- **External Agents** Investors for Equity financing **and** Creditors for Debt financing
- **Internal Agents**
  - Cashiers typically process cash receipt events
  - Financial Officers (possible also Board of Directors) approve debt and equity financing agreements
  - Financing Clerks (or accounts payable clerks or cashiers) typically process cash disbursements
- **Duality** Cash is exchanged for cash; duality represents the timing difference between the related cash inflows and outflows
- **Fulfillment**
  - Financing agreement (debt or equity) fulfills cash requisition event
  - Cash receipt fulfills financing agreement (debt or equity)
  - Cash disbursement fulfills debt financing agreement or equity dividend declaration (or stock repurchase)
- **Proposition** Cash requisition proposes to increase cash to meet financing needs
- **Reservation**
  - Debt Financing agreement reserves cash to be received and also reserves cash to be disbursed (with different timing patterns)
  - Equity Financing agreement reserves cash to be received
  - Equity Dividend Declaration reserves cash to be disbursed
- **Stock-flow** Cash resource is increased by cash receipts **and** Cash resource is decreased by cash disbursements
- **Participation relationships** See agent descriptions for events in which each type of agent participates
- **Reciprocal** Between Equity Financing Agreement Commitment Event and Dividend Declaration Commitment Event

Chapter – 14

The Relationship between Risks, Opportunities, and Controls

- **Risks** A risk is any exposure to the chance of injury or loss (also known as a threat).
- **Opportunities** and Objectives Opportunity and risk go hand in hand. You can't have an opportunity without some risk and with every risk there is some potential opportunity.
- **Controls** A control is an activity performed to minimize or eliminate a risk.

COSO's internal control model has five components:

- Control environment
- Control Activities
- Monitoring
- Risk assessment
- Information and communication

The control environment includes the following areas:

- Integrity and ethical behavior
- Board of directors and audit committee participation
- Organization structure
- Human resource policies and practices
- Commitment to competence
- Management philosophy and operating style
- Assignment of authority and responsibility

Risk assessment identifies and analyzes the relevant risks associated with the organization achieving its objectives. And forms the basis for determining what risks need to be controlled and the controls required to manage them
Control activities are the policies and procedures the organization uses to ensure that necessary actions are taken to minimize risks associated with achieving its objectives.
Monitoring is the process of assessing the quality of internal control performance over time

Control activities

- **Objectives - Prevent, Detect, and Correct**

Preventive controls focus on preventing an error or irregularity.
Detective controls focus on identifying when an error or irregularity has occurred.
Corrective controls focus on recovering from, repairing the damage from, or minimizing the cost of an error or irregularity.
All else being equal, it is best to prevent errors and irregularities

- **Error versus Irregularity**

Error is unintended mistake
Irregularity is an intentional effort to cause loss to an enterprise

Risk Identification:

- **Economy Risks**: Affect an entire economy, Examples: war, terrorism, environmental disasters
- **Industry Risks**: Affect an entire industry, Examples include industry wide cost increases or demand decreases, or an economy risk that has an especially strong effect on a specific industry
- **Enterprise Risks**
- **Internal:** Lack of ethics, low employee morale, employee incompetence
- **External:** Increased competition, reduced brand quality perceptions
- **Business Process Risks**: Risks associated with business process objects
- **Information Process Risks**: Risks associated with recording, maintaining

Controls for Economy/Industry Risks: Economy and industry risks can be very difficult to control

- Diversify to multiple industries
- Use hedges and derivatives
- Be outwardly focused
- Pay attention to industry and economy trends and market demands

Controls for Enterprise Risks:

- Respond quickly to drops in perceived brand quality or firm reputation
- Purchase insurance
- Use sound personnel practices

- Set a strong "tone at the top"
- Create contingency plans to minimize business interruptions

Controls for Business Process Risks:

- Resources
  - Resource Risks
  - Resource Risk Controls
- Instigation Event Risks
- Controls for Instigation Event Risks
- Mutual Commitment Event Risks
- Controls
- Economic Decrement Event Risks
- Controls for Economic Decrement Event Risks
- Economic Increment Event Risks
- Controls for Economic Increment Event Risks
- Economic Decrement Reversal Event Risks
- Economic Decrement Reversal Event Risks
- System Resource Risks and Controls
  - Physical access controls
  - Logical access controls
  - Logical access controls, continued

Controls for Information Process Risks:

- Terminal identification codes
- Encryption
- System Failure Protection

- System Failure Protection
  - Virus protection (anti-virus) software
  - Firewalls
- Software Processing Controls
- Application Controls

Batch Control Totals How are they generated and verified?

- Typically, batch control totals are generated manually as batches are created; this happens before data from documents are entered into a computerized process.

Chapter – 15

Intra-Enterprise Systems: ERP and the REA Enterprise Ontology

- **Enterprise Resource Planning (ERP) Systems**

- Groups of software applications integrated to form enterprise-wide information systems
- Began as back-office applications Seen and used only by people within enterprises
- Bolt-on applications have allowed expansion to front office use
  - **Bolt-on applications** are software programs that can be added to existing ERP applications
  - **Front-office systems** are seen and interacted with by external partners such as customers and suppliers

Goals and Methods of ERP Software and the REA Enterprise Ontology

- **Database Orientation**

Data must be stored at their most primitive levels, at least for a defined time period
Data must be stored only once, in a way that all authorized decision makers can access the data
Data must be stored to allow retrieval in various formats as needed for different purposes

- **Semantic Orientation**

Requires objects in the system's conceptual model to correspond as closely as possible to objects in the underlying reality
Precludes use artificial constructs such as debits, credits, and accounts as base objects in the enterprise system
REA mandates semantic orientation
ERP systems do not require semantic orientation

- **Structuring Orientation**

Demands the use of a pattern as a foundation for the enterprise system
REA mandates use of pattern, with implementation compromises allowed to tailor the system to the business
ERP software packages do not exhibit pattern-based design, but rather attempt to build industry "best-practices" into the software

Intra-Enterprise Integration

- **Integration among systems of functional areas and divisions within the same enterprise**

1. **In-house developed software** software created specifically for an enterprise by its own programming staff or by a consultant
2. **Single source ERP** Entire system uses one ERP software package
3. **Best-of-Breed ERP** Modules from different ERP software packages are used for different functional areas

Enterprise application integration software or inhouse programming solutions may be used to connect the different packages

Electronic Commerce Solutions and Inter-Enterprise System Design

- **Business to Consumer (B2C) E-commerce**

Customers obtain information and purchase items from enterprises electronically, for example, via the enterprise's website
The primary differences between physical B2C commerce and electronic B2C commerce are the breaking down of time, place, and form barriers

- **Business to Business (B2B) E-commerce**

Shift has occurred that requires conceptual models to change from those that result from typical physical B2B commerce.
Foundations include

i. Telecommunications infrastructure
ii. Electronic data interchange (EDI)
iii. The Internet

Electronic Data Interchange (EDI) Exchange of data between enterprises in a prescribed electronic format, usually through a VAN (value added network).