TRL3708 – Exam Prep (S2-2015)

Extracts from Tutorial Letters

"The examination paper consists of question from all study units. In order to pass the exam, it is advisable to study the whole study guide and not only your assignments. Remember to read through your study material consistently and to go through all the activities listed at the end of each study unit. All these activities and assignment questions are valuable for **revision purposes**.

It is advisable to study the study guide for TRL3708, the prescribed book, as well as the two compulsory assignments for semester 02. Remember that you are ultimately assessed on the content of this module."

"you will not get marks if you don't fully discuss in your answers. Giving just headings is not enough. You must fully discuss, describe or explain to get full marks"

Format of the October/November 2015 Exam:

- Provisional Date: 11 November 2015 @ 11:30
- Duration: 2 Hours
- Marks: 70
- Type of Question: Four compulsory Short Questions = 20 marks
  Long & Short Questions - to answer only any 2 of the 3 given = 25 marks each

Author's Notes:

Document Index *Actions Taken* *[In Line with 2015-S2-EXAM SCOPE]*

➢ Study Unit 1	Page 2	Fully Summarised [Integrated 2013/2015 online sources, Bowesox 2013 & Study Guide]
➢ Study Unit 2		None/Read Only
➢ Study Unit 3	Page 6	Fully Summarised [Integrated 2013/2015 online sources, Bowesox 2013 & Study Guide]
➢ Study Unit 4		None/Read Only
➢ Study Unit 5	Page	Fully Summarised [Integrated 2013/2015 online sources, Bowesox 2013 & Study Guide]
➢ Study Unit 6		None/Read Only
➢ Study Unit 7	Page	Fully Summarised [Integrated 2013/2015 online sources, Bowesox 2013 & Study Guide]
➢ Study Unit 8	Page	Fully Summarised [Integrated 2013/2015 online sources, Bowesox 2013 & Study Guide]
➢ Study Unit 9		None/Read Only
➢ Study Unit 10		None/Read Only
➢ Study Unit 11		None/Read Only

Text in Grey = Unsure or has not been checked/edited from source material

No questions from previous exams were included. Appears as though lecturers changed a couple of times. And even so, on quick glance it didn't look as though questions tended to repeat

SEQ = Self-Assessment Question from the study guide

Compiled using Mrs. NJ Matsona UNISA Study Guide TRL3707/1/2013-2019 &
Bowersox's Supply Chain Logistics Management 2013 – Fourth Edition

STUDY UNIT 1: FUNCTIONS & COMPONENTS OF INFORMATION SYSTEMS *SG PAGE 5*

[2015-S2-EXAM SCOPE: SHORT & LONG QUESTION]

1.1 Introduction

Logistics: that part of the supply chain process that plans, implements & controls the efficient, effective flow & storage of goods/services, and the related information from the point-of-origin to the point-of-consumption in order to meet customers' requirements. Information systems play a huge role.

1.2 The functions of logistics / supply chain information systems (SCIS)

"Make sure you know what supply chain information system is, its characteristics, its reasons, levels, components, its modules that interact with it etc. Bowersox at al. 2010:96-103; 2013:7-12"

SEQ WHY IS TIMELY & ACCURATE INFORMATION CRITICAL FOR LOGISTICS SYSTEMS DESIGN & OPERATIONS? Ref. Bowersox 2013:8 & SEQ.3

- *Customer wants real time info* on product availability, tracking of delivery and invoices / *perceived info*
- Managers realize info can be used to *reduce supply chain [SC] assets* such as inventory and HR requirements
- Information *increases flexibility* with regards to how, where and when resources might be utilized to achieve a competitive advantage
- *Enhanced info transfer and exchange* via the internet facilitates collaboration & redefies SC relationships

MAKE SURE YOU KNOW WHAT SUPPLY CHAIN INFORMATION SYSTEM IS: Ref. Par. 14

- Thread linking logistics activities into an integrated process & builds on four levels, namely See functionality below
- Regarded as the backbone of modern logistics activities and process
- Comprehensive SCIS initiates, monitors, assists management in the decision-making process and
- Reports on activities required for the completion of SC operations & planning
- Facilitates initiating activities & tracking information during logistics processes
- Facilitates information sharing, within the firm & between SC (supply chain) partners
- Integrates firm's activities alongside the SC processes to promote service and maintain efficient costs.

SCIS INTEGRATION BUILDS ON FOUR LEVELS OF FUNCTIONALITY: Ref. Par. 1.4 & SEQ

1) Transaction System

- Characterised by formalised rules, procedures & standardised communications, large volume of transactions & operational day-to-day focus.
- Initiates & records logistics activities and their outcomes
- Functions: provides foundation by electronically accepting orders, initiating order selection & shipment, and completing appropriate financial transactions.

2) Management Control System

- Focused on performance measurement and reporting.
- Performance measurement is necessary to provide feedback about supply chain performance and utilisation.
- Dimensions include cost, customer service, quality and asset management measures
- Proactive SCIS should be able to identify future inventory shortages

3) Decision Analysis System

- Focused on software tools that help managers identify, evaluate & compare strategic & tactical alternatives in order to improve effectiveness
- includes supply chain design, inventory management, resource allocation and transport routing.

4) Strategic Planning Systems

- gives top management insight about impact of strategic changes e.g. merger, acquisition, competitive action
- Involves organising & synthesising transaction data in a relational database that assists in strategy evaluation
- Incl. development & refinement of SC capabilities & customer relationship management [CRM]

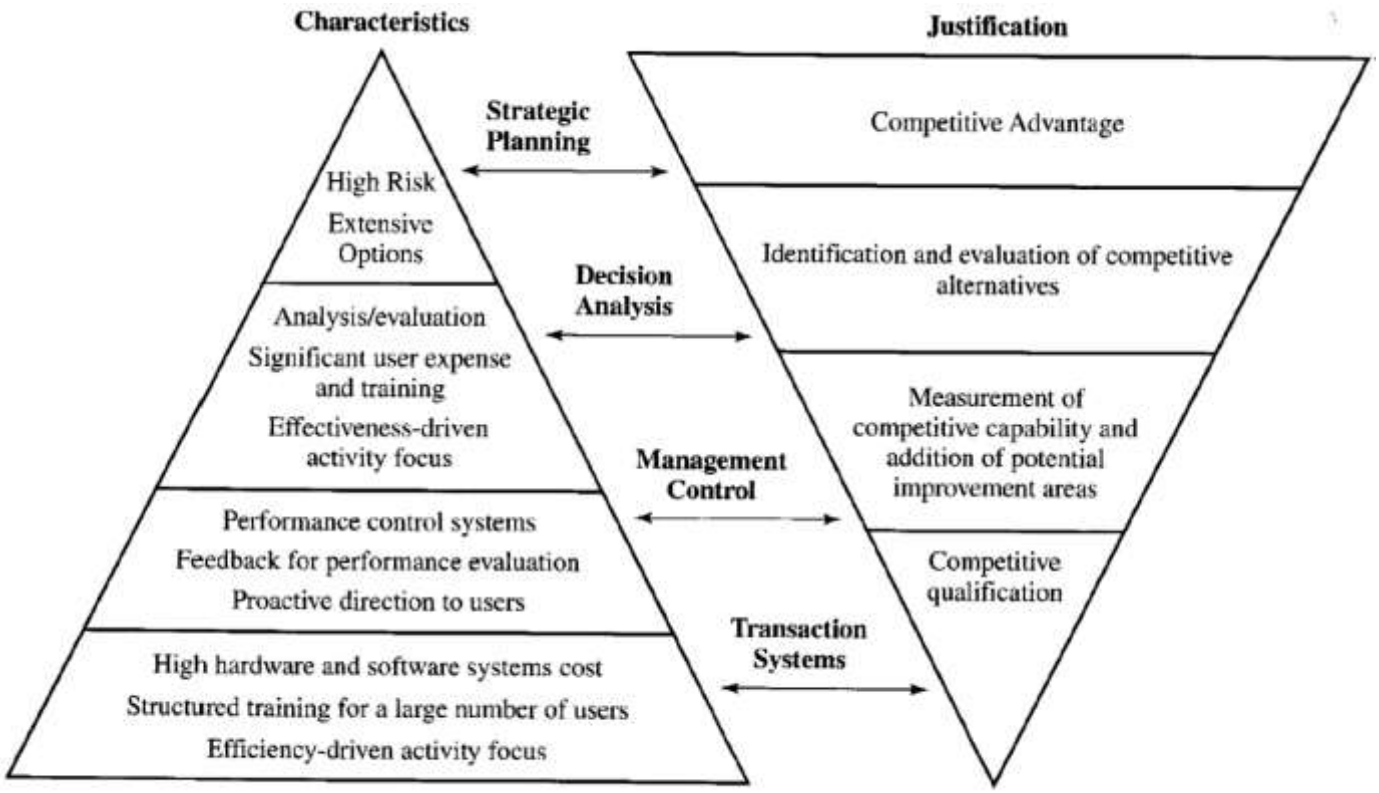


FIGURE 1.3 SCIS Usage, Decision Characteristics, and Justification

1.3 Logistics information system components

THE MAJOR SYSTEM COMPONENTS ARE:

- Enterprise Resource Planning (ERP): Backbone of SCIS – maintaining current & historical data & processes to initiate & monitor performance
- Communication Systems: hardware/software facilitating info exchange between systems & physical infrastructure within firm & between SC partners.
- Execution Systems: Works in conjunction with ERP to support logistics operations e.g. controlling warehouse & transport operations
- Planning Systems

- Data within SCIS: obtained/recorded by using communication systems, e.g. electronic data interchange [EDI], bar coding, radio frequency identification, internet. This is then
- organised so that it can be used for planning, execution, control & decision making.
- Common way of organising data meaningfully = by clustering it into certain files so that it can be retrieved easily for a specific purpose.
- This data can be stored on a computer in an enterprise resource planning [ERP] system.
- Info retrieved from "filing system" to plan, execute & control logistics operations throughout the supply chain.

MAJOR ERP MODULES THAT INTERACT WITH SCIS: Ref. 2015-S2-Assign.02.Q3; Bowersox 2013:10-13

Enterprise Integration & Administration	Enterprise Supply Chain Operations	Enterprise Planning & Monitoring
General Administration	CRM	Sales & Operations Planning
Accounts Receivable & Payable	Logistics	SC Visibility & Event Management
Financial Inventory Accounting	Manufacturing	SC Compliance
General Ledger	Purchasing	
Human Resources	Inventory Deployment	
	WMS, TMS & YMS	

1.4 Summary & Self-Evaluation Questions [SEQ] Integrated into section above

[See SU 3 for detail on ERP & SU 4 for detail on APS]

"Supply chain planning and supply chain applications. Bowersox at al. (2010:132-135) or (2013:117-119)"

SUPPLY CHAIN PLANNING Ref. Bowersox et al. (2010:133-134); (2013: 117-118)

- Provides the framework wherewith identified modules/components can be coordinated to satisfy customers & effectively deploy resources.
- SC planning system & supportive information systems integrate info & coordinate overall logistics & SC decisions. Ref. 2015-S1-Assign.01.3

Advise a firm that wants to succeed in SC industry on the **factors driving effective planning** (10):
For a firm to succeed in planning in the supply chain industry, the following factors should be in place:

Supply chain visibility: (✓)

- Need for visibility regarding location and status of supply chain inventory and resources. (✓)
- Able to track SC inventory & resources
- Effectively evaluate & manage info about available resources. (✓)
- Requires exception management to highlight the need for changes in flow or deployment decisions to minimize or prevent potential problems.
- Uncertainty in product availability → limited visibility on inventory in transit & expected arrival times. (✓)

Simultaneous resource consideration: (✓)

- Consider combined SC demand, capacity, material requirements & constraints. (✓)
- SC design reflects customer demand for product quantity, delivery timing & location. (✓)
- Identifes trade-off between relevant requirements & capacity constraints → achieve desired SC performance

Resource utilization: (✓)

- Logistics & SC management decisions influence many enterprise resources e.g. production, distribution facilities & equipment, transport equip. &. (✓)
- These resources consume substantial proportion firm's fixed & working assets. (✓)
- Functional management must focus on resource utilization within its scope of responsibility. (✓)
- need for coordinated approach that considers service req. while minimising combined SC resources

(APS) SUPPLY CHAIN PLANNING APPLICATIONS Ref. Bowersox et al. (2013: 118-120)

1) *Demand planning*

- Increasing complexity of product offerings & marketing tactics together with shorter product life cycles requires increased accuracy, flexibility & consistency in determining inventory requirements.
- Demand management systems seek to provide such capabilities.
- It develops forecasts that drive anticipatory SC processes.
- It integrates historically based forecasts with other info of events that could influence future sales activity, e.g. promo plans, pricing changes, new product intros → best possible integrated statement of requirements
- It focuses on creating forecast consistency across multiple products and warehouse facilities.
- Rationalises detailed logistics plans, unique forecasts for each warehouse & product with aggregate product group and national plans.

2) *Production Planning*

- Use statement of requirements [SoR] together with manufacturing resources and constraints to develop a workable manufacturing plan.
- SoR defines what items are needed and when.
- Production planning systems match requirements plan with the production constraints.
- Obj.: To satisfy necessary requirements at min total production cost while not violating any constraints.

- Effective production planning results in a time-sequenced plan to manufacture the correct items in a timely manner while operating within facility, equipment, and labour constraints.
- Identify items to be produced in anticipation of need; remaining within production constraints yet minimise inventory.

3) Logistics Planning

- Coordinates transport, warehousing & inventory within firm & between SC partners.
- Integrates overall movement demand, vehicle availability & relevant movement cost into a common decision support system that seeks to minimise overall freight expense.
- Historically handled individual transportation perspectives by that particular transportation focus → limited economies of scale, limited info sharing & excessive transport cost.
- Logistics planning is essential for effective resource utilisation.

4) Inventory Deployment

- Represents major enterprise integrators of sales, marketing & financial goal
- Can be completed independently by individual SC functions, integrated by SC overall or coordinated by firm
- Long & short term elements
- Specific goals incl. projected annual/quarterly activity levels of revenue, shipments & case volume.
- Inconsistency between marketing & financial plans = poor service, excess inventory
- Key Obj.: integrated inventory plan using APS

STUDY UNIT 3: ENTERPRISE RESOURCE PLANNING & EXECUTION SYSTEMS, SG PAGE 15

[2015-S2-EXAM SCOPE: SHORT & LONG QUESTION]

"pay attention to the ERP modules and the components of those modules Bowersox at al. 2010:98-103; 2013:10-13; study guide page 16; and the additional information posted on myUnisa Announcements."

3.1 Introduction

3.2 Enterprise resource planning

3.2.1 Enterprise Resource Planning Defined Ref. SG page 16

ENTERPRISE RESOURCE PLANNING (ERP) → major software component of logistics / SC information systems

- Consists of database & various modules designed to help initiate & coordinate business activities
- "Backbone" of firm's logistics information system
- Maintains current & historical data & processes transactions → initiate, track, monitor & report on customer orders & logistics performance

ERP PRODUCTS: Enterprise-wide transactional tools that

- Captures data &
- Reduces manual activities & tasks associated with processing financial, inventory & customer order info

IMPORTANCE OF ERP: Ref 2014-S1-Assign.02.6: Bowersox et al. (2010:98; 2013: 11)

- ERP system facilitates integrated operations and reporting to initiate, monitor and track critical activities such as order fulfilment and replenishment

GLOBAL ERP [Can be used under ERP description, design or reasons (if it fits with the question)]

- makes exchange of info possible across the globe
- systems necessary to provide:
  - Common data regarding global customers, suppliers, products & financials
  - Common & consistent info regarding order & inventory status regardless of location from which global customer is inquiring or where shipment is to be delivered.

3.2.2 Benefits / Reasons for implementing ERP Ref. myUnisa "Communication+Technologies+and+ERP;" Bowersox (2010:98-130, 297, 364); 2011-Assign

[Seems that Benefits and/or reasons for implementing can be used interchangeably depending on the question / application thereof]

BENEFITS:

1) *Consistency*

- 1st obj. → to create system that utilises consistent data & processes for different regions and divisions globally
- data is resident in common data warehouse that can be accessed globally
- data can be modified with appropriate security and controls using transactions available in multiple languages

2) *Economies of scale*

- firms merge & expand globally → management increases demand to take advantage of global economies of scale → done through resource rationalisation
- customers looking for suppliers providing products globally using consistent system capabilities and interfaces

3) *Centralised ERP approach*

- significant software scale economies as req. only limited no. of software licenses with all divisions & regions

4) Integration

- Enhanced system integration within firm & enterprise; between suppliers & customers
- Results from common integrated database & implementation of common processes across divisions/regions

REASONS: Ref. SG pg. 16

- Seen as backbone of most of firms' logistics information systems → maintaining current & historical data.
- Used to initiate, monitor & track critical activities such as order fulfilment and replenishment.
- Transactions facilitated by ERP: order entry, inventory management & shipping
- Other enterprise applications operate using ERP backbone to develop & organize insight about customers, products & operations
- Core of ERP → integrated corporate wide database → central data warehouse: maintain info to facilitate access to common data by all modules → relational info repository for entire ERP system.
- ERP includes the supply chain info modules required for the day to day support to supply chain operations.

3.2.3 ERP System Design

Ref. myUnisa "ERP files.pdf;" 2014-S1-Assign.01.1: Bowersox, Gloss & Cooper (2010:100-101; 2013)

- Designing ERP system → complicated task. Carefully considered before finalising:
  - Evaluate ERP package → does it fit with company's strategy
  - Upgrade or change software
  - Expand with bolt-on solutions: keep current solution, finding solutions to enhance abilities
  - Corporate wide; one or many solutions

SEQ MAJOR FILES critical for logistics operations in the central database of a typical ERP system:

1) *Customer order file*
- Contains info about/describing all the company's customers
- Info includes names, addresses, billing info, ship info, price, terms of sale, special instructions etc.

2) *Product Price file*
- contains the info concerning the products and services offered by the firm
- also has prices and quantity info
- difficult to maintain because of shorter product life cycle and price changes

3) *Supplier file*
- list the firms suppliers of materials and services
- includes info about supplier's name, address, pay info

4) *Order File*
- Contains info regarding all open orders in progress or ready to be filled
- each order represent current or potential request by customers
- Indicates orders processing stage / that have been filled, order quantities, customers' name & number

5) *Bill of Materials file*
- describes how raw materials are combined for finished products
- Logistics operations are beginning to use BOM to facilitate packaging and customization

6) *Purchase Order File*
- Contains PO's that have been sent to suppliers
- PO's are for raw materials or for repairs and maintenance

7) *Inventory File*
- Records physical inventory/product firm has/maybe available according to current production schedules

8) *History file*
- Documents firm's order & PO history to facilitate management reporting, budget & decision analysis and forecasting

3.3 Supply chain information system design [Ref. 2015-S2-Assign.01.3; Bowersox et al (2010: 99-103 or 2013: 10-12)]

CRITICAL COMPONENTS (& THEIR MODULES) OF THE ERP MODULE WITHIN SCIS:

1) *Enterprise Integration & Administration*

- ERP modules that are not specifically SC applications but do have substantial interactions.
- Along with FINANCIAL & OPERATIONS REPORTING – Other components include:

GENERAL ADMINISTRATION

- Includes: various transactions to structure firm & define transaction process flow.
- SC operations use these modules to define
  - reporting functional & organisational structure
  - process flows such as customer and replenishment order fulfilments.

ACCOUNTS RECEIVABLE & PAYABLE

- Represents functions for invoice collection from customer & invoice payments to suppliers.
- Typically acknowledged as accounting functions.
- However, significant interaction with SC operations since:
  - accounts payable influenced by material & services acquisition
  - accounts receivable influenced by delivery & invoicing of complete orders.

FINANCIAL INVENTORY ACCOUNTING

- Relates to tracking of value-added processes through SC to facilitate financial & tax reporting.
- Timing & location of supply chain value-added processes (e.g. production, inventory control & packaging) → significant influence on what's reported to treasury & financial markets (for stock valuation purposes).

GENERAL LEDGER

- Relates to the structure of detailed accounts for monitoring & reporting revenue accounts.
- SC involves substantial interaction with firms & external processes → structure of general ledger accounts significantly influences SC's ability to measure, monitor & report costs related to delivering products or serving customers.

SEQ HUMAN RESOURCES

- Tracks personnel profiles & their activities levels.
- Most firms have large number of individuals involved in SC operations (e.g. manufacturing, distribution & purchasing), often in different global environments → ability to track pay scales & activity levels is critical to make effective supply chain personnel decisions.
- Assists in planning & scheduling workforce, appointing, recruiting & capturing employees' personal details
- Linked with the ERP systems

2) *Enterprise Supply Chain Operations*

- Enterprise operation systems work in together with firm's ERP system to provide specific functionality to support supply chain operations.
- Includes SCIS modules required to support day-to-day supply chain operations such as:

CUSTOMER ACCOMMODATION / CUSTOMER RELATIONSHIP MANAGEMENT [CRM]

- Designed to facilitate information sharing between customers, sales force, and operations management.

MANUFACTURING

- Schedules and allocates production process and determines the component requirements
- Influenced by the manufacturing strategy chosen

PURCHASING

- Initiates and tracks procurement activities like PO initiation, expediting & supplier management

INVENTORY DEPLOYMENT

- Schedules and monitors material flow to meet product and deployment requests
- Distribution requirement planning (DRP): an inventory management tool used to implement logistics req.

LOGISTICS

- Direct & monitor logistic activities including finished goods & inventory management
  - WAREHOUSE MANAGEMENT (WMS), TRANSPORTATION MANAGEMENT (TM) & YARD MANAGEMENT (YMS) SYSTEMS That specialise in providing & maintaining state-of-the-art performance systems.

SOFTWARE AS A SERVICE [SAAS]

- Application –specific software packages
- Purchased for either internal use or on a hosted basis (then called cloud computing).

3) Enterprise Planning and Monitoring

- Processes & technologies facilitating exchange of planning & coordinating info both within organisation & between supply chain partners.
- Components interact with other SC components → require substantial standardisation with other firm functions and supply chain partners.
- Major components include:

SALES & OPERATIONS PLANNING [S&OP]

- Describes process used to balance demand requirements & supply capabilities of firm & its SC partners.
- Process itself requires functional coordination & integration
- Also requires info tech to evaluate demand, supply & resource trade-offs.
- Technology is generally characterised as planning & scheduling applications

SUPPLY CHAIN VISIBILITY & EVENT MANAGEMENT ("Track & Trace")

- Increasingly capable of proactively suggesting changes in supply chain flows to minimise the potential of manufacturing shutdowns or service failures. Capabilities include:
  - *Track & tracing*: ability to determine exact position of shipment & carrier/shipper responsible for it.
  - *Notification* informs shipper/customer of shipment's status.
  - *Reporting* allows logistics manager to measure performance of individual carrier based on their history with actual shipment.
  - *Rerouting*: allows managers to change mode/flow of a shipment if it were to get delayed.
  - *Simulation* allows managers to simulate alternative routes.

SUPPLY CHAIN COMPLIANCE

- Systems monitor component & product flow info → insures they comply with government & regulatory requirements for label, taxation, and security restrictions

3.4 Execution systems [Ref. SG par 3.4; 2014-S2-Assign.02]

- Develop execution systems as part of ERP system to meet the specific logistics requirements of an enterprise.
- ERP system focus on consistency & integration in SC
- Common ERP modules often not capable of managing/performing some of the major activities in the company
- Enterprise Executive Systems work in conjunction with ERP to support logistics operations.
- Most executive systems are “bolt-on” or integrated into ERP system by linking them to the central database and/or other enterprise resource planning files.
- Executions systems are becoming more critical for controlling warehouse & transport operations

3.5 Summary & Self-evaluation questions

SEQ: (3) DISCUSS THE DIFFERENCES BETWEEN ENTERPRISE RESOURCE PLANNING SYSTEMS AND DISTRIBUTION REQUIREMENT PLANNING SYSTEMS.

An ERP system assists management in allocation & application of logistics activities in different SC channels

DRP system assists management in allocation & distribution of products to different SC participants for example assisting in the transportation of the final product to the customers.

SEQ: (4) EXPLAIN THE YARD MANAGEMENT SYSTEM AS PART OF THE ENTERPRISE RESOURCE PLANNING EXECUTION SYSTEM.

Since you now know that the execution system is part of the enterprise resource planning system, you should explain how the yard management system works.

The yard management system manages and empties trailers in the parking lot or yard at manufacturing plants and distribution centres. The objective with this system is to make the yard an extension of the plant, distribution centre or warehouse by being able to quickly find a specific trailer and its contents.

Additional 2015-S1-Assign.01.2: COMPARE 2 MOST USED SCIS MODULES: (10) **Ref. Bowersox et al. (2010: 98-110; 111-115); (2013: 7-10; 126-130)**

One deals with the facilitation of information; the other deals with the planning and allocation of resources.

ERP

- backbone of most firms' logistics information system. (✓)
- maintains current and historical data and processes to initiate and monitor performance. (✓)
- facilitate integrated operations and reporting to initiate, monitor, and track critical activities such as order fulfilment and replenishment. (✓)
- incorporates an integrated corporate wide database, referred to as data warehouse. (✓)
- facilitates processes like order entry and management, inventory assignment, and shipping. (✓)

APS

- reflects the resource status and allocation at a point in time. (✓)
- develops requirement projections for the planning horizon. (✓)
- It defines and coordinates supply chain system resources and constraints. (✓)
- Uses a combination of mathematical programming and heuristics to determine how to most effectively meet customer requirements while optimizing resource utilisation. (✓)
- Specifies the resource assignments and communicates them to the ERP system to initiate appropriate transactions. (✓)

Additional myUnisa: TO ENSURE THE ERP REMAINS EFFECTIVE THE FOLLOWING ACTIONS CAN BE TAKEN:

- Do a gap analysis
- Get external assistance from a Consultant to ensure the ERP is functioning alongside the business objectives and the correct information is being reported from the system.
- Review all processes and procedures and ensure it is aligned with the ERP system and vice versus to meet company objectives.
- Upgrade the ERP where necessary and ensure sufficient software and training is provided to make the system work alongside the business objectives
- Share information internally via sources such as intranet and training to ensure all personnel working on the ERP system is capable of making use of the software
- Share info externally with customers and within the supply chain
- Maintain an active partnership with ERP vendors for interaction and obtaining up to date information, software and news
- Evaluate the planning package as well as strategies, processes and costs within the ERP system and ensuring it works alongside and with the business model and objectives
- Renew membership for external support on the ERP system
- Customise and invest in the ERP system to streamline the system, make it useful, practical, efficient, reliable and valuable to the business

STUDY UNIT 5: LOGISTICAL OPERATING SYSTEMS, SG PAGE 37

[2015-S2-EXAM SCOPE: SHORT & LONG QUESTION]

5.1 Introduction

Response-based logistics contrasts with anticipatory business model. Fundamental difference is *timing* & sequence of events that drive business practice.

5.2 Response-based supply chains

5.2.1 Definition of TRADITIONAL (PUSH) ANTICIPATORY business model

- "reactive" process
- Manually intensive
- Unable to meet changing req. of dynamic logistics environment
- Involve inventories in all stages of the SC - inventory is kept in anticipation of sales
- Requires anticipation of what customers will demand in the future
- Info on purchase behaviour not readily available & firms didn't share their plans → business operations driven by *forecasts*.
- Forecast results typically wrong → differences between what firms planned & ended up doing → variation = unplanned inventory.
- Customer is passive participant
- High cost & high risk → adversarial relationship between trading partners - each protecting its own interest.

"Responsiveness & barriers when implementing responsive systems Bowersox (2010:11-16 or 2013:19-23)"

5.2.2 Definition of responsive (pull) business model

RESPONSIVE SUPPLY CHAIN:

- Network/collaboration of firms capable of creating wealth to stakeholders in a competitive environment by
- Reacting quickly & cost effectively to changing market requirements → more flexible
- Based on core competencies & on leveraging people & info a.s.a.p. in the most cost-effective manner

RESPONSIVENESS

- Made possible through improved info tech & info sharing & connectivity
- Method of controlling production flow & processes through the factory based on a customer's demand
- Concept each process manufactures component in line with another department to build final part to exact expectation of the customer.
- Production processes designed to produce only what is deliverable → not holding excessive stock levels of raw, part-finished & finished materials → lean businesses

SEQ RESPONSIVE (PULL) BUSINESS MODEL – Demand Driven

- Aimed at reducing forecast reliance through joint planning & rapid info exchange in SC
- Goal: ↓ amt. of inventory in total SC by controlling & compressing time between order's receipt & delivery.
- Availability of low cost info has created time-based competition.
- Managers increasingly using info tech & sharing info to improve speed & accuracy of SC logistics.
- When all SC members synchronise operations → opportunities exist to reduce overall inventory & eliminate costly duplicate practices → faster product delivery.
- Key concept in postponement
- Potential to uniquely customise products on smaller orders; accelerated by direct connectivity via internet. Benefits to *customers* include:

- Comprehensive Search Capabilities → Expands range of sources & choices when selecting product/service
- Better informed about prices; sometimes able to drive price advantage by virtue of bids/auctions.
- Provides innovation. E.g. customer choice board: customers design/customise own product configuration.

5.2.3 Definition of manufacturing postponement

SEQ POSTPONEMENT

- Time-based competition: Capability to postpone customization & timing of logistical fulfilment.
- Postponement strategies reduce anticipatory risk of SC performance.
- Anticipatory arrangements require inventory to be produced to final product state & deployed on basis of forecasts or planned requirements.
- Working arrangements: allows postponement of final manufacturing/customization/distribution of product *until receipt of customer order* → reduce incidence of wrong manufacturing/incorrect inventory deployment
- Company can maintain valid dates of custs.' orders when specs are fully known & purchase confirmation rec.
- Two types of postponement used in highly responsive SC operations:

1) *Manufacturing / Form Postponement (a.k.a. Late Customisation)*

- Goal: maintain products in a neutral / non-committed status as long as possible.
- Produce sufficient qty.'s of standard/base product to realise economies of scale but delay final features →
- Withhold product's final shape/features until exact customer order specs are fully known & customer is committed to the purchase of the product.
- Fewer resources are wasted when goods are made on order.
- Req. fast order processing & flexible logistical operational systems to meet orders within a reasonable time.
- E.g.'s: Paint dealers mixing paint; accessories during car manufacture
- Aimed at the product

2) *Geographic / Logistical Postponement*

- Differentiated products are kept in stock at a central point for fast response to customer orders.
- Goal: Build & stock full line inventory at one / limited number of strategic locations.
- Forward deployment of inventory (closer to market) is postponed until customer orders are received.
- Central inventory storage ↓ inventory levels needed to maintain high degree of availability in all markets
- Once logistical process is initiated → make effort to accelerate economic movement of prod. directly to cust.
- Retains manufacturing economy of scale & meet customer service req. by accelerating direct shipments.
- Mostly service supply / spare parts.
- Anticipatory inventory deployment to local market warehouses substituted by accelerated delivery of precise order req.
- Focuses on time.

BARRIERS TO IMPLEMENTING RESPONSIVE SYSTEMS

1) Publicly held corporations need to maintain planned quarterly profits					
This Accountability →	Creates expectation of continued sales & financial results →	Drives Promotional & Pricing Strategies to "load channel" with inventory to create timely sales.	Never timely to make major reduction in channel inventory	Effort to lean/deload inventory → req. ability to absorb a one-time sale reduction among SC partners	E.g. Start-ups are ideal to implement responsive systems → no invent. to take out of existing channel

2) Need to establish & sustain collaborative relationships

- Belief in long-term potential for responsive alliances faced with frustration concerning arrangement impl.
- Lack of managerial training/experience on implementing collaborative arrangements designed to share benefits & risk

5.3 Logistical operating systems

- Potential to favourably impact customer → directly related to operating system design
- Choice & design of logistics operating structure must balance performance, cost & flexibility
- All arrangements have two common characteristics:
  - Designed to manage inventory positioning
  - Range of logistics alternatives is limited by available technology
- SEQ Commonly observed logistical operating arrangements(systems):

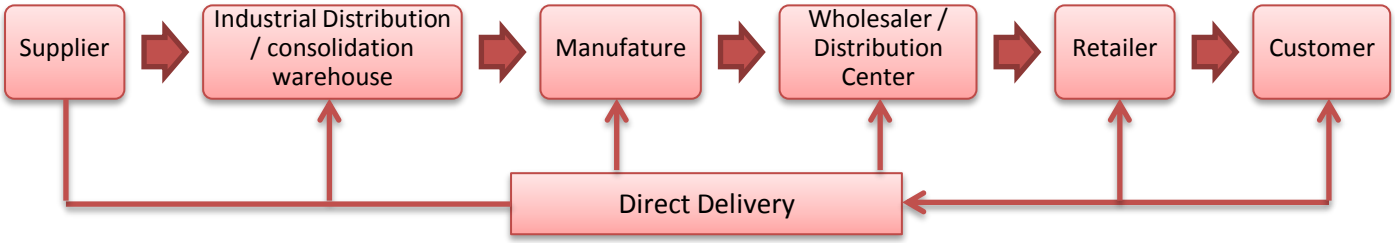
"The Logistical operating arrangements/structures Bowersox at al. 2010:36-40 2013:42-46"

ECHELON-STRUCTURED LOGISTICS

- Flow of products proceeds through common arrangement of firms & facilities as it moves from origin to final destination.
- Utilises warehouses to create inventory assortments & achieve consolidation economies (large vol. transport shipments)
- Inventory is sorted, stored & positioned ready for deployment, in anticipation of future customer req.
- Uses breakbulk or consolidation warehouses.
- *Breakbulk*: receive large volume shipments from a variety of suppliers.
- *Consolidation*: required by manufacturing firms that have plants at different geographical locations. Products manufactured at diff plants consolidated at central warehouse facility to allow the firm to ship full line assortments to customers.
- Total cost analysis justifies stocking some inventory / performing specific activities at consecutive levels of SC

DIRECT LOGISTICAL STRUCTURES

- Designed to ship products direct to customer's destination from one/a limited number of centrally located inventories
- Use expedited services of premium transport combined with info tech to rapidly process customer orders & achieve delivery performance.
- Reduces time delays & overcomes geographical separation from customers.
- Planners use when economies permit → Reduces anticipatory inventories & intermediate product handling.
- Use limited by high transportation cost & potential loss of control.



COMBINED LOGISTICAL ARRANGEMENT

- Ideal logistics system is where benefits of echelon & direct are combined.
- Basis service commitment & order size determines most desirable & economical structure to service cust.
- Anticipatory commitment of inventory should be postponed as much as possible.
- E.g. car parts: Slowest/less demanded stocked at one location; Fast moving stocked close to customers

5.3.1 Definition of flexible operations Ref. Bowersox et al.(2010:38-39; 2013: 45-46)

FLEXIBLE STRUCTURES: Pre-planned contingency strategies to prevent logistics failures

- Prerequisite: use info tech to monitor inventory status throughout logistical network & provide capability to rapidly switch methods for servicing customer orders.
- Typically based on importance of meeting needs of specific customer / critical nature of product ordered
- Distinction between emergency & routine flexible systems.
- SEQ Four situations where flexible logistics operating systems can be applied/justified: Ref. 2011-S1-Assign.02.b; 2015-S2-A2

1st: Delivery times & delivery costs from two/more warehouses are equal

- Service order from facility that has best inventory position or available transportation capacity to achieve timely delivery
- Offers way to fully utilise system capacity by balancing workload between facilities while protecting customer service commitment.

2nd: Cust. order size creates opportunity to improve logistical efficiency if serviced through alt. channel arrangement.

- E.g. Use independent distributor with small consignment; Direct delivery more economical with a large order

3rd: Results in selective inventory stocking strategy.

- Careful analysis of Cost & risk associated with stocking inventory → determine which items to place in warehouse.
- Placement parts: Common strategy = stock selected items in specific warehouses with total line being stocked only at a central facility.
- Master facilities: describe inventory strategies designating larger facilities for backup support of smaller restricted facilities
- Selective inventory stocking by echelon level → common strategy used to reduce overall inventory risk.

4th: Agreements between firms to move selected shipments outside established echelon/ direct logistics arrangements.

- Special arrangements gaining popularity:
  - flow through *cross-docks:* involves multiple suppliers arriving at designated time at handling facility
    - typically used in situations where storage material handling can be avoided.
    - Sort inventory receipt across the dock &consolidate into outbound trailers for direct destination delivery.
    - Growing in retail industry & common method of continuous inventory replenishment.
  - *Service Supplier arrangements*

5th: Use integrated service providers to consolidate products delivery

- use specialist to consolidate product delivery
- avoids storage & handling of slow moving products through mainstreams of echelon logistics structure.
- Most companies use third party logistics providers. 150 in SA E.g. Imperial, victor logistics, DHI

Show a schematic presentation of flexible echeloned and direct delivery. (7) Didn't include in this summary

5.4 Summary & Self-evaluation questions [SEQ] Integrated into section above

myUnisa e-tutor EXPLAIN THREE SYSTEMS COMMONLY USED, NAMELY THE ECHELON STRUCTURE, DIRECT SYSTEM AND FLEXIBLE SYSTEM.

NOTE IN PARTICULAR THE FOLLOWING:

- THE ESSENCE OF EACH SYSTEM (WHAT THE SYSTEM INVOLVES)
- THE CIRCUMSTANCES IN WHICH EACH SYSTEM IS JUSTIFIED
- THE SYSTEM'S EFFECT ON TRANSPORTATION COSTS AND INVENTORY DEPLOYMENT OR REPLENISHMENT
- HOW THE SYSTEM INFLUENCES CUSTOMER SERVICE

LOGISTICAL INTEGRATIVE OBJECTIVES Ref. Bowersox et al. (2013:40-42)

To achieve logistical integration within a supply chain 6 operational objectives must be achieved:

- Responsiveness
- Variance Reduction
- Inventory Reduction
- Shipment Consolidation
- Quality
- Life Cycle Support

1) *Responsiveness:*

- Firms ability to satisfy customer requirements in a timely manner
- Moves emphasis from forecasting future req.'s to accommodating cust.'s on a rapid order to shipment basis
- Responsiveness system: order is not deployed until a customer commits

2) *Variance reduction:*

- All operating areas of a logistical system is open to variance
- Variance: failure to perform any expected facet of logistical operation as required / operational disruption
- Common solution: safe guard using inventory safety stocks to buffer operations and/or
- Use premium transport to overcome unexpected variance that delays planned deliveries

3) *Inventory reduction:*

- To achieve objective integrated logistics system must control asset commitment turn velocity
- Asset commitment: financial value of deployed inventory
- Turn velocity: reflects rate at which inventory is replenished over time
- High turn rates coupled with desired inventory availability = assets devoted inventory are efficiently & effectively utilized → overall assets committed is minimised

4) *Shipment Consolidation:*

- Significant logistical cost is transport
- Transport cost directly relate to shipment size, product and distance
- Objective is to achieve shipment consolidation in an effort to reduce transport cost
- The larger a shipment and the longer the distance it is transported the lower the transport cost per unit

5) *Quality:*

- Objective: continuous quality improvement
- Total Quality Management (TQM) major initiate throughout industry
- If product becomes defective / service promises not kept → no value can be added to the logistical process
- Product quality fails after delivery → return & replace → logistics cost rapidly accumulate

6) *Life Cycle support:*

- Few items are sold without guarantee that product will perform as advertised
- Increasingly rigid quality standards, product expiry dating & responsibility for hazardous consequences → Product return becoming common → *reversal* of initial value-added inventory flow
- Reverse logistics also from laws encouraging *recycling* of beverage containers & packaging materials
- Maintain max control when potential liability exists e.g. product recall
- Life cycle support important if majority of profits are achieved in aftermarket services & sales of supplies
- Cradle-to-Cradle logistical support goes beyond reverse logistics & recycling to include possibility of aftermarket service, product recall & product disposal

STUDY UNIT 7: THE TRADE-OFF BETWEEN SERVICE & COST, SG PAGE 55

[2015-S2-EXAM SCOPE: SHORT QUESTIONS] - *Study the whole study unit*

7.1 Introduction

Unit concentrates on trade-off between cost & service that lead to the positioning of logistics as an integral part of overall corporate strategy. To finalise logistical strategy, N.B to evaluate the relationships between alternative customer and its associated costs.

FORMULATING LOGISTICAL STRATEGY Ref. Bowersox (2013:301-302) General approach consists of:

- Determining a least-total-cost network i.e. *Cost Minimisation*
- Measuring service availability &capability associated with least-total-cost-system design i.e. *threshold*
- Conducting *sensitivity analysis* related to incremental service & cost directly with revenue generation
- Finalising the plan

COST MINIMISATION

- Strategy of least total cost that seeks a logistical network with the lowest fixed and variable costs.
- System design is driven purely by cost-to–cost trade-offs; very little attention to customer service
- Customer service level results from safety stock policy & locational proximity of warehouse to customer

7.2 The threshold service level Ref. Bowersox (2010:319-321) or (2013:301-307)

THRESHOLD SERVICE: Overall level of customer service associated with lowest total-cost system design par. 7.2

- To establish threshold service level: initiate network reengineering with policies regarding desired inventory availability and capability 2014-S1-Assign.02.3
- Analysis often initiated assuming customer service capability based on existing systems & methods.
- Given assumptions, current performance provides starting point evaluate potential service improvement
- Delivery times are estimated on the basis of distance.
- Time elapsed customer placing order to the time order is delivered → longer than for a system focused on service performance.
- E.g. Customers closer to receive deliveries sooner than those who are far → wait for other orders so supplier gets truckload savings.

7.3 Service level sensitivity Ref. Bowersox (304-306) SEQ: How can logistics system's service level capability be modified?

"Study various approaches to design an ideal logistical system. Bowersox (2010:321-324; 2013:304-306)"

SENSITIVITY ANALYSIS REF. BOWERSOX (2010:321) OR (2013:304)

- Least-total-cost logistical design → threshold service → basis for service sensitivity analysis
- Network's basic service capabilities can be improved or decreased by:
  - Varying number of warehouses (Local Modification)
  - Performance cycle modification (e.g. speed or consistency of operations)
  - Safety stock policy modification

1) Varying Number of Warehouses (Local Modification):

- Logistical system's warehouse structure establishes service that can be realised without changing the performance cycle or safety stock policy
- Impact of adding warehouses to the system are:
  - Incremental service is a diminishing function
  - Achieve high degrees of service much faster for longer performance intervals than for shorter intervals
  - Total cost associated with each location added to the logistical network increases dramatically
- Incremental service from additional locations ↓ while incremental cost with each new location ↑ thus service payoff for each new facility is incrementally less.
- *Portfolio Effect*: Relationship between uncertainty & required inventory (est. inventory impact of adding/deleting warehouses)

2) Performance cycle modification:

- Vary speed & consistency of service to a specific market/cust. by modifying some aspect of perform. cycle
- Use web-based ordering & premium transport to improve service
- Increasing service by adopting faster performance cycle arrangement → typically increase variable cost vs.
- Service improvement by adding warehouses → high degree of fixed cost & ↓ in overall system flexibility
- Using premium transport → increase total cost
- Justify move from least total cost logistical system if improved service results in increased profits

3) Safety Stock [SS] Modification:

- Changing amount of SS held at one/more warehouses → Direct way to change service
- Impact of increasing SS across total system → shifts average inventory cost curve upward
- To improve customer service availability, safety stock has to increase at each warehouse
- Availability increases → SS req. to achieve each equal increment of availability increase at an increasing rate

7.4 Logistical service strategies

ESTABLISHING STRATEGY Ref. Bowersox (2010:324-325) or (2013:306-307)

- Overly optimistic strategy/lack of understanding → excessively high cust. Expectation → erratic performance
- Logistics can be position to accommodate almost any service level but at a price
- Evaluate cost of particular cust. service level against income it will generate
- Acceptance or rejection of marketing's proposal for increased service involves strategic positioning.
- Policy changes, once adopted, will influence logistical network design & cost
- To finalise logistical policy , management typically requires considering a range of strategic alternatives
- Four logistical service strategies:
  - Maximum service
  - Maximum profit
  - Maximum competitive advantage – Divided into Service programmes & High-cost warehouses
  - Minimal asset deployment

7.5 Summary & Self-Evaluation Questions [SEQ]

SEQ: (2) WHAT EFFECT DOES ABOVE MENTIONED MODIFICATION HAVE ON THE TOTAL LOGISTICS COST?
Ref. Bowersox (2010:321) or (2013:304)

1) Location Modification

- Total cost associated with each location added to logistical network increases dramatically.
- Thus, while incremental service resulting from additional locations diminishes, incremental cost associated with each new location increases.
- Service payoff for each new facility is incrementally less.

2) Performance Cycle Modification

- Can offer no generalisations regarding cost/service improvement ratio attainable from performance cycle modification.
- Typical relationship of premium to lowest cost transport = significant incentive in favour of large shipments.
- E.g. Substantial order vol. → expect economics of logistics to favour use of warehouse / consolidation point to service market area.
- Impact of using premium transportation → increase total cost.
- Justify adjustments from least-total-cost logistical system if improved service = ↑ profitability.

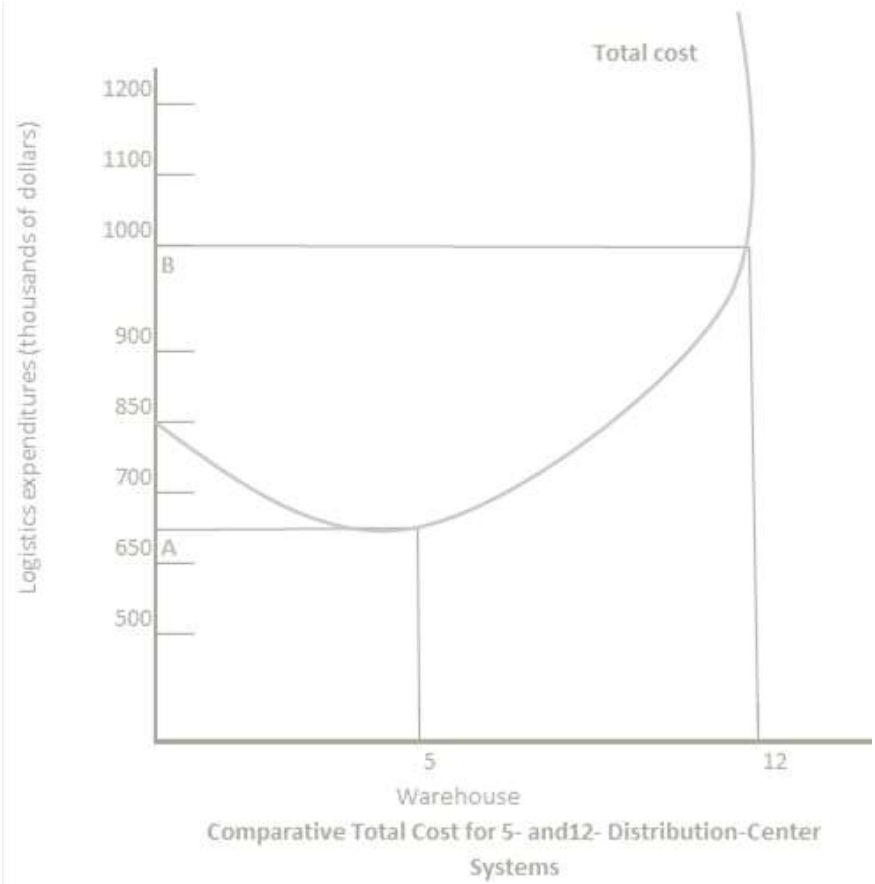
3) Safety Stock Modification

- Impact of increasing the safety stock across a total system will shift the average inventory cost curve upward.

SEQ: (3) EXPLAIN THE GRAPH OF COMPARATIVE TOTAL COST FOR A FIVE-DISTRIBUTION & 2-DISTRIBUTION POINT SYSTEM
Ref. Bowersox (2010:325) or (2013:307)

The final step in establishing a strategy is to evaluate the cost of incremental service in terms of generating offsetting revenue. To illustrate, assume that the current system is geared to service at least 90 percent of all customers at a 95 percent average inventory fill rate within 60 hours of order receipt. Furthermore, assume that the current logistical system is meeting these objectives at lowest total cost by utilizing a network of five warehouses. Marketing, however, is not satisfied and believes that service capability should be increased to the point where 90 percent of all customers would receive 97 percent inventory availability delivered within 24 hours. Logistical management needs to estimate the cost of this strategic commitment.

The figure below illustrates how the alternative strategies can be evaluated. Assume marketing is requesting a 2 percent improvement in inventory availability combined with a 36-hour improvement in delivery capability, Assume design analysis identifies that 12 warehouse facilities represent the lowest-cost network capable of achieving the new service standards, The total cost of this expanded service capability is measured on the vertical axis of the figure by the distance between points A and B. The total cost of achieving marketing's requested service will require approximately a $400,000 per year increase in logistical cost. Assuming an average before-tax profit margin of 10 percent of sales, it would be necessary to generate $4 million in incremental sales to break even on the cost of providing the added service.



Comparative Total Cost for 5- and12- Distribution-Center Systems

myUnisa e-tutor Digikad Solutions is one of the leading global enterprises in electronic engineering, operating in the industry, energy and healthcare sectors. Digikad Solutions have consulted you to advice on how they can achieve high performance and excellent results in their supply chain.

BRIEFLY EXPLAIN THE THRESHOLD SERVICE LEVEL TO THE MANAGEMENT OF DIGIKAD SOLUTIONS AND HOW IT CAN CONTRIBUTE TOWARDS THEIR SERVICE DELIVERY. COMMENT ALSO ON HOW THE THREE (3) WAYS WILL IMPROVE SERVICE DELIVERY AT DIGIKAD SOLUTIONS.

STUDY UNIT 8: LOGISTICS NETWORK PLANNING & DESIGN METHODOLOGY, SG PAGE 64

[2015-S2-EXAM SCOPE: SHORT & LONG QUESTION]

8.1 Introduction

Deals with the systematic process that can be followed in the planning & design of a logistics network that will fulfil customer service requirements at the lowest possible total cost for a reasonably long time.

Unit equips you with the knowledge of these key issues which is important for continuous planning in the logistics environment.

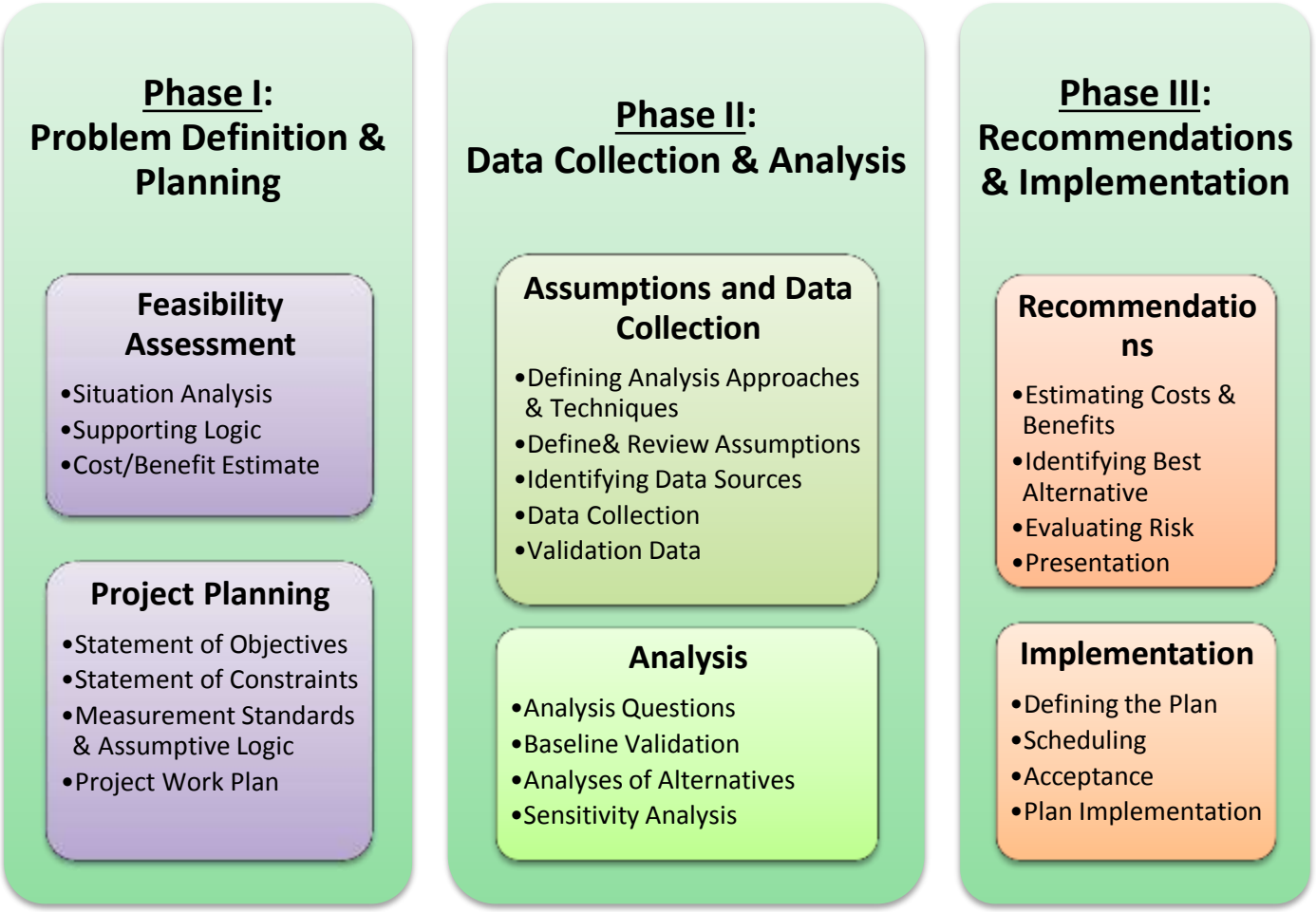
To accommodate such rapid change, firms often face questions such as:

- How many warehouses should our logistics system use and where should they be located?
- What are the inventory/ service trade-offs for each warehouse?
- What types of transportation capability should be used?
- (4)Is a redesign of our warehouse network justified?

8.2 The logistics network planning process Ref. Bowersox (2010:7-343) or (2013:311-327)

"Various phases of the logistics strategy. You may be asked to discuss/develop/explain the whole/part of the process/phases. Therefore know them all & what each phase entails. Bowersox 2013:311-320, 2010:328-336"

- Basic purpose of network design study: establish how logistical resources can best be exploited to achieve customer service goals at lowest possible total logistics cost
- Take into account current status & future req. of logistics system & cust. service levels
- Logistics environment continually subjected to change → continual planning → not once-off process
- Systematic process can be followed in planning & design of logistics network:



PHASE I: Problem Definition & Planning

- This stage provides the foundation for the overall analysis.
- Thorough & well-documented problem definition & plan → essential to all that follows

1) Feasibility assessment

- Begin logistic design & planning with eval. of current situation (environ. process, problems, characteristics) → understanding of current system → what if any modification appears worthy for consideration
- Process of evaluating change. Includes the following tasks:

SITUATIONAL ANALYSIS

- Collection of performance measures, characteristics & info describing current logistics environment.
- Purpose: provide senior management with best possible vision of strengths & weaknesses of existing logistics system capabilities for both existing & potential future logistical requirements.
- Typical analysis requires internal operational review, market assessment & technology assessment to determine existing capabilities & improvement potential.
- Internal operating review focuses on understanding existing logistics practices & process.
  - Profiles historical performance, data availability, strategies, operations and tactical policies & practices
  - Covers overall logistical process as well as each function.
  - Examine all major resources e.g. workforce, equipment, facilities, relationships and information,
  - Focus particularly on comprehensive evaluation of existing system's capabilities & deficiencies.
- Should span full functionality of SC → fully understand logistics supporting procurement, manufacturing operations & customer relationship management.
- Carefully examine each logistics systems' elements → stated objectives & ability to meet them.
- Market Assessment: Review of trends & service demands
  - Obj.: Document & formalize customer perceptions & desires with regard to potential changes in firm's logistics capabilities.
  - Includes interviews customers / substantive customer surveys.
  - Focus on external relationships i.e. suppliers, customers & consumers.
  - Consider trends in requirements & processes as well as enterprise & competitor capabilities
- Technology Assessment: focuses on application & capabilities of key logistics technologies
  - Consider firm's technological ability & potential for applying new technologies.
  - Obj.: Identify advancements capable of facilitating effective trade-off with other logistics resources
- Recommended procedure:
  - manager responsible for evaluating logistical strategy;
  - develops logical statement & justification of potential benefits;
  - responsible design team documents & justify most attractive strategy modifications.

SUPPORT LOGIC

- Developed to integrate findings from above (internal reviews, market assessment & technology study)
- Often most difficult part of strategic planning process.
- Utilises logistics principles (e.g. transportation tapering principles, principle of inventory aggregation & total landed cost principle) &
- Builds on situational analysis review in three ways:

a) Identify value proposition to justify detailed research & analysis.
   - Forces critical view of potential improvement opportunities, including determination of whether the cost/benefit justification provides a business case → determine potential of more detailed analysis

b) Critically evaluates current procedures & practices
   - on basis of a comprehensive factual analysis to remove perceptual biases.

c) Include clear statements of potential redesign alternatives. These statements should include:
   - definition of current procedures & systems,
   - identification of most likely alt.'s: based on leading industry competitive practices & prevailing theories
   - suggestion of innovative approaches based on new theory and technologies.

COST/BENEFIT ESTIMATE

- Projects potential benefits & risks associated with performing a logistics analysis and implementing the recommendations.
- Risk: potential downside related to the proposed changes
- Categorise benefits in terms of service improvements, cost reductions, cost prevention.
- Service improvements e.g. in availability/quality/capability ↑ existing loyalty & may attract new business
- Observe cost reduction in two ways:
  - One-time reduction in financial/managerial resources required to operate the logistics system.
  - Reduced out of-pocket or variable expenses.
- Cost Prevention helps eliminate involvement in programs & operations experiencing cost increases
- No precise rule to determine when a planning situation offers adequate cost/benefit potential to justify proceeding to in-depth analysis.
- Ideally, complete review on continuous basis at regular intervals to assure viability of current & future logistics operations.
- In final analysis, decision to undertake in-depth planning depends on how convincing supporting logic is, how believable estimated benefits are & they offer sufficient return on investment to justify organisational & operational change.
- Potential benefits must be balanced against the out-of-pocket cost required to complete the process

2) Project Planning

- Logistics system complexity requires that any effort to identify & evaluate strategic/tactical alternatives must be planned thoroughly to provide sound basis for implementing change.
- Specific tasks involved in this action are:

STATEMENT OF OBJECTIVES

- Documents cost & service expectations for logistics systems revisions
- Stated specifically & in terms of measureable factors.
- Defines market/industry segments, time frame for change & specific performance expectations.
- These requirements topically define specific goals that management is seeking to achieve.
- Specific definition directs system design efforts to achieve explicit customer service performance levels.
- Alt. performance obj. can establish max total cost constraints → system achieving max customer service level attainable within acceptable logistics budget may be evaluated.
- Cost-driven solutions: recommendations are guaranteed to fit within acceptable budget ranges.
- Cost-constrained design solutions lack sensitivity to customer service drivers.

STATEMENT CONSTRAINTS

- Concerns design constraints → all that serve to limit the scope of the analysis.
- In terms of situational analysis → expect senior leadership to place restrictions on the scope of permissible system modifications.
- Nature of restrictions & constrains vary between firms.
- Purpose: to have well-defined starting point for planning effort
- Defines specific organisational elements, facilities, systems, procedures, practices to be retained from the existing logistical system.

MEASUREMENT STANDARDS & ASSUMPTIVE LOGIC

- Feasibility assessments often highlight a need for measurements standards developments.
- Directs analysis by identifying cost assumptions & performance obj. essential to evaluate recommendations
- Management must stipulate measurement standards & objectives as prerequisite for plan formulation.
- Adequately reflect total system performance rather than a limited focus on logistics functions
- Include definitions of how cost components such as transport, inventory & order processing are quantified, including detailed financial account references.

- Also include specifications of relevant customer service measures and method of calculation.
- Assumptions providing logic that support standards should have senior leadership approval
- Assumptions can significantly shape the results of the operational analysis

PROJECT WORK PLAN

- Developed on basis of e.g. feasibility assessment, → resources & time required for completions is specified.
- Project management is responsible for achievement of expected results within time & budgets constraints.
- Underestimation of time req. to complete a certain project → common error in strategic planning.
- Overruns increase financial expenditures & reduces project credibility.

PHASE II: Data Collection & Analysis

- This phase requires definition of assumptions, data collection, and analysis of alternatives

1) Assumptions & Data Collection

- Extends feasibility assessment & project plan by developing detailed planning assumptions and identifying data collection requirements by:

DEFINING ANALYSIS APPROACHES & TECHNIQUES

- Determination of appropriate analysis technique for planning situation under consideration
- Most common techniques include:

a) Analytical: uses numerical tools (e.g. spreadsheets) to evaluate each logistical alternative
   - E.g. determination of inventory/service trade-offs using formulas
   - Spreadsheet availability and capability have increased use of analytical tools for logistical analysis

b) Simulation
   - likened to laboratory for testing supply chain logistics alternatives
   - widely used when significant uncertainty is involved
   - testing environment can be physical, such as a model materials handling system that physically illustrates product flow in scaled-down environment, or numerical, e.g. computer model
   - most cost-effective approaches for evaluating dynamic logistics alternatives (e.g. PC-based simulation can model flows, activity levels, and performance characteristics)
   - Many simulations have the capability to illustrate system characteristics graphically (e.g. supply chain dynamic simulation can be used to illustrate trade-off between inventory allocation strategy and customer service levels)

c) Optimisation: uses linear / mathematical programming
   - evaluates alternatives & select best design or alternatives under consideration;
   - Benefit: able to identify best option, but are often smaller in scope than typical simulation applications

DEFINING & REVIEWING ASSUMPTIONS

- Builds on situation analysis, project objectives, constraints & measurement standards
- For planning purposes, assumptions define key operating characteristics, variables, and economics of current and alternative systems
- While format differs by project, assumptions generally fall into three classes:

a) Business Assumptions
   - define characteristics of general business environment
   - Assumptions define broad environment within which an alternative logistics plan must operate
   - generally outside the ability of the firm to change

b) Management Assumptions
   - Define physical & economic characteristics of current / alternative logistics environment
   - Generally within management's ability to change
   - Typically include: warehouse locations to be considered, transport modes, ownership arrangements, logistics processes, and fixed and variable costs

c) Analysis Assumptions
- Define constraints and limitations required to fit problem to analysis technique
- Assumptions frequently focus on problem size, degree of analysis detail, and solution methodology.

IDENTIFYING DATA SOURCES
- process of data collection begins with feasibility assessment
- detailed specification of data required to determine desired analytical technique
- if extremely difficult to collect data / unknown level of accuracy → use sensitivity analysis to eval data impact
- Analysis indicating best answer is very sensitive to actual freight rates → take additional effort to obtain transport rates quotes from carriers
- once a technique is operational → use sensitivity analysis to identify major variables that drive conclusions
- After identifying sensitive drivers → direct additional effort to increasing accuracy of assumptions
- major data category is sales and customer orders
- specific customer data are also required to add a spatial dimension to a logistics analysis
- for SC logistics analysis → necessary to identify & track costs associated with manufacturing and purchasing
- must identify policies & costs associated with inventory transfer, reordering & warehouse processing
- each current and potential warehouse, necessary to establish operating costs, capacities, product mix, storage levels, and service capabilities
- transportation data requirements include number and type of modes utilized, modal selection criteria, rates, transit times, shipping rules, and policies

DATA COLLECTION
- After identifying alternative data sources, data collection process can begin
- process includes acquisition and assembly of required data and conversion to appropriate formats for analysis tool → tedious and time-consuming task → errors are likely
- potential errors include:
  - collecting data from a misrepresentative time period
  - including data that do not reflect major components of logistics activity
- Therefore, carefully document data collection process → assists in identifying errors that might reduce analysis accuracy and to determine any necessary changes to achieve acceptable accuracy
- primary justification for placing formal data collection process after the selection of analysis technique is to match data to technique requirements
- main purpose in collecting such data is to provide competitive benchmarks that compare customer service capabilities, facility networks, and operating capabilities

VALIDATION DATA
- Collect data to support alternative analysis → collect base case or validation data to verify that the results accurately reflect reality
- Specific concern: Does chosen analytical approach accurately replicate historical logistics practices?
- Objective of validation: increase credibility regarding analysis process
- if not validated → management will have little confidence in results and resulting recommendations

2) Analysis

- Uses techniques & data to evaluate strategic & tactical logistics alternatives. The analysis process includes:

ANALYSIS QUESTION
- 1st Task: Establish specific questions concerning alternatives and degree of acceptable uncertainty
- specific analysis questions based on research objectives and constraints
- in case of inventory analysis, questions typically focus on alternative service and forecast uncertainty
- Other alternatives could include fewer / more warehouse locations or evaluation of different locations or more refined inventory management policies

- Take care to define analysis questions so that wide range of possible options can be evaluated without requiring time-consuming modification of model or additional data collection

BASELINE VALIDATION

- 2nd task involves validation of model being used
- Compare analysis result with validation data to determine degree of fit between actual & modelling results
- comparison should focus on identifying significant differences and determining sources of possible error
- as discrepancies are encountered, errors should be identified and corrected
- once discrepancies have been removed or explained to within ± 2%, application is generally accepted as valid representation → analysis can proceed

ANALYSIS OF ALTERNATIVES

- next step → complete design analysis
- analysis should determine relevant performance characteristics for each alternative design / strategy
- options should quantify impact of:
  - changes in management policies
  - practices involving factors e.g. no. of warehouses, inventory target levels, transport shipment size profile

SENSITIVITY ANALYSIS

- After this analysis, best-performing alternatives can be targeted for further sensitivity evaluation
- when undertaking sensitivity analysis uncontrollable factors such as demand, resource costs, and competitive actions are varied to assess design alternative's ability to operate under variety of conditions
- sensitivity analysis could test appropriateness of this solution under alternative demand or cost scenarios
- current environment requires assessment regarding impact of increased energy cost
- Use sensitivity analysis along with assessment of potential scenario probabilities, in decision tree to identify best alternative to meet managerial expectations

PHASE III: Recommendation & Implementation

- Puts to action (operationalises) plans & designs from Phase II .
- Review Recommendations → implement best alternative with less cost, saving benefits and/or less risk.

1) Recommendations Ref. Bowersox (2010: 34, 341-342; 2013: 325-326); 2014-S1-Assign.01.2; 2014-S2-Assign.02.3

- Alternative & sensitivity analysis results are reviewed to finalise managerial recommendations & develop implementation plans.
- Process includes four tasks:

ESTIMATING COSTS & BENEFITS

- Potential Benefits from Phase I's strategic planning: service improvement, cost reduction & cost prevention
  - Benefits are not mutually exclusive
  - Sound strategy might seek all benefits simultaneously.
- Analysis comparing present cost & service capabilities with projected performance → Evaluates potential of a logistics strategy → completed for each alternative.
- Ideal cost/ benefit analysis:
  - compares alternatives for a base period, then
  - projects comparative operations across a planning horizon.
- Can project benefits on basis of both:
  - one-time savings that impact of system redesign as well on
  - ongoing/recurring operating economies.

IDENTIFYING THE BEST ALTERNATIVE

- Alternatives & sensitivity analyses should identify best options to consider for implementation.
- However, multiple alt.'s often yield similar/comparable results.

- Compare performance characteristics & conditions for each alt. → identify two / three best options.
- "Best" generally means: alternative meeting desired service objectives at minimum total cost.

EVALUATING RISK

- Assessment of risk involved.: 2nd justification necessary to support strategic planning recommendations
- Risk assessment considers:
  - Probability that actual operating environment will match assumptions.
  - Potential hazards related to system implementation / change-over.
- Using sensitivity analyses → Quantify risk related to adoption of a specific alternative.
- End result of risk appraisal = financial eval. of the downside risk if planning assumptions fails to materialize.

PRESENTATION

- Development of managerial presentation that identifies, quantifies & justifies suggested changes.
- Presentation & accompanying report must:
  - identify specific operating & strategic changes,
  - provide qualitative rationale as to why such change is appropriate, then
  - quantitatively justify changes in terms of service, cost, asset utilization & productivity improvements.
- Incorporate extensive use of graphs, maps & flowcharts → illustrates change in logistics operating practices, flows, anti-distribution network.

2) Implementation

Remember that after all the toil & hard work:

D: Definitely =Defining the plan
S: Shall = Scheduling
A: All = Acceptance
P: Pass = Plan implementation

- Final process activity → actual plan / design implementation
- May require a number of events, but four broad tasks are:

DEFINING THE PLAN

- Define implementation plan in terms of individual events, their sequence & dependencies.
- Initially at macro level → refine plan to provide individual assignment responsibility & accountability.
- Plan dependencies identify interrelationships between events, thus defines the completion sequence.

SCHEDULING

- Schedules implementation
- Time-phases assignments previously identified.
- Must allow adequate time for:
  - acquiring facilities & equipment,
  - negotiating agreements,
  - developing procedures,
  - training.
- Ideally, uses comprehensive project management methods / software scheduling aids to guide the process.

ACCEPTANCE

- Define acceptance criteria for evaluating plan's success.
- Acceptance criteria should focus on:
  - service improvement,
  - cost reduction,
  - improved asset utilization
  - enhanced quality.
-

If Primary Focus is:	Acceptance Criteria must:
▪ Service	identify detailed components such as improved product availability or reduced performance cycle time
▪ Cost	define the expected positive and negative changes in all affected cost categories

- N.B. to take broad perspective → focus motivation on total logistics system performance, not individual functions' performance.
- Also N.B. that acceptance criteria incorporate broad organizational input.

PLAN IMPLEMENTATION

- Actual implementation of plan / design.
- Must include:
  - adequate controls: to ensure performance as anticipated
  - Careful monitoring of acceptance criteria.
- Must use formalised process to guide logistics system design & refinement projects → ensures that:
  - Objectives are documented & understood
  - Analyses are completed appropriately.

8.3 Summary & Self-Evaluation Questions [SEQ]

SEQ (1) WHAT ARE THE INTERNAL AND EXTERNAL PERFORMANCE MEASURES THAT SHOULD BE TAKEN INTO CONSIDERATION WHEN ANALYSING A SITUATION? WHY ARE THESE MEASURES IMPORTANT?

- *Internal review assessments* measures incl.: customer service, material management performance, transport performance, warehouse performance, inventory performance
- *External assessments* measures incl.: supplier performance, response to consumers' buying patterns, conformity to customer performance requirements & benchmarking best-in-class practices.
- These measures are important because they provide the company with a basis for comparison.
- They also help to answer the following questions:
  - Are we doing what we should be doing?
  - Are we doing these things as well as we can?
- The answers to these questions will justify any changes that are made and will measure the potential value of improvements to the system.

SEQ (2) WHAT IS THE ROLE OF SENSITIVITY ANALYSES IN THE DESIGN OF A LOGISTICS NETWORK?

- Involves testing logistics network in terms of factors outside the company's control.
- Examines changes in demand, supply, competitors' actions & regulation under certain assumptions about the company's capabilities.
- Often used to test the response to changes in the system.
- Useful instrument in designing a logistics network → it allows the designer to determine how much certainty has to be built into the system & what types of data require higher levels of accuracy.

SEQ (3) WHY IS THE COST–BENEFIT ESTIMATE IMPORTANT IN THE DESIGN OF A LOGISTICS NETWORK?

- Cost-benefit evaluation is important in any investment decision.
- Strategic implications of investment in company's logistics network differ widely, however.
- Serves as final form of assessment before making implementation proposals.
- Used to examine potential service improvements, cost reductions & cost prevention.
- Critical challenge regarding this analysis is to accurately determine
  - opportunity costs and benefits
  - cost and benefits that will ultimately be realised.
- Despite efforts to make these estimates as accurate as possible, calculations and ultimate decisions are often subject to management's subjective judgement.

myUnisa e-tutor THE LOGISTICS ENVIRONMENT IS CONTINUALLY SUBJECT TO CHANGE AND THIS, IN TURN, RESULTS IN THE NEED FOR CONTINUAL PLANNING. FOR THIS REASON, LOGISTICS NETWORK DESIGN AND ANALYSIS ARE NOT ONCE-OFF PROCESSES.

WITH THE AID OF A DIAGRAM ILLUSTRATE THE LOGISTICS NETWORK PLANNING PROCESS. DISCUSS STEPS OF EACH PHASE IN DETAIL.