Impact of Information Quality in Supply Chain Management

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Executive Summary/Abstract: Sharing high quality information, between inter and intra company supply chain partners, is critical for companies that want to achieve the full benefit of investments made in information technology for supply chain management.

The Basic Premise

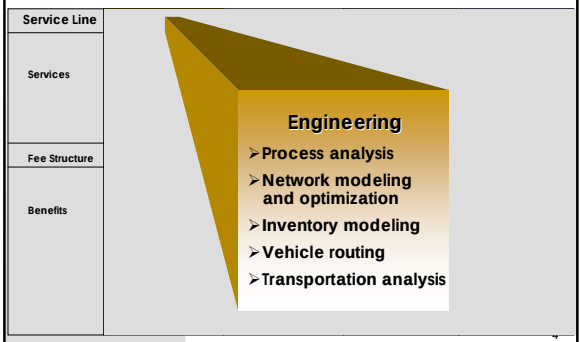
- Supply Chain Management (SCM) is about
  Replacing INVENTORY
  with INFORMATION
- If Garbage-In = Garbage-Out, then
  Garbage data ⇔ Garbage information
- Therefore, low Information Quality (IQ) in SCM results in

Replacing INVENTORY with GARBAGE!!!

Schneider Logistics, Inc. (SLI)

- 3rd Party Logistics (3PL) services provider
- Operating in 37 countries
- Manage $2.5 B in purchased transportation
- Pay $7.2 B in third party invoices
- 1,400 associates
- 1,300 service providers
- Over 10,000 electronic trading partners
- Wholly-owned subsidiary of Schneider National, Inc.

SLI Products & Services



Information Quality is ...

1. The *right* data
2. With the right *completeness*
3. In the right *context*
4. With the right *accuracy*
5. In the right *format*
6. At the right *time*
7. At the right *place*
8. For the right *purpose [1]*

This definition works well in SCM.

Typical Problem - 1

- Truck load shipment weight
  - Scenario
    - Required field in order entry system
    - Did not impact shipment execution &/or cost
    - Very high number of shipments with weights of 1 lb or 11,111 lbs or 40,000 lbs, etc.
  - Impact
    - Performance measures for Cost/CWt. understated?
    - Unrealistic savings projected from better utilization
    - 2 week analysis took 6 weeks

Typical Problem - 2

- Internet Order Entry
  - Scenario
    - Orders entered by customer over the internet
    - Automate shipment creation process
    - Free form entry fields used for origin & destination
  - Impact
    - High percentage of shipments "kicked out" due to origin/destination mismatch
    - Manual process created to cleanse and re-enter orders
    - Increased cost per transaction

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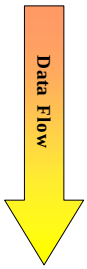
Data Life Span in SCM

- Operational
  - Life span : Life of transaction
  - E.g. Order entry
- Tactical
  - Life Span : Week, Month, Quarter
  - E.g. Monthly reporting
- Strategic
  - Life Span : Years
  - E.g. Supply chain analysis



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Causes for Concern

- IQ to adequately support
  - Efficiencies that are driven by the automated exchange of timely data
  - Integrated systems that use the same data in multiple places
  - Push for more real-time optimization
- Exponential growth in the quantity of data
- High IQ is NOT a explicit priority for most companies

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Location Master Problem

- Multiple location IDs for the same location
  - Poor search utilities to find existing location
  - Lack of standards for location identification
  - Incomplete processes for location creation
- Results in
  - Lost opportunities for volume based consolidation
  - Multiple views of the customer/vendor

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Extended Location Master Problem

- Across INTER vs. INTRA company supply chains
  - How many ways can multiple suppliers identify Wal*Mart stores around the country?
  - How many ways can Albuquerque be spelled?
- Standards must be followed across
  - Multiple systems (ERP, WMS, TMS, …) and
  - Across multiple companies

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Impact on Supply Chain Engineering

- Tasked with developing engineered solutions to supply chain problems
  - Vehicle routing,
  - Facility Location,
  - Fleet design, etc.
- 40%-60% of time is spent cleaning data
  - Less time spent doing actual analysis
  - Lack of confidence in the results
  - Outcome driven by assumptions more than reality
  - Benefits not realized after implementation

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The Disconnect

- **OLTP Systems** are designed around
  - Data relationships with a systems view
  - Complex and rigid hierarchies
  - Required fields with bounds checking
  - Assumption of perfect data
- **Work Processes** are designed around
  - Continually changing operational demands
  - Flexible interpretations of hierarchies
  - Entering data to meet short term needs
  - Imperfect data

This **Disconnect** results in systems incapable of High Information Quality

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Quantifying The Impact

- Tangible
  - Reduced cost of doing business
  - Opportunity cost
  - Data preparation / transformation
  - Minimize rework
- Intangible
  - Quality of analysis
  - Customer confidence

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Changing How We Think

- Data as **RAW MATERIAL**
  - has inherent quality characteristics
  - can be consumed over and over again
  - can be combined an infinite number of ways with other data
- Information as **FINISHED PRODUCT**
  - From simple reporting to advanced analytics
  - Adding value to the information consumer

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Process Design and Education

- Processes designed to support IQ
  - Include data quality in performance measures
  - Use transactional systems that increase IQ
  - Use feedback mechanisms for continuous improvement
- Education
  - Identify information customers through the information supply chain
  - Create awareness for where and how data is used

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Creating Awareness

- Logistics Information Strategy
- Vision

Providing Information,
Gaining Knowledge &
Developing Insight
Across Our Customers' Supply Chains

- Timing
  - Strong economy
  - VP of Knowledge Services
  - Data warehousing efforts
  - Existing systems were at breaking point

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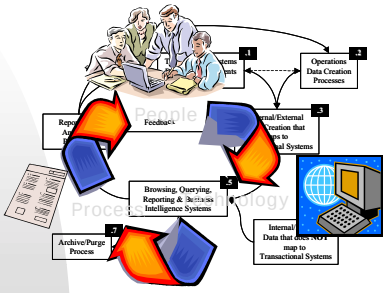
The Logistics Information Strategy



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A Success Story

- Improving Trailer Utilization on Pick-up Routes
  - Scenario
    - Managing routes for an automotive assembly operation
    - Utilization was lower than expected from route design
  - Cause
    - Discrepancy between actual and anticipated parts/packaging data
    - Vendors were not providing accurate data on weight, cube, number of parts per package, etc.

A Success Story (contd.)

- Solution
  - Vendors were educated on impact of inaccurate data
  - Vendors re-surveyed for accurate parts/packaging data
  - New routes designed and implemented
  - Vendors with discrepancies given regular feedback
  - Surveys performed on an as needed basis
- Impact
  - Trailer utilization improved over a 13 week period from 81% to 94%
  - Avg. utilization stabilized at over 90%
  - Estimated annual savings of over $6 MM

Conclusions

- In the short term
  - Increase visibility to the problem by highlighting the costs of low IQ
  - Design work processes around providing high IQ
  - Design data entry systems to support high IQ
- In the long term
  - Get ready to lead, recruit and/or participate in the upcoming and inevitable Information Quality revolution.

References

- Books

[1] English, L. *Improving Data Warehouse and Business Information Quality*, John Wiley & Sons, New York, NY, 1999, p. 31.