Review of Trends in Production and Logistics Networks and Supply Chain Evaluation

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Ecole Centrale Nantes

- A so called in France « Grande Ecole d'Ingenieurs »
- Member of the Intergroupe Ecoles *Centrale* (Nantes, Paris, Lyon, Lille , Marseille, Beijing)
- 1 350 students (950 engineering students), 120 teaching and research staff, 120 administrative and technical staff.
- Possible Major in :

Automation and Control
Computer Science,
Design Manufacturing and Production,
Materials Science,
Computational Structural Mechanics,
Civil and Environmental Engineering,
Energetic and Environmental Engineering,
Hydrodynamics and Oceanic Engineering,
Numerical Fluid Mechanics.

Irccyn

« Institut de Recherche en Communications et Cybernétique de Nantes »

- **Research Center associated with « Ecole Centrale de Nantes », « Université de Nantes » and « Ecole des Mine de Nantes ».**
- **Irccyn : around 200 persons. 50% permanent researchers and 50% visiting professors or Phd students.**
- **The research programs of the IRCCyN are concentrated in the following areas : Interleaving automatic control,**
  Signal processing,
  Real time processing,
  Logistics,
  Mechanics design,
  Production process,
  Robotics and psychology

Irccyn

I.V.G.I. : « Ingénierie Virtuelle pour le Génie Industriel »

Project Team

Key words : Virtual Engineering
Knowledge Management
Economic Factors
Human Factors
Performance Evaluation in industrial process
Indicators of Performance (time, costs, risks)

University of Bath / IdMRC

- **Mechanical Engineering Department ,**

  Aerospace, Automotive, Innovation, Engineering Design, Manufacturing.

- **Research department : IdMRC**

  Innovative Design and Manufacturing Research Centre

Objectives

- Review of new trends in networks;
- Review of news trends in performance assessments;
- Lean and Agile concepts impacts.

Plan of the presentation

I. From Supply Chain to Productions Network

II. Performance Assessment of Supply Chains and Networks

III. Established Benchmarks for Production Networks

Conclusion and perspectives

I. From Supply Chain to Production Network

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- ***Supply Chain*** **: large scope and often vague**

  SCOR Model : Plan, Source, Make, Deliver, Return

- ***Supply Network*** **: include the news aspects : more complex networks, reverses, loops, strategic view, development.**

- ***Integration*** **: virtual integration and virtual companies**
  the most flexible and unstable network
  need of trust and information sharing

I. From Supply Chain to Production Network

- ***Join Venture*** **: usual to penetrate new markets**
  the choice of partners and rules are critical

- ***Cluster*** **: Geographical concentration of companies & institutions**
  motivation, competition, cooperation

- ***Production Network*** **: cooperation between several companies**
  long and stable relationship
  - Same market
  - Target same customers and suppliers } **opportunities**

I. From Supply Chain to Production Network

- ***Reverse Logistic*** **: to manage the « unusual direction of flows»**

(Ravi et al., 2004)

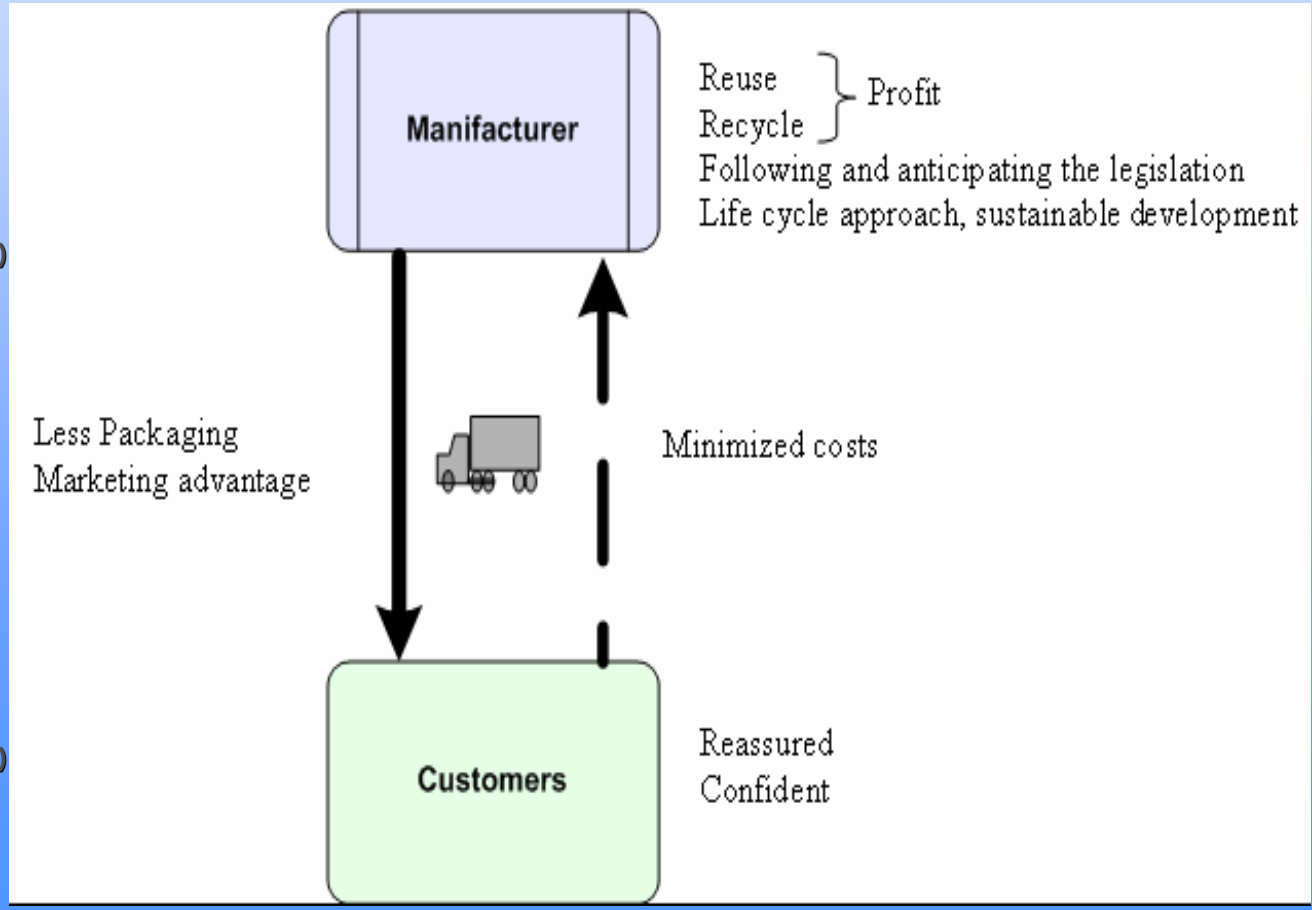
unsold items, empty packaging, dissatisfied buyers…

- **First barrier : lack of information**

(Ravi et al., 2004)

- **Opportunity to make profit**
- **Law pressure**
- **No for profit firm experience**

(Reyes et al., 2006)



UNIVERSITY OF BATH

I. From Supply Chain to Production Network

- **Competence Profiling for Company Identification and Appraisal**

Rapid competences identification
search
matching
of potential partners.

4 main stages : - Competence data collection
- Normalizing
- Building available database
- Partnership formation

II. Performance Assessment of Supply Chains and Networks

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- Concept of performance follows the evolution of industrial word

  - 1 economic criteria : costs

  - Multi dimension : Effectivity, Efficiciency, Effectiveness, Pertinence (Senechal, 2004)

  - Temporal approach : Production

    Lifecycle (design, prototyping, maturity, decline, recycling, and destruction)

    Sustainable development

    (Berrah, 2002)

  The choice of criterias has an influence on behaviors.

  (Breen, 2006; Bernon, 2007)

II. Performance Assessment of Supply Chains and Networks

Environment

ISO 14001 or others
Volume of waste material generated
Water waste disposal
Supplier's effort in eliminating waste
Air emission
Design for environment

Production's aspect

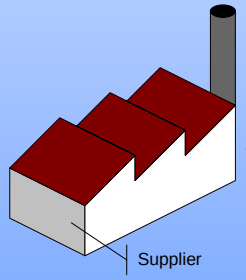
Ability to meet delivery due dates
Supplier's process capability
Commitment to quality
Correct quantity
Price of materials
Attractive discounts
After sales service
Innovation

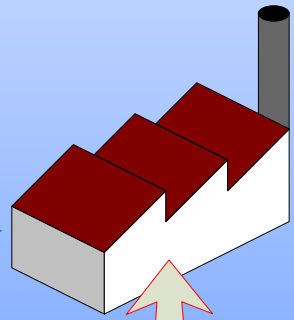
Strategy

Financial stability and staying power
Company size
Importance of your contracts in their business
Geographical compatibility/proximity
Risk with the stability of the supplier's country
Risk of disruption

Flexibility

Quick response time in case of emergency
Customer query time
Possibility to change their products and services following your changing needs
Flexible contract terms and conditions
Possibility of change the order
Management of Returns





Stakeholders

Customer | Shareholders
Labour | Environnement

Communication

Honest and frequent communication
Supplier's acceptance to share confidential information,
Supplier's acceptance to let visit and evaluate site
Supplier's order entry and invoicing system including EDI
Use of electronic data interchange
Existence of IT standards

Management

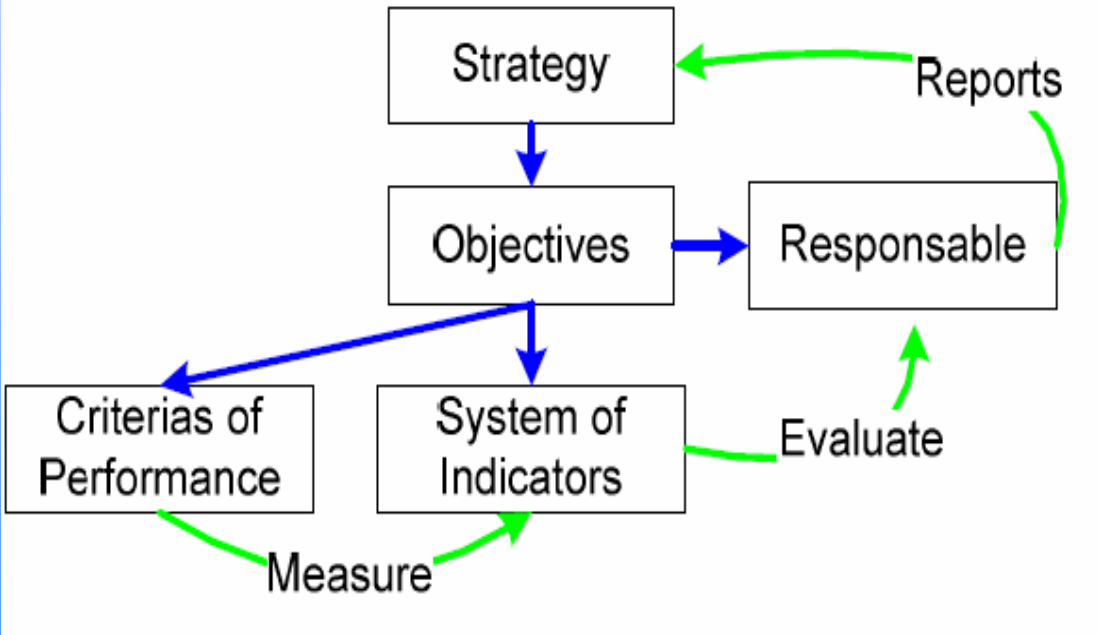
Industry knowledge
Ethical standards
Continuous improvement in product and process
Implication in JIT and Lean principles
Willingness to participate in your firm's new product development and value analysis
References/reputation of supplier
Insurance and litigation history

Competitive Market
Global Market
Evolutions of technologies

II. Performance Assessment of Supply Chains and Networks

- Measurements should take place where the activity is.

- Difficulties faced to have valid, accurate and recent data.



II. Performance Assessment of Supply Chains and Networks

RFID : a real time network evaluation technology

Advantages	Limits	Future
- Real Time data - Visibility of inventory - Visibility in VMI - Labour Cost Reduction - Faster Pick and Pack - Information sharing - Reduce Stock Out - Reduce Shrink -Delivery Reliability	- Cost (chip, software) - Risk of hacking - Reluctance to share data - Different technology	- Pressure of manufacturer and domino effect - Standardisation (EPC) - Linked with ERP - Safety tag - 0.05$ per tag

III. Established Benchmarks for Production Networks

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- Key element of evaluation : objective.

- Lean concepts: fight against wastes, value stream focused, reduction of cycle time, reduction of stocks,…

  to achieve lean supply network

  based on trust and transparency between partners.

  (Lamming, 2003)

- Agililty : required to respond quickly to market variability and customers expectations.

  Need of real time data, well developed IT.

- Combination of agility and lean concepts in different places and at different time : leagility

Conclusion

- Review of diverse types of supply and production networks a company can join or build.
  Tools :Competence profiling, assessment of performance
- Crucial : information management through ERP, RFID and rapid information sharing and communication of performance measurement within the network
- Lean and the Agile concepts offer objectives that can be used as performance benchmarks.
- Perspectives : implementation in a company, analyze the barriers faced, tree decision.

Thank you for your attention!

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