CARLO CATTANEO – LIUC UNIVERSITY

1991
2011
VENTI
NUOVI
LIUC
UNIVERSITÀ
CARLO
CATTANEO

OLTRE LO STUDIO

Castellanza - Varese

UNIVERSITÀ CARLO CATTANEO
LIUC

ING-IND/17 RESEARCH TEAM

Carlo Noè
Full professor
cnoe@liuc.it

Fernanda Strozzi
Assistant professor and researcher
fstrozzi@liuc.it

Fabrizio Dallari
Associate professor
fdallari@liuc.it

Claudia Colicchia
Research assistant
ccolicchia@liuc.it

Tommaso Rossi
Assistant professor and researcher
trossi@liuc.it

Alessandro Creazza
Research assistant
acreazza@liuc.it

Domenico Sorrenti
Assistant professor and researcher
dsorrenti@liuc.it

Centro di Ricerca sulla Logistica
C-log

http://clog.liuc.it
clog@liuc.it
Tel.: 0331-572.342

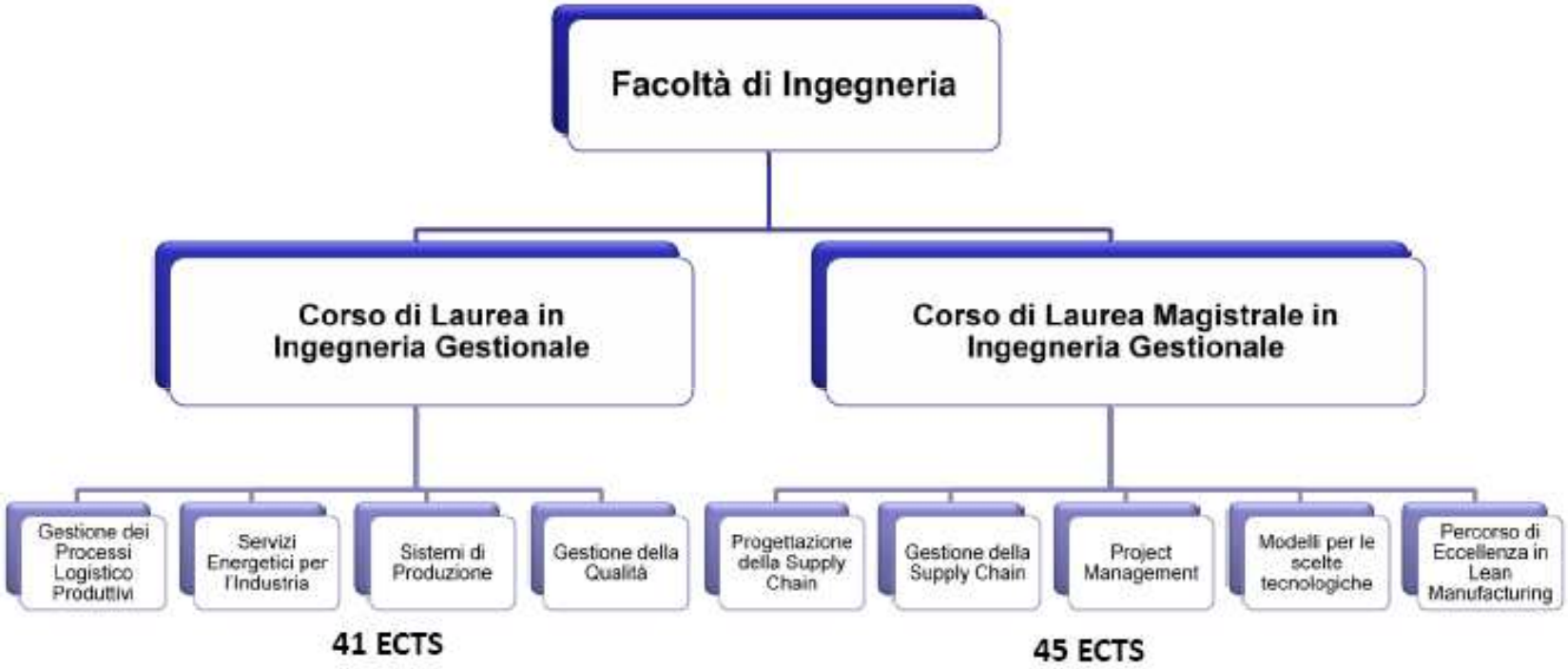
LEAN CLUB

leanclub@liuc.it
Tel.: 0331-572.388

XVI Summer School "Francesco Turco" Impianti Industriali
Abano Terme (Padova, Italy) - 14-16 September 2011

UNIVERSITÀ CARLO CATTANEO
LIUC

TEACHING ACTIVITY

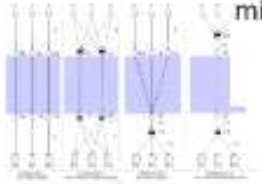


86 ECTS overall - *780 hrs lectures*

UNIVERSITÀ CARLO CATTANEO
LIUC

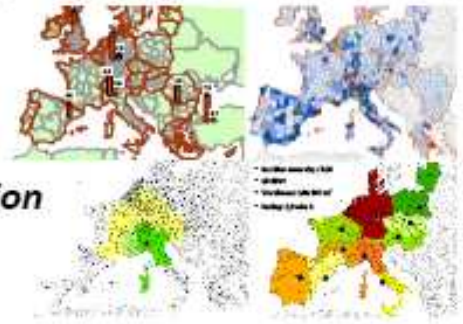
LOGISTICS – Supply Chain and Logistics Network Design

Global Logistics Networks Design and Distribution Network Optimisation



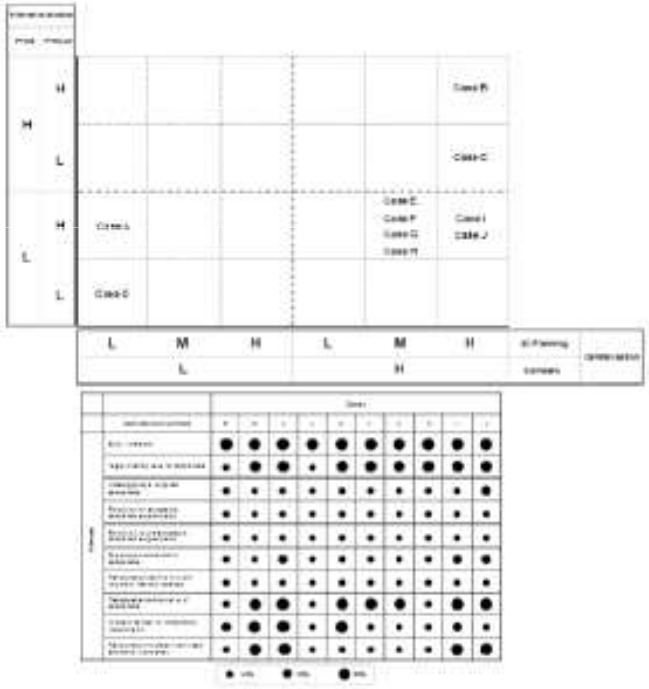
MILP Models

$$\min \left(\sum_{h=1}^{H} \sum_{j=1}^{J} cs_{h,j} \cdot d_{h,j} \cdot k_{h,j} \cdot D_j + \sum_{h=1}^{H} \sum_{j=1}^{J} cw_h \cdot k_{h,j} \cdot D_j + \sum_{h=1}^{H} \sum_{p=1}^{P} cp_{p,h} \cdot \sum_{j=1}^{J} p_{p,j} \cdot k_{h,j} \cdot D_j \right)$$



Extensive adoption of GIS Tools

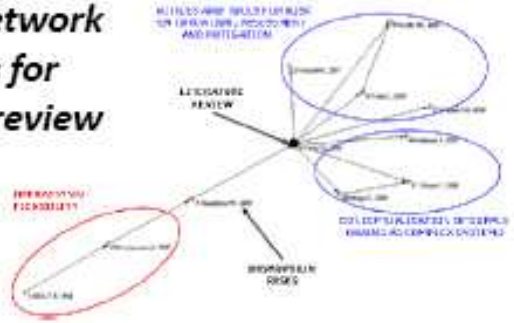
Global Supply Chain Planning Centralisation Degree study



UNIVERSITÀ CARLO CATTANEO
LIUC

LOGISTICS – Supply Chain Risk Management

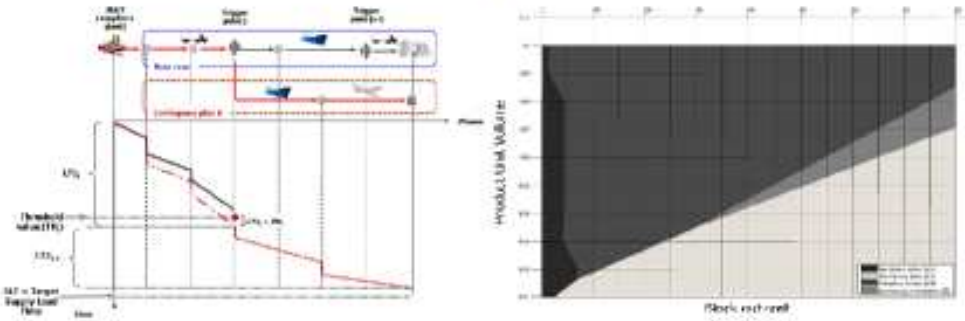
Citation network analysis for literature review



A simulation-based framework for managing global inbound supply risk

A time-dependent MILP Model for SC robustness

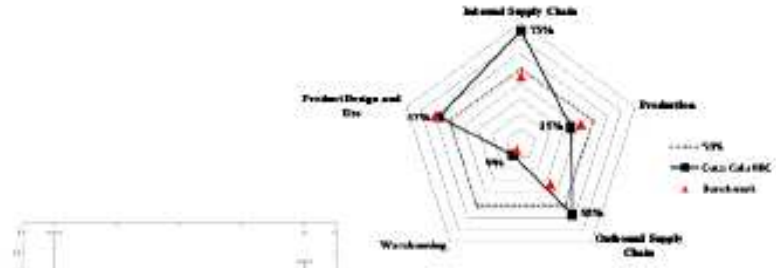
$$\max \left(\sum_{i=1}^{I} \sum_{j=1}^{J} \sum_{t=1}^{T} x_{ij}(t) \cdot D_j(t) \cdot p_j(t) - \sum_{i=1}^{I} v_i \cdot cf_i - \sum_{i=1}^{I} \sum_{j=1}^{J} \sum_{t=1}^{T} x_{ij}(t) \cdot D_j(t) \cdot tc_{ij}(t) - \sum_{i=1}^{I} \sum_{j=1}^{J} \sum_{t=1}^{T} x_{ij}(t) \cdot D_j(t) \cdot vc_i(t) - \sum_{i=1}^{I} \sum_{t=1}^{T} \left(\sum_{j=1}^{J} x_{ij}(t) \right) \cdot oc_i(t) - \sum_{i=1}^{I} \sum_{j=1}^{J} \sum_{t=1}^{T} Q_{ij}(t) \cdot sp_{ij}(t) \right)$$

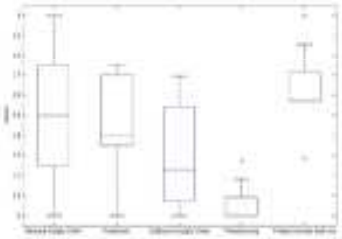


UNIVERSITÀ CARLO CATTANEO
LIUC

LOGISTICS – Supply Chain Sustainability

Benchmarking supply chain sustainability

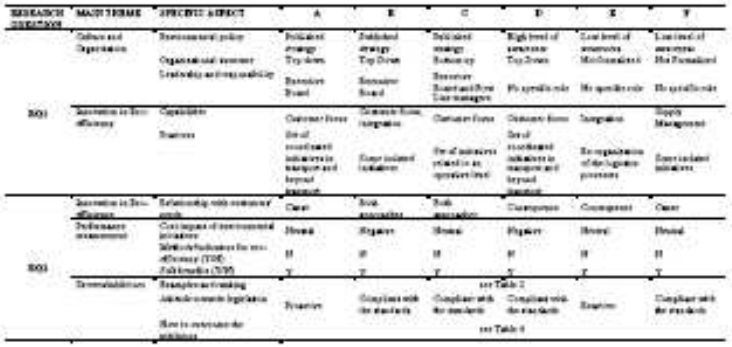




The role of Logistics Service Providers in Eco-efficiency innovation

In collaboration with:

Cranfield UNIVERSITY
School of Management



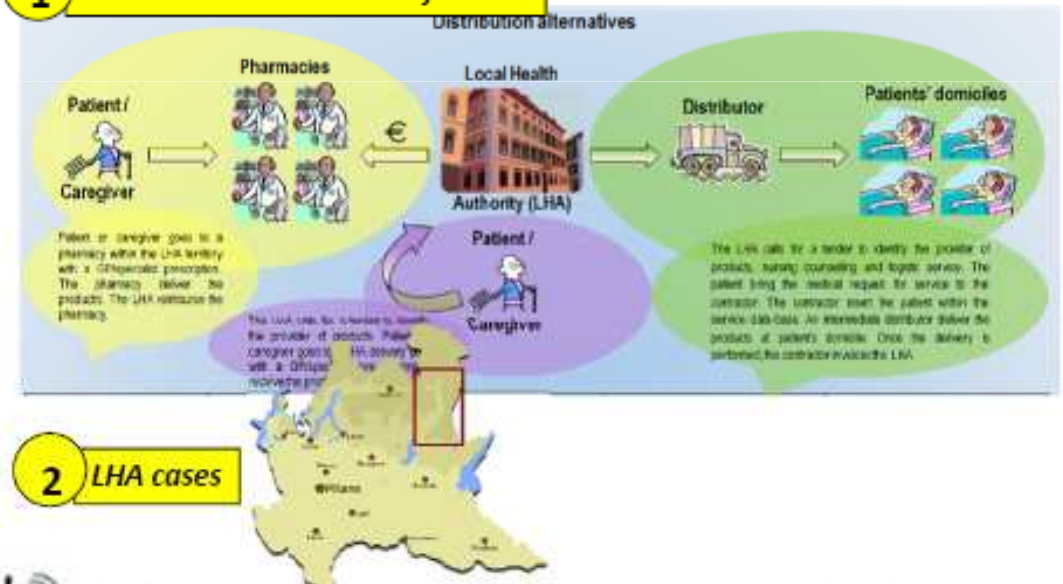
UNIVERSITÀ CARLO CATTANEO
LIUC

LOGISTICS – Healthcare Logistics

Distribution models for delivering pharmaceuticals and medical equipments at the local level in the Integrated Home Care Services

The shift of the healthcare focus from the hospital towards the local and domicile levels (Integrated Home Care Service) can be mentioned as one of the most relevant evolutionary trends in the world healthcare sector.

1 *Distribution models identification*



2 *LHA cases*

3 *Models Assessment*

		DISTRIBUTION MODELS		
		pharmacies	LHA district distribution	Patient's domicile distribution
Efficiency	Product unit cost	High (presence of the pharmacy intermediation)	Low (no intermediation)	Low (no intermediation)
	Delivery service cost	Medium (pharmacies' supplies)	Low (LHA districts' supplies)	Optimised (deliveries planned in advance)
	Average delivery batch size	Low (actual product's demand)	High (estimated demand between two deliveries)	High (estimated demand between two deliveries)
	Inventory level in the network	High (inventory replicated in many network nodes)	Medium (inventory held at LHA districts – few facilities on the territory)	Low (centralized inventory at the logistics service provider warehouse)
Efficacy	Capillarity and accessibility of the distribution network	High (diffuseness of the territorial pharmacies)	Low (few facilities on the territory)	High (domicile level)
	Product's portfolio choice for the patient	Medium (depending on the pharmacist)	Low (no patient's choice)	Low (no patient's choice)
	Convenience for the patient	Low (necessity to reach the pharmacy)	Very low (necessity to reach the LHA districts)	High (domicile level)
	Patient training/consultancy at the time of delivery	High (highly skilled vendor)	Medium (possibility to involve LHA personnel)	Low (no skilled personnel)

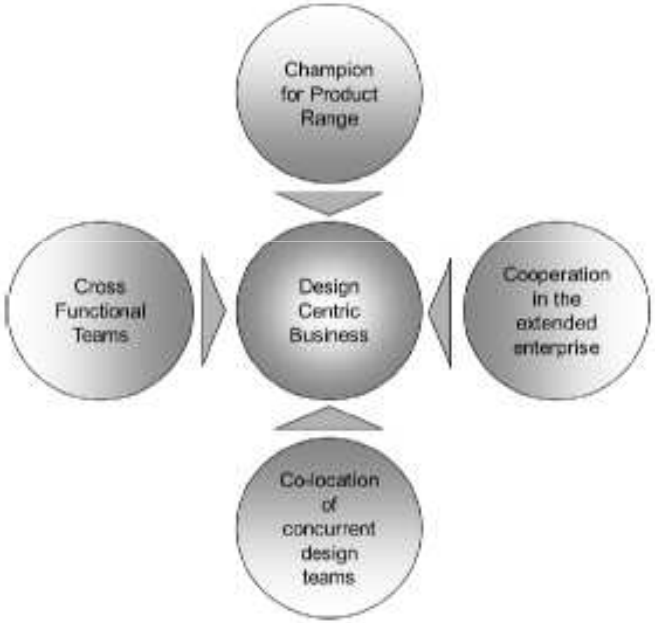
LOGISTICS – Product Design and Supply Chain Alignment

Towards the «Design Centric Business» by means of an improved alignment of Product Design and the Supply Chain for better resilience and responsiveness

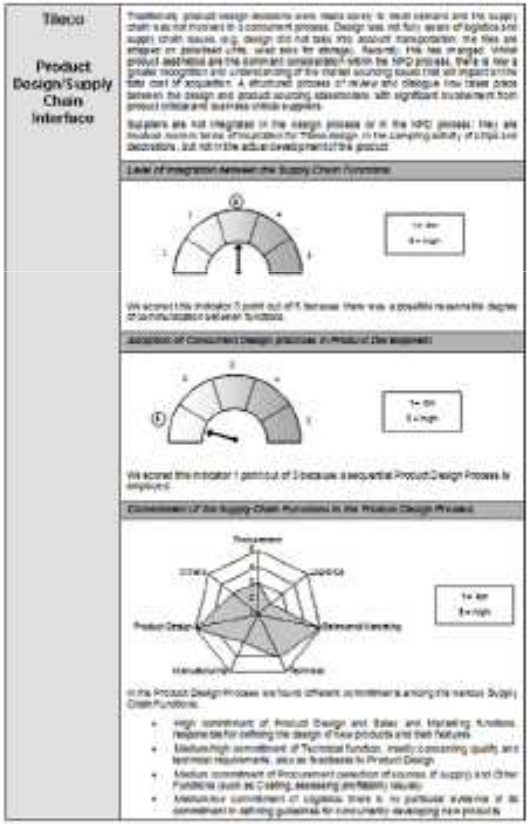
In collaboration with:

Cranfield UNIVERSITY
School of Management

UNIVERSITY OF Hull



The «4C's» Model

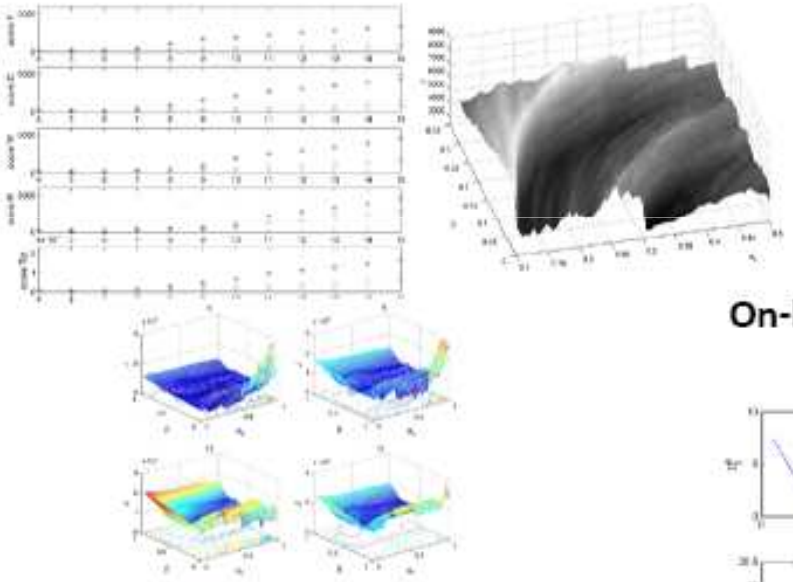


XVI Summer School "Francesco Turco" Impianti Industriali Meccanici
Abano Terme (Padova, Italy) - 14-16 September 2011

UNIVERSITÀ CARLO CATTANEO
LIUC

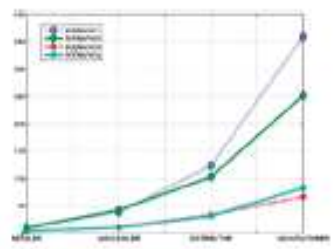
OPERATIONS - Supply chains and dynamical systems stability analysis and control

Beer Game inventory costs applying the same or different order policies

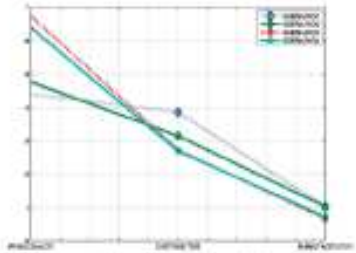


Optimization using GA

Bullwhip based on inventories

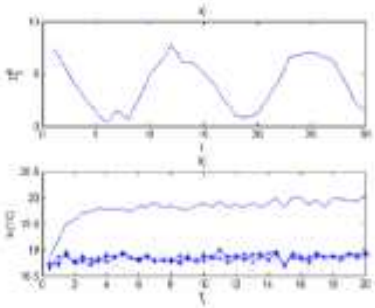


$$IOS_i = \frac{\text{Var(Inventory of level 'i')}}{\text{Var(Inventory of retailer)}}$$



$$IOG_i = \frac{\text{Var(Inventory of level 'i')}}{\text{Var(Inventory of level 'i − 1')}}$$

On-line order control using divergence operator



$$V_t = \left| \det \begin{bmatrix} O_t - O_{t-\Delta t} & 0 & 0 \\ 0 & NS_t - NS_{t-\Delta t} & 0 \\ 0 & 0 & D_t - D_{t-\Delta t} \end{bmatrix} \right|$$

$$O_t = D_t + \frac{1}{T_t}(k \cdot \sigma_{D^R} - NS_t)$$

$$NS_t = NS_{t-1} + O_{t-1} - D^R_{t-1}$$

$$D_t = \rho(D_{t-1} - \mu) + \theta(D^R_{t-1} - D_{t-1}) + \varepsilon_t + \mu$$

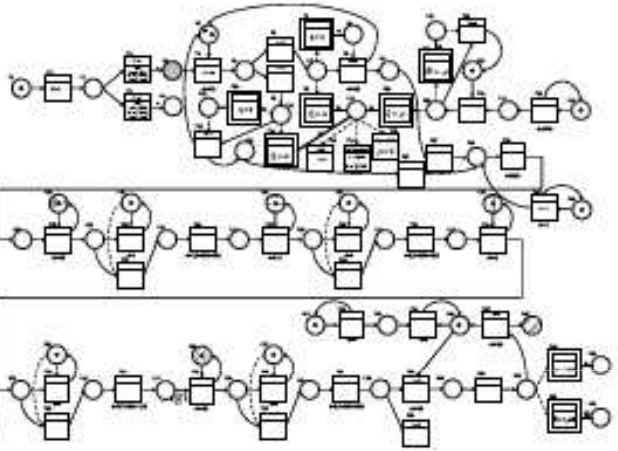
$$T_t^{t-1} = T_t^t + K_p \cdot (0 - V_{t-1}) + K_d(0 - \Delta V_{t-1})$$

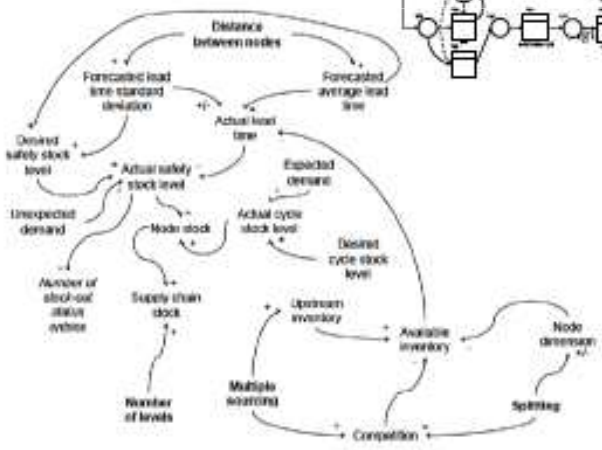
XVI Summer School "Francesco Turco" Impianti Industriali Meccanici
Abano Terme (Padova, Italy) - 14-16 September 2011

UNIVERSITÀ CARLO CATTANEO
LIUC

OPERATIONS – Simulation models

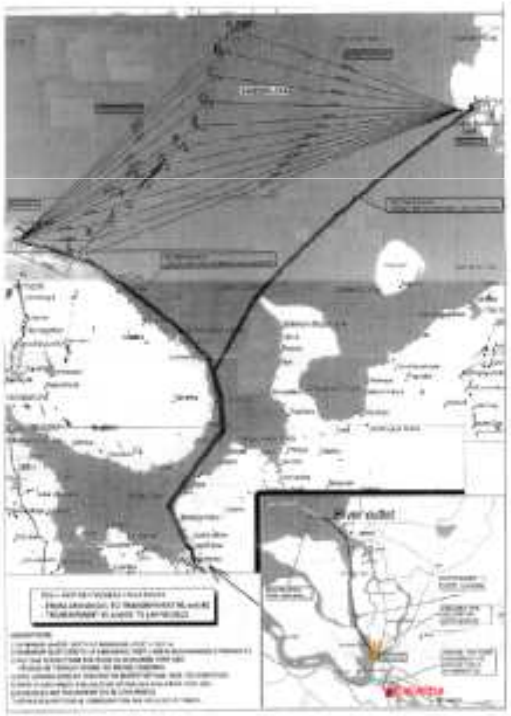
Simulation models and meta-models for representing production plants/ supply chains





Relationships between supply chain design and supply chain performance

Simulation models and meta-models for shaping project logistics systems



UNIVERSITÀ CARLO CATTANEO
LIUC

TOP 10 PUBLICATIONS
last 5 years (2006-2011)

Authors	Title	Journal/Conference	Year-Vol-PP	Research Topic
Strozzi, Bosch, Zaldívar	Beer Game Order Policy Optimization under Changing Customer Demand	Decision Support Systems	2007, Vol. 42, pp. 2153-2163	1
Khan, Creazza	Managing the Product Design-Supply Chain Interface: Towards a Roadmap to the 'Design Centric Business'	International Journal of Physical Distribution and Logistics Management	2009, Vol. 39, pp. 301-319	6
Colicchia, Dallari, Melacini	Increasing supply chain resilience in a global sourcing context	Production Planning and Control	2010, Vol.21, pp. 680-694	6
Coppini, Rossignoli, Rossi, Strozzi	Bullwhip effect and inventory oscillations analysis using the beer game model	International Journal of Production Research	2010, Vol. 48, pp. 3943 – 3956	1
Creazza, Dallari, Melacini	Evaluating logistics network configurations for a global supply chain	Supply Chian Management: an International Journal	2010, Vol. 15, pp. 154-164	6
Pero, Rossi, Noè, Sianesi	An exploratory study of the relation between supply chain topological features and supply chain performance	International Journal of Production Economics	2010, Vol. 123, pp. 266-278	6
Cigolini, Pero, Rossi	An object-oriented simulation meta-model to analyse supply chain performance	International Journal of Production Research	2011, in press	6
Colicchia, Melacini, Perotti	Benchmarking supply chain sustainability: Insights from a field study	Benchmarking: an International Journal	2011, in press	6
Creazza, Dallari, Rossi	An integrated model for designing and optimising an international logistics network	International Journal of Production Research	2011, in press	6
Strozzi, Noè, Zaldívar	Stability control in a supply chain: total costs and bullwhip effect reduction	International Journal of Production Research	2011, in press	1

Research Topics – Ing/Ind-17

1	2	3	4	5	6	7
Production system analysis and design	Auxiliary plant analysis and design	Processes and production technologies	Ergonomics and safety of industrial systems	Production system management	Logistics	Production system automation

UNIVERSITÀ CARLO CATTANEO
LIUC

RESEARCH PROJECTS
last 4 years (2007-2011)

Design of the «Moving Warehouse» for perishable food products distribution

Since: june 2011

The logistics of the fresh food sector is strongly influenced by the characteristics of the goods and of the structure of the their supply chain: this project aims at developing a logistics model using technologies and services for supply chain integration and exploiting the opportunities given by rail intermodality.

The Logistics Atlas

Since: september 2010

By means of an extensive survey we are analysing the warehouses and distribution centres run by third party logistics across the whole Italian territory also in order to understand the features of the logistics flows.

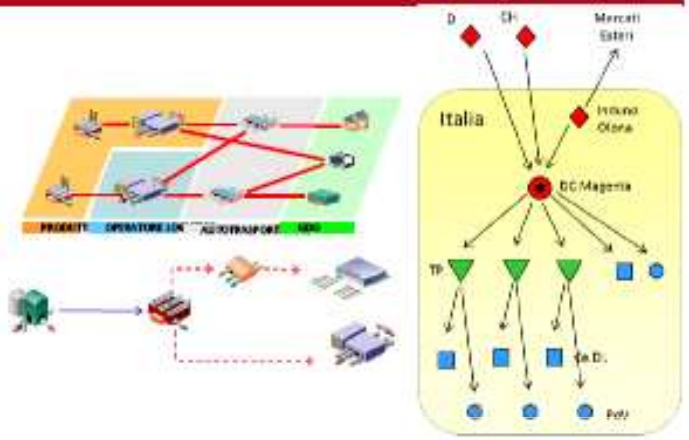
UNIVERSITÀ CARLO CATTANEO
LIUC

RESEARCH PROJECTS
last 4 years (2007-2011)

FMCG logistics flows analysis and mapping

Since: may 2010

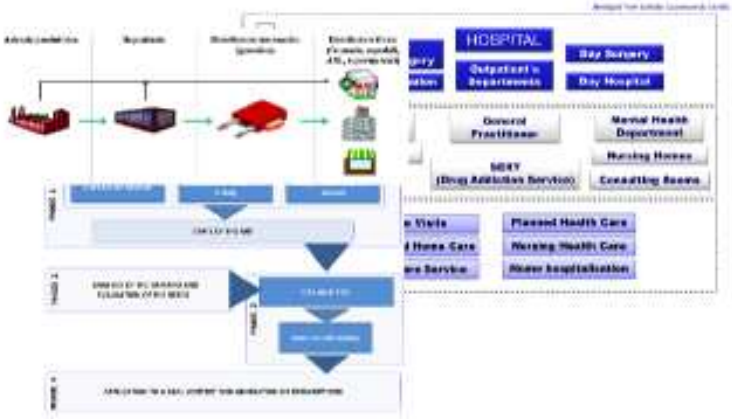
In collaboration with ECR Italy, we are studying the specific features, the map and the overall scope of the Fast Moving Consumer Goods logistics flows in Italy from the factory warehouse down to the point of sale.



PRIN 2008: Logistics management of health technologies for the home care services

Since: january 2010

The objective of this research is to identify the features of the various distribution models available for the health technologies (with particular reference to medical equipments and pharmaceuticals) and to unfold their strengths and weaknesses



XVI Summer School "Francesco Turco" Impianti Industriali Meccanici
Abano Terme (Padova, Italy) - 14-16 September 2011

UNIVERSITÀ CARLO CATTANEO
LIUC

RESEARCH PROJECTS
last 4 years (2007-2011)

AUTOMA: Automobile Logistics Management

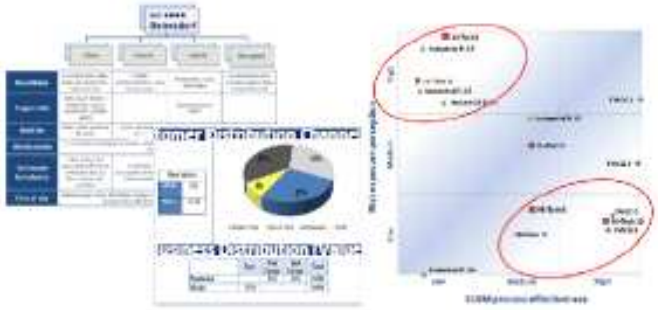
Since: may 2009

We developed an innovative application for the tracking activity in the *vehicle logistics* sector by means of the RFId technology. We specifically devloped the full project for the compund operations in the automotive port terminal at Gioia Tauro port.

Supply Chain Risk Management in Italy

Since: april 2009

The project, developed in collaboration with Assologistica and Trueconomy, analyses the strategies adopted for managing the risk in the supply chain of different industries, highlighting the degree of maturity, the approaches and the practical actions implemented for mitigating supply chain risk.



UNIVERSITÀ CARLO CATTANEO
LIUC

RESEARCH PROJECTS
last 4 years (2007-2011)

Characterisation of the Logistics flows in the Milan Logistics Region

Since: march 2009

C-log supported the CCIAA of Milan in developing a research project aimed at measuring the «value generated by the Milanese Logistics» by the companies operating on the territory as international logistics flows «orchestrators».

Manmade project: diagnosing vulnerability, emergent phenomena, and volatility in manmade networks

Since: january 2007

Granted by the European Community, it concerns the compound networks that comprise Europe's critical infrastructure, primarily on energy supply, emergency response systems and key infrastructures. Aim was to develop and apply mathematical methods to analyse large, man-made multi-element infrastructure systems.