



**Istituto di Tecnologie Industriali e Automazione**  
Consiglio Nazionale delle Ricerche

from research .... to market



## La ricerca Europea su Modelli di Business Manifatturieri Innovativi

Giacomo Copani

Consorzio MUSP

11 Marzo 2011



- Aree di ricerca:
  - Machine and Manufacturing Control Systems
  - Enterprise Engineering and Virtual Applications
  - Supply Chain and Integrated Logistics
  - Manufacturing Business Models and Industrial Service
  - Intelligent and Autonomous Robot Systems
  - Dynamic Analysis and Simulation of Machinery
  - Micro Enabled Devices and Systems
  - Innovative Mechanical Components
  - Advanced Systems for Mechanical Machining

- Numeri

- 95 persone (83 in R&D)
- 15 progetti Europei
- 10 progetti Nazionali
- 4 progetti Regionali

- Network

- European Commission
- Technology platforms
- EFFRA PPP
- Universities and R&D centres
- Enterprises



## **Stato dell'arte**

- Survey internazionale EMS

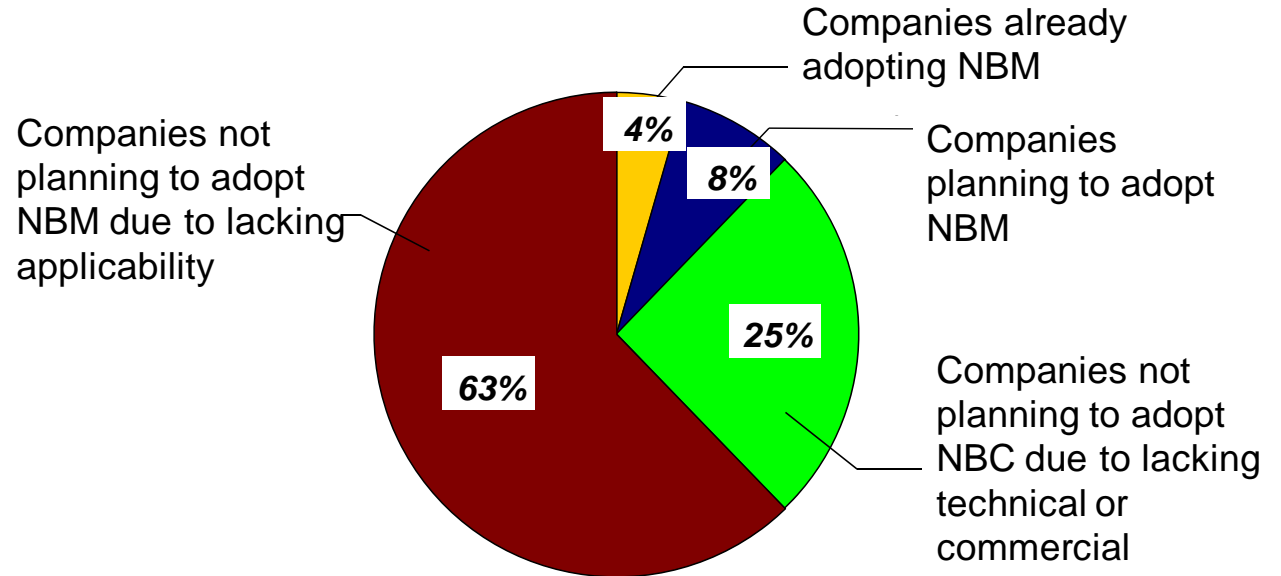
## **Ricerca Europea su queste tematiche**

- Next FP6
- Demat FP7

- **Survey internazionale Fraunhofer ISI**  
*(Austria, Croatia, France, Germany, Greece, Great Britain, Netherlands, Italy, Slovenia, Spain, Switzerland, Turkey, China, Russia)*
- ITIA responsabile parte italiana
- Scopo: indagare innovazione imprese manifatturiere
- 3300 aziende nel campione 2007

## 2006

*"New Business Models diffusion and trends in European machine tool industry", G. Copani, L. Molinari Tosatti, G. Lay, M. Schroeter, R. Bueno, 40th CIRP International Manufacturing Systems Seminar Proceedings, June 2007, Liverpool, UK*



## 2010

*"The relevance of service in European manufacturing industries", 2010, Lay G., Copani G., Jager A., Biege S., Journal of Service Management, Vol. 21 No. 5, 2010, pp. 715-72.*

- 85% aziende offre servizi
- 16% fatturato medio da servizi (9% indiretto, 7% fatturato direttamente)
- 2/3 servizi orientati al prodotto
- 1/6 operational services



- Business model innovativi ben poco diffusi
- Ad appannaggio di grandi imprese
- Strategie di servizio non mature

Perché?

- Cultura (G-d-L vs S-d-L)
- Complessità (multidisciplinarietà, entità del cambiamento)
- Mancanza di metodi e strumenti per passare da strategia a pratica
- Win-win

*The biggest initiative ever undergone in Europe  
in the production systems area  
(25 partners, budget 24 million €)*

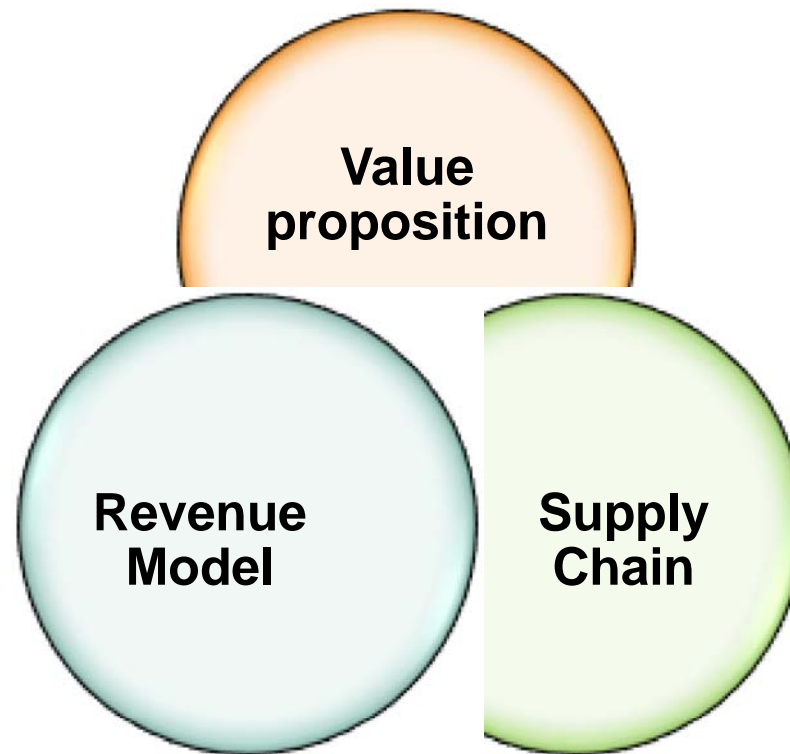
## MISSION

To determine the machines of the future and the sector's new business models that signify an important technological, industrial and social advance in Europe, so contributing to the transformation the manufacturing industry is demanding faced with the new challenges that arise: delocalization, low manufacturing costs in emerging economies...

Fatronik Tecnalia, Ascamm, Bosch, Siemens, University of Budapest, Cecimo, Cesi, Cnrs, Crf, Danobat, Epfl, Fidia, MAG, Ifw Hannover, Fraunhofer Isi, Itia-Cnr, Ku Leuven, Kutxa, Ona, Tekniker, Wzl, Emco, Nicolas Correa

## Il business model

**MANUFACTURER**

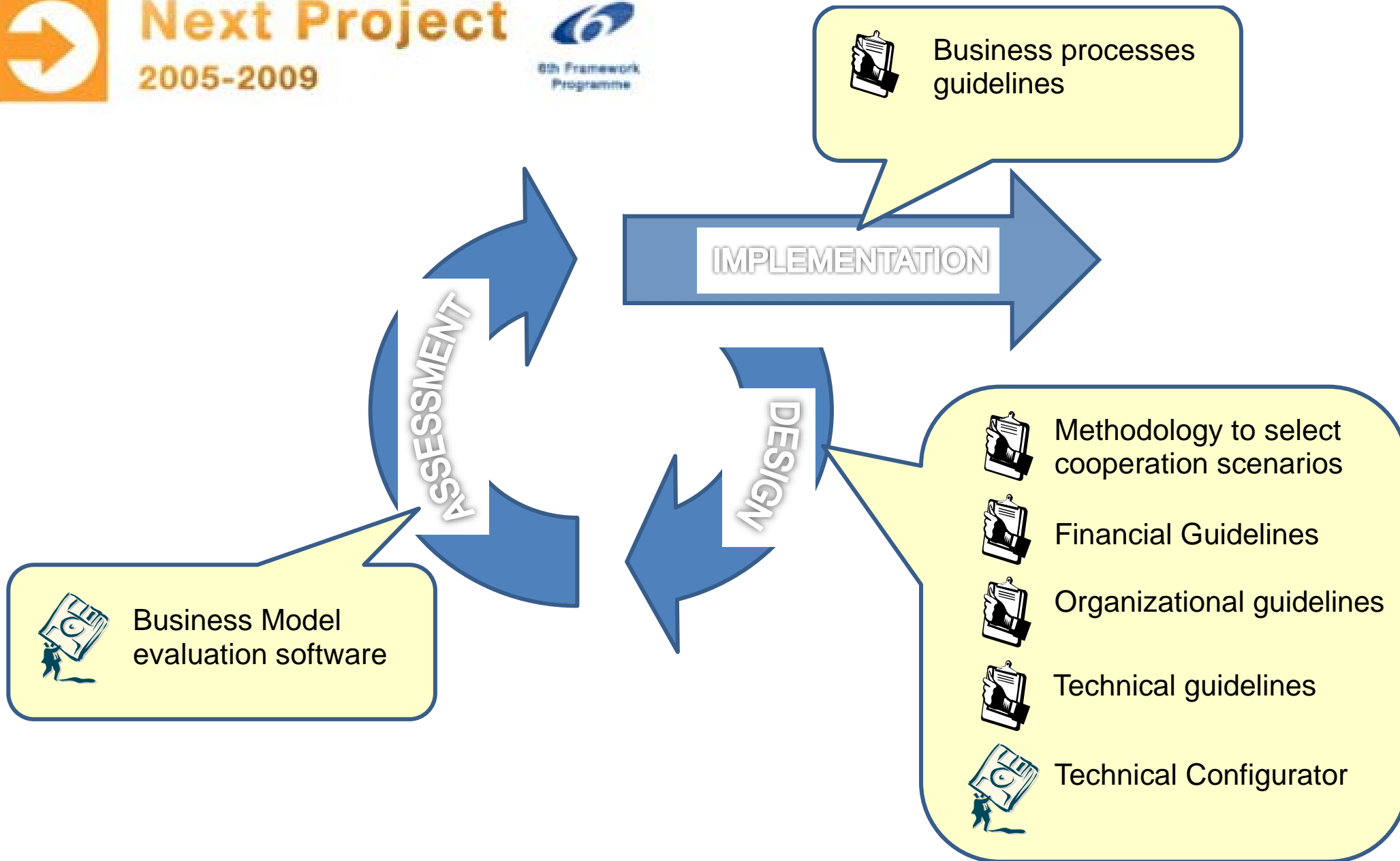


**MACHINERY  
SUPPLIER**





**Next Project**  
2005-2009



# Progetto NEXT FP6

Characteristic features		Options				
Operating personnel		Equipment producer	Operating Joint Venture	Third party	Customer	
Maintenance personnel		Equipment producer	Operating Joint Venture	Third party	Customer	
Location		Equipment producer	Third party	"Fence to Fence" to the customer		Customer
Payment modus		Pay per Part	Pay per Use (Rent)	Pay for availability	Fixed rate	Pay for equipment
Ownership	During phase of use	Equipment producer	Leasing bank		Customer	
	After phase of use	Equipment producer	Leasing bank		Customer	
Utilization rate		High			Low	
Procurement of raw materials		Equipment producer	Operating Joint Venture	Third party	Customer	
Transport of end products		Equipment producer	Operating Joint Venture	Third party	Customer	
Technology	Automation level	High				
	Performance level	High				
	Reconfigurability level	High				
	Availability (MTTR/MTBF)	High				
	Complexity level	High				
	Efficiency level	High				

**Availability/TCO guarantee**

**Providing personnel assistance for customer operations**

**Production service to cover peaks/spot demands**

**Build - (operate) - own business model**

**Lean machine adaptation service**



## Methodology to select Cooperation Scenarios

### Value propositions

### Business needs

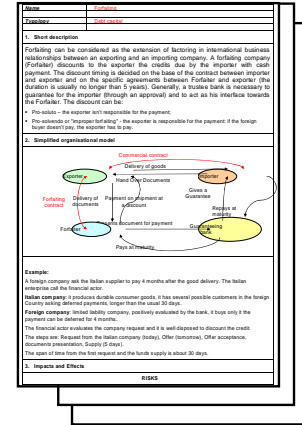
		VALUE PROPOSITIONS								
		A	B	C	D	E	F	G	H	I
		Offering concepts for leveling irregular and temporary customer capacity requirements	Offering complete production service (outsourcing)	Offering procurement management	Offering delivery management	Providing availability guarantee	Solving customer qualification deficits	Lean machine business concepts	Continuous modernisation concepts	Towards reconfigurable production system
EU General Business Needs	High quality						●			
	Process								●	
	Production	→	→					→		
	Maintenance					●				
	Procurement			●						
	Delivery				●					
	Production	→	→						→	
	Maintenance					●				
	Procurement			●						
	Delivery				●					
High productivity	→	→						→		
High flexibility	●	●							●	
Low risks	Operative	●	●							
	Logistic			●	●					

*“An innovative pattern to design new business models in the machine tool industry”, G. Copani, S. Marvulli, L. Molinari Tosatti, Innovation in Manufacturing Networks - Eighth IFIP International Conference on Information Technology for Balanced Automation Systems Proceedings, June 2008, Porto, Portugal*

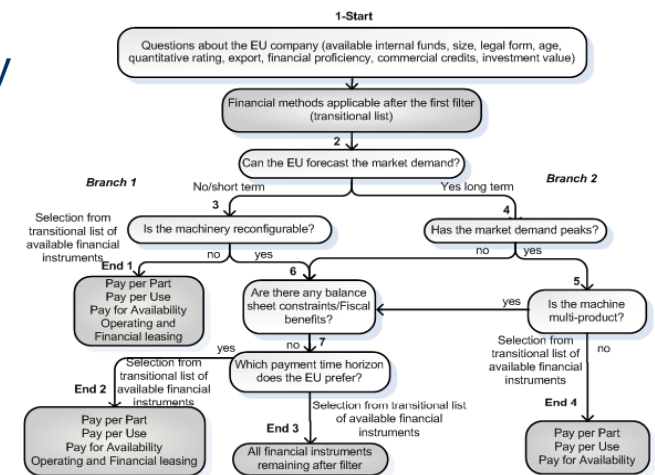


## Financial Guidelines

- Bank loan;
- Trade credit;
- Overdraft;
- Leasing (financial and operative);
- Factoring;
- Forfaiting;
- Stand-by lines of credit;
- Commercial paper;
- Syndicated lending;
- Bank advances;
- Project financing;
- Bonds;
- Venture leasing;
- Equity (internal funds or capital call);
- Pay Per Use
- Pay Per Part
- Pay for Availability



$$T > \frac{(f - c * T_m) * (1 + MarkUp) + P * T_m}{P - c * (1 + MarkUp)}$$



“New Financial Approaches for the Economic Sustainability in Manufacturing Industry”, G. Copani, L. Molinari Tosatti, S. Marvulli, R. Groothedde, D. Palethorpe, 14th CIRP Conference on Life Cycle Engineering Proceedings, Waseda University, Tokyo, Japan, June 11th-13th, 2007

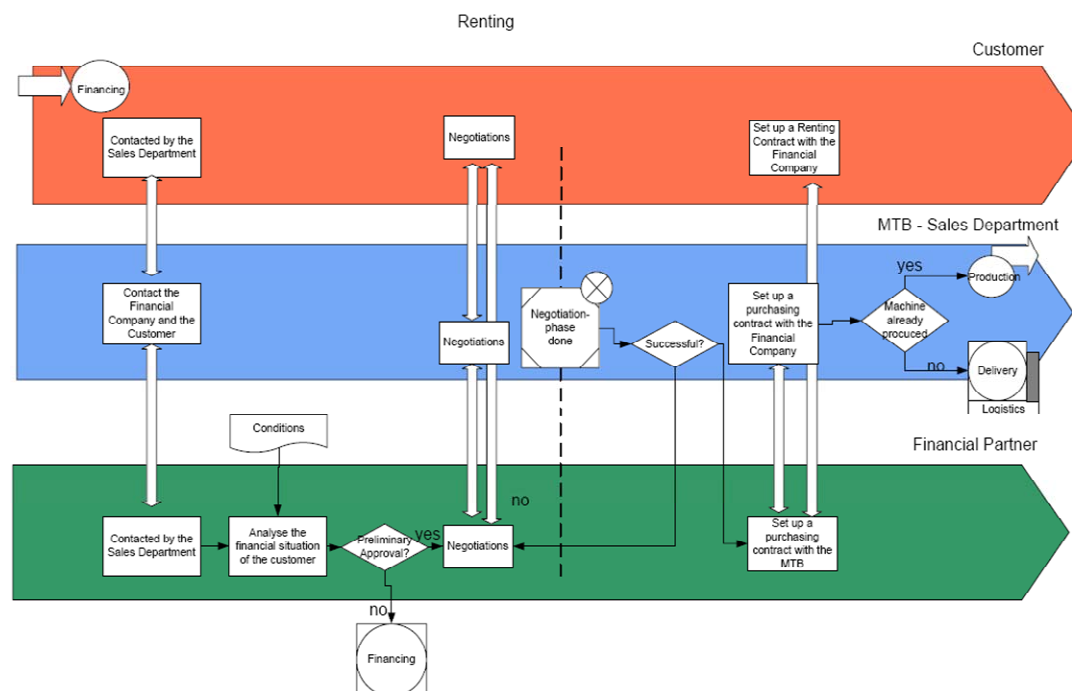


## Organizational Guidelines

OPZIONI ORGANIZZATIVE

- Accorpamento a divisione esistente
- Nuovo dipartimento
- Project team
- Joint Venture
- Outsourcing
- Networking

PROCESSI





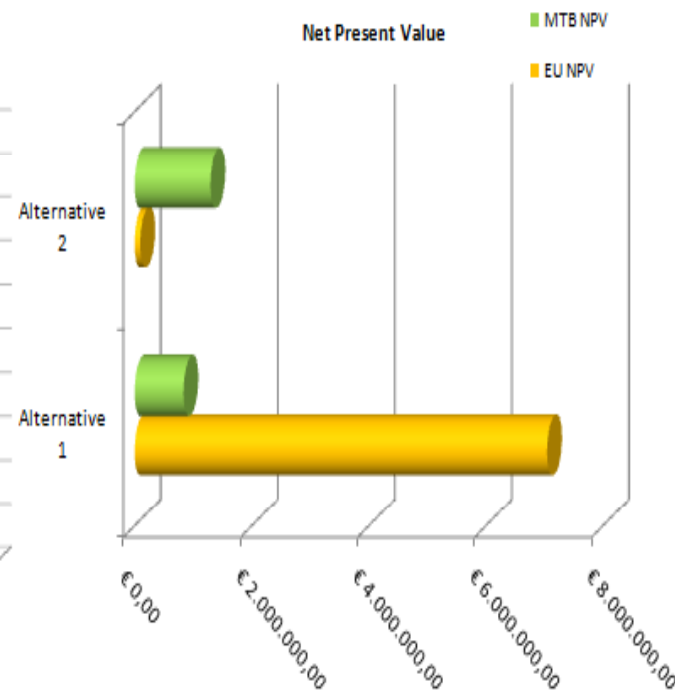
## Business Model evaluation life cycle software

### GLOBAL RESULTS

	Alternative 1	Alternative 2
Layout Name	Axle Machining Line1	Axle Machining Line1
Period of analysis	11	11
Total Life Cycle Costs	€ 910.620.519,79	€ 853.913.927,26
EU LCC	€ 902.815.086,55	€ 454.834.693,11
MTB LCC	€ 7.805.433,24	€ 399.079.234,14
Total NPV	€ 7.879.658,17	€ 1.391.001,95
EU NPV	€ 7.045.375,57	€ 95.537,95
MTB NPV	€ 834.282,60	€ 1.295.464,00
Equivalent Annual Annuity EU	€ 986.890,44	€ 13.382,61
Equivalent Annual Annuity MTB	€ 116.863,26	€ 181.463,86
EU Payback time	1	10
MTB Payback time	1	9
EU IRR	Not evaluable	8,00%
MTB IRR	Not evaluable	12,00%
EU PI	2,35	1,04
MTB PI	1,16	1,25

### COOPERATION MODELS

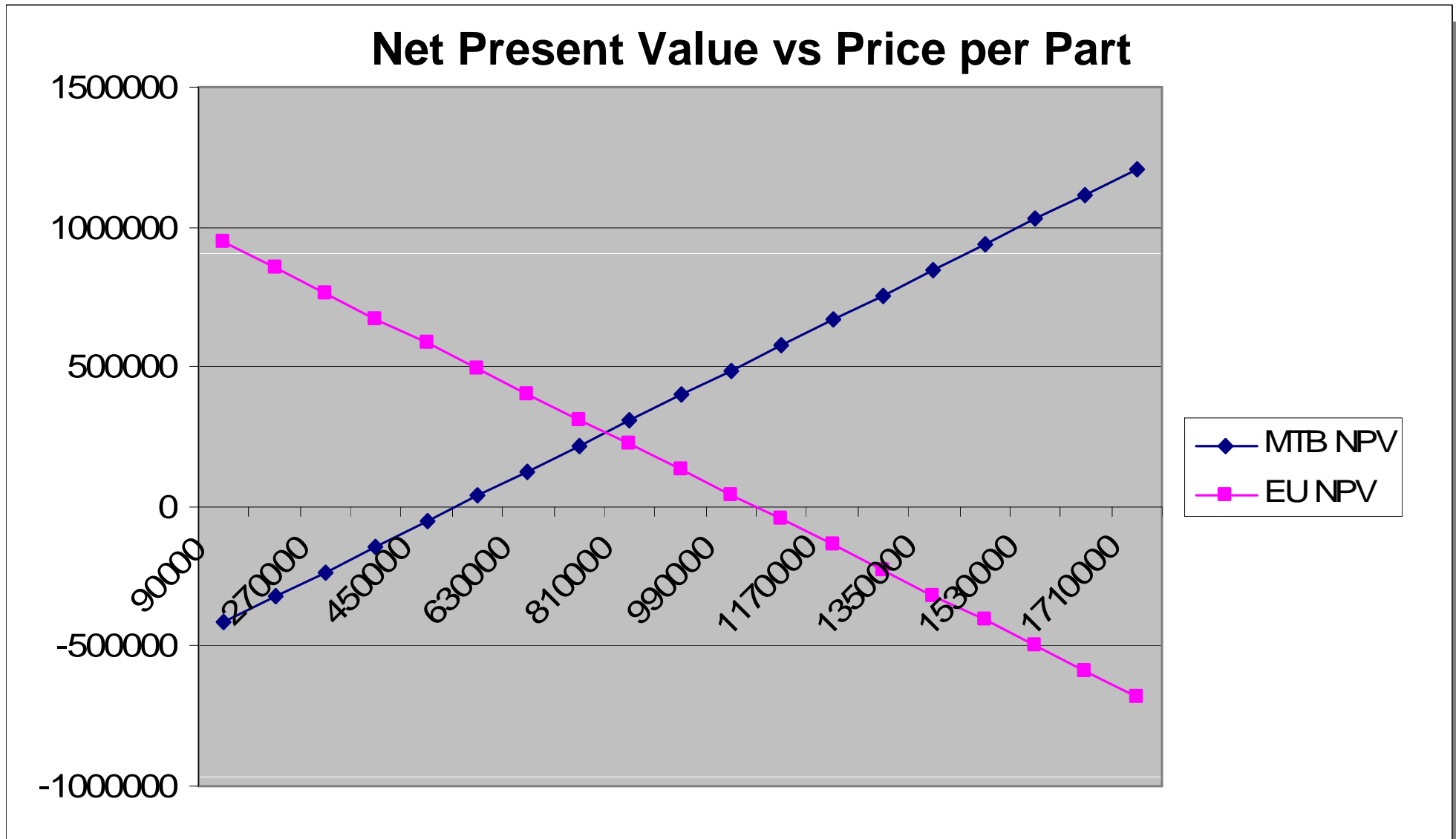
	Alternative 1	Alternative 2
Procurement management	EU	MTB and EU
End products delivery management	EU	EU
Operating personnel	EU	MTB and EU
Maintenance personnel	MTB	MTB and EU
Location	EU	MTB and EU



“An LCC-LCA methodology to design manufacturing systems under a business model perspective”, G. Copani, S. Marvulli, C. Colombo, L. Molinari Tosatti, Proceedings of the 6th CIRP International Conference on Intelligent Computation In Manufacturing Engineering (CIRP ICME '08), 23-25 July 2008, Naples, Italy



## Business Model evaluation life cycle software



## MISSION

**To dematerialise the machine tools and manufacturing systems that are produced in Europe. These dematerialized machines will be integrated with immaterial goods and services such as innovative win-win business models and human-capital based services.**

Fatronik Tecnalia, Cecimo, Ibarria, Micromega, Cesi, Epfl, Fraunhofer Isi, Itia-Cnr, Ku Leuven, Intelliact, D. Electron, Missler, Nicolas Correa Service, University of Bath, University of Stuttgart, MCM



- concepire una **nuova generazione di macchine e sistemi** intelligenti, leggere, flessibili, riconfigurabili e a basso consumo energetico
- Abilitare **nuovi business model orientati alla flessibilità** attraverso la progettazione integrata di macchine, sistemi e servizi

**Reconfiguration-based contracts**

**Flexibility guarantee**

## Contenuti scientifici e metodologici:

- Tecniche di progettazione sistemi con **flessibilità focalizzata** (programmazione stocastica)
- Tecniche per la quantificazione e **gestione del rischio** dal punto di vista economico-finanziario (Analisi di scenario tramite albero decisioni, Real Option Analysis)
- Performance-based contracting



Istituto di Tecnologie Industriali e Automazione  
Consiglio Nazionale delle Ricerche

from research .... to market



Thank you for your attention!

For further information:

[giacomo.copani@itia.cnr.it](mailto:giacomo.copani@itia.cnr.it)

