

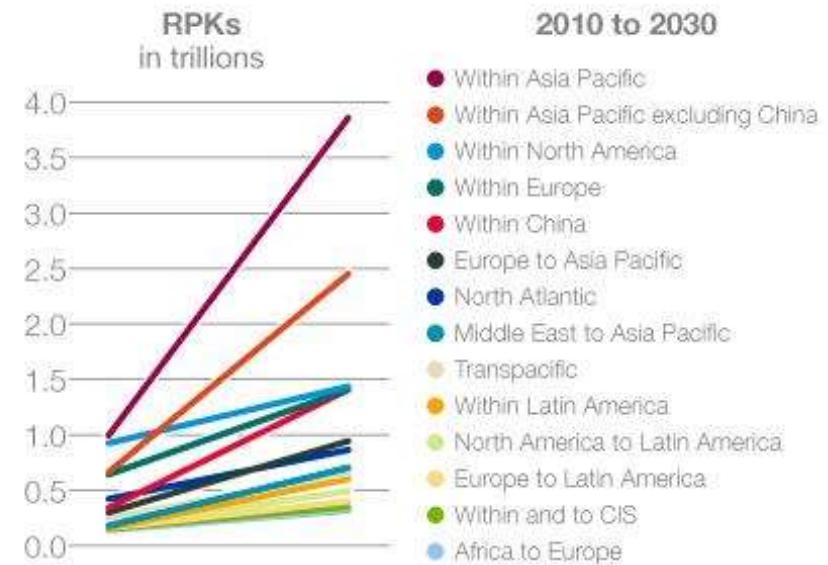
## IL TECHNOLOGY FORECASTING: finalità, metodo, esperienze a confronto

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[gaetano.cascini@polimi.it](mailto:gaetano.cascini@polimi.it)

# Introduzione



## Forecast summary Passenger traffic development



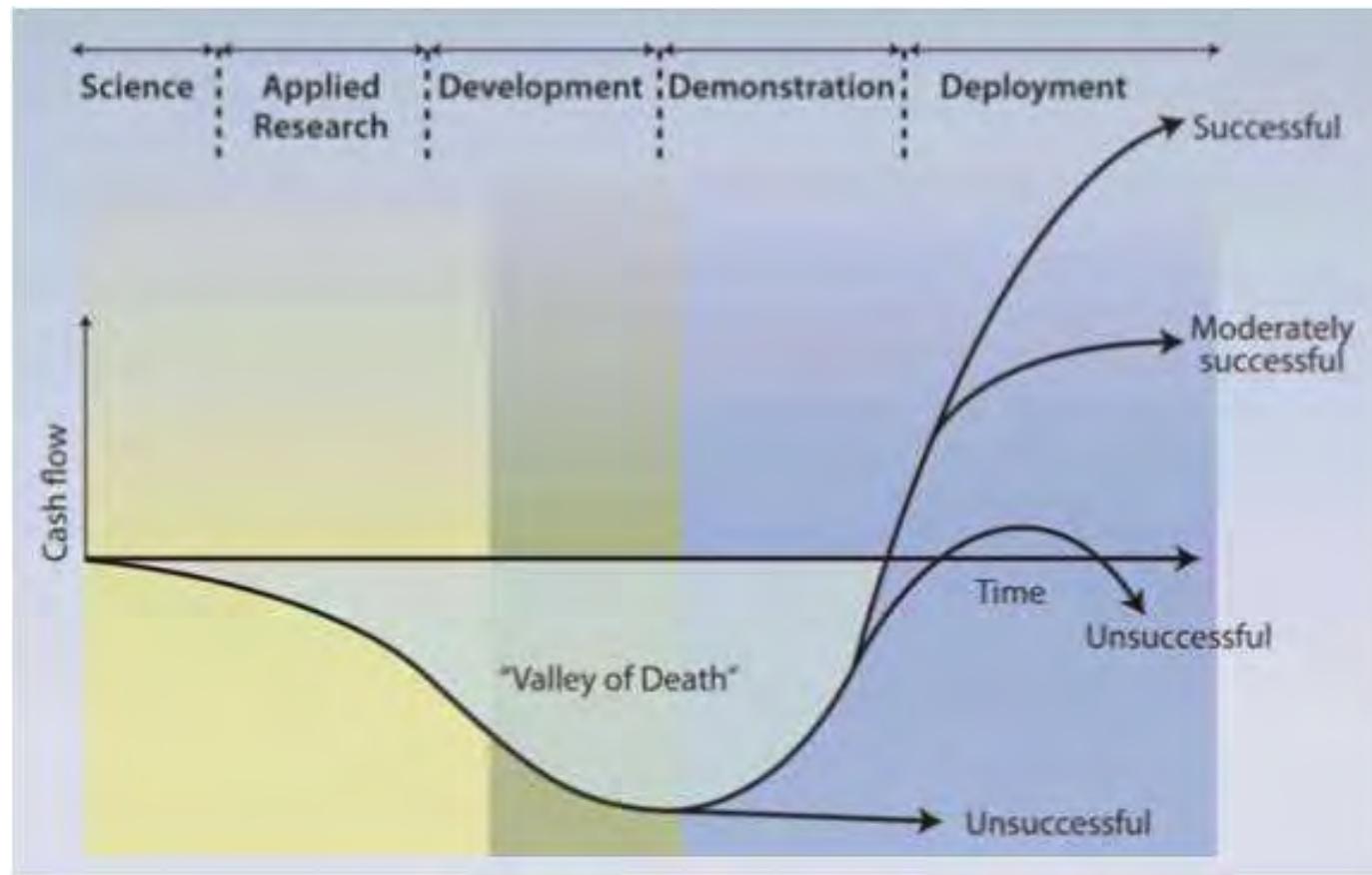
## Current Market Outlook 2011–2030



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# Introduzione

- Innovazione, opportunità e timori
  - ❖ Dalla ricerca al mercato



source: ca.gov

# Introduzione

## ■ Technology Forecasting: a quale scopo?

- ❖ supportare le decisioni di imprenditori, amministratori e ricercatori in modo da rendere più efficaci ed affidabili le scelte strategiche che si devono affrontare.
  
- ✓ investire o meno in una certa tecnologia;
- ✓ individuare competenze di cui è bene dotarsi per incrementare la propria competitività;
- ✓ selezionare un partner o un fornitore;
- ✓ orientare gli investimenti di ricerca e sviluppo;
- ✓ ...

# Introduzione

## ■ forecast = knowledge

❖ *Those who have knowledge, don't predict.  
Those who predict, don't have knowledge.*

*-Lao Tzu*

❖ The goal of forecasting is not to predict the future but to tell you what you need to **know to take meaningful action** in the present.

*-Paul Saffo*

# Introduzione

## ■ An example Best Practice from IBM



Since 1982, IBM Research has marshaled the unique capabilities of its worldwide community of top scientists to create the **Global Technology Outlook (GTO)**.

The GTO is a comprehensive analysis that looks **three to ten years into the future** seeking to identify significant, disruptive technologies that will change IBM and the world.

The completed GTO is used within IBM to **define areas of focus and investment** and is shared broadly with a range of IT influencers, including clients, academics, and partners, through education programs and client briefings.

GTO is not **perfect**:  
predicting is  
difficult

GTO is not  
**speculative**: driven  
by business

GTO is not **ignored**:  
100M\$+ investments  
based on GTO

# Introduzione

## ■ An example Best Practice from Siemens



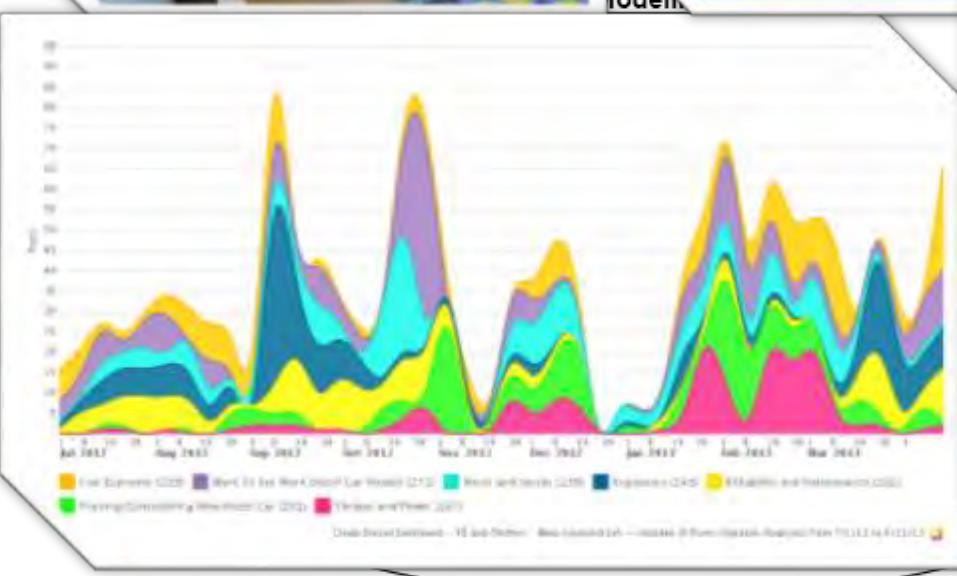
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Trends Reinventing Energy Cons...				

Since 2001, Siemens' **Pictures of the Future** magazine reports twice a year on **major technology trends** and looks at the latest research in the company's laboratories. The magazine includes **scenarios of the future, features, reports on associated R&D activities at Siemens, and interviews with internationally-recognized experts.**

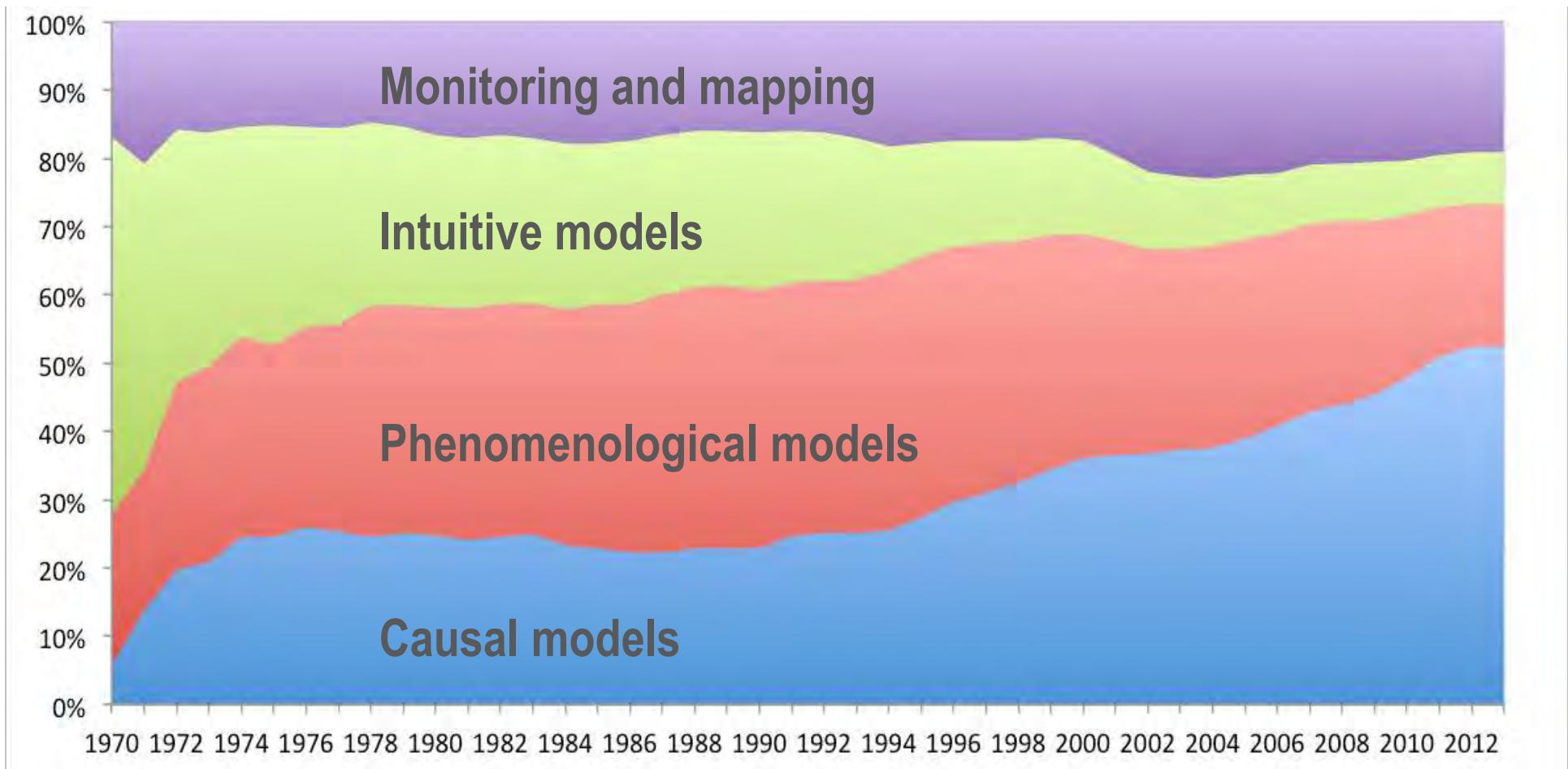
# Forecasting Methodologies



Potter

# Forecasting Methodologies

- ❖ Types of forecast: cumulative appearance of articles



# FORMAT project



- ✓ Grant Agreement number: **286305**
- ✓ Project acronym: **FORMAT**
- ✓ Project title: **Forecast and Roadmapping for Manufacturing Technologies**
- ✓ Starting date: **01/01/2012**
- ✓ Project Duration: **48 months**
- ✓ Total estimated eligible cost: **1,690,454.00€**
- ✓ Total requested EU contribution: **1,690,454.00€**

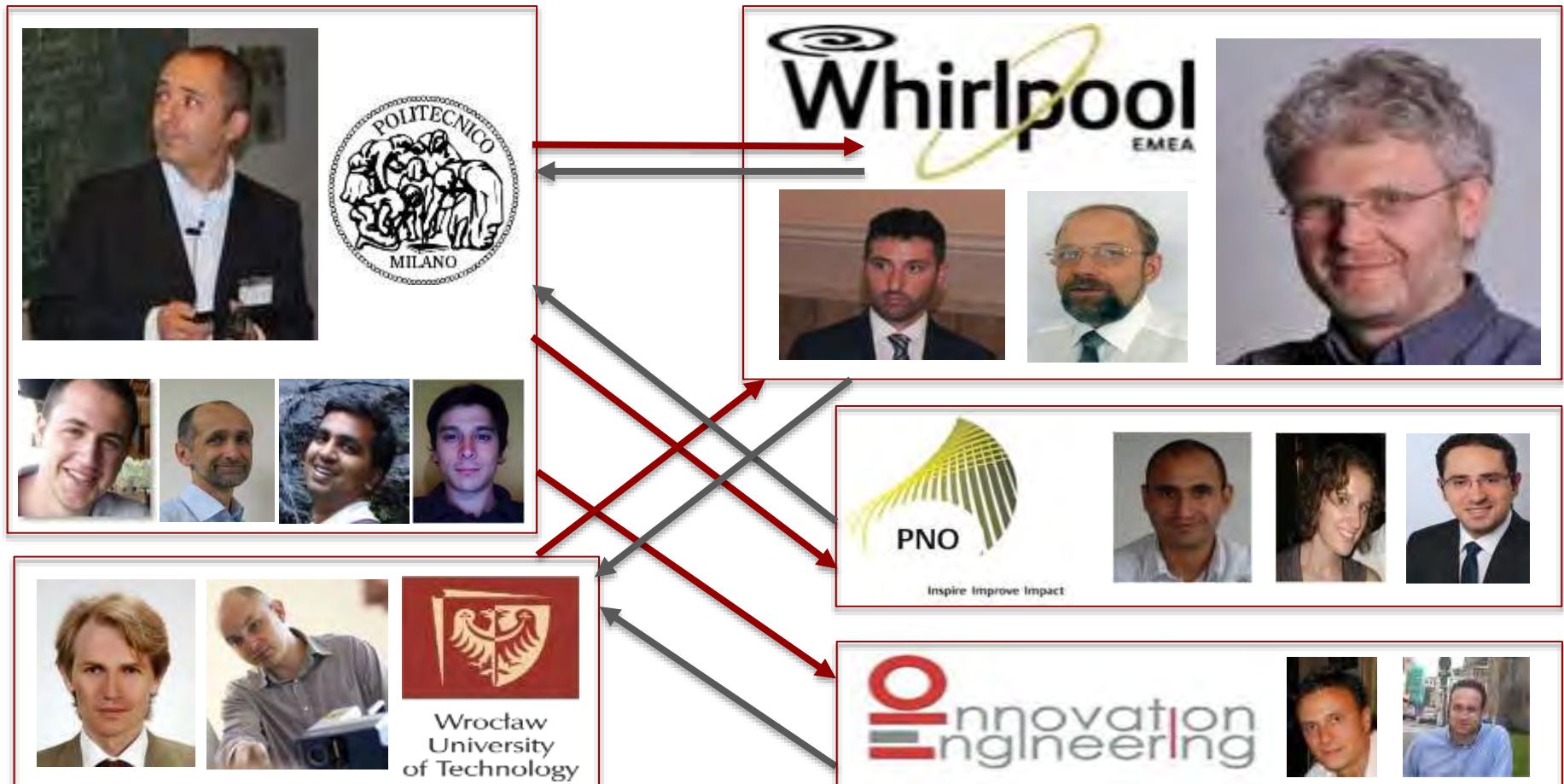


# FORMAT project



Academia

Industry

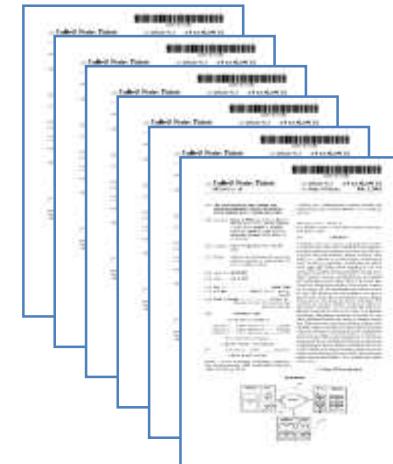


## Теория Решения Изобретательских Задач Theory of Inventive Problem Solving



Genrich Altshuller  
(1926-1998)

Analysis of hundreds of  
thousands inventive  
solutions



# Reference models

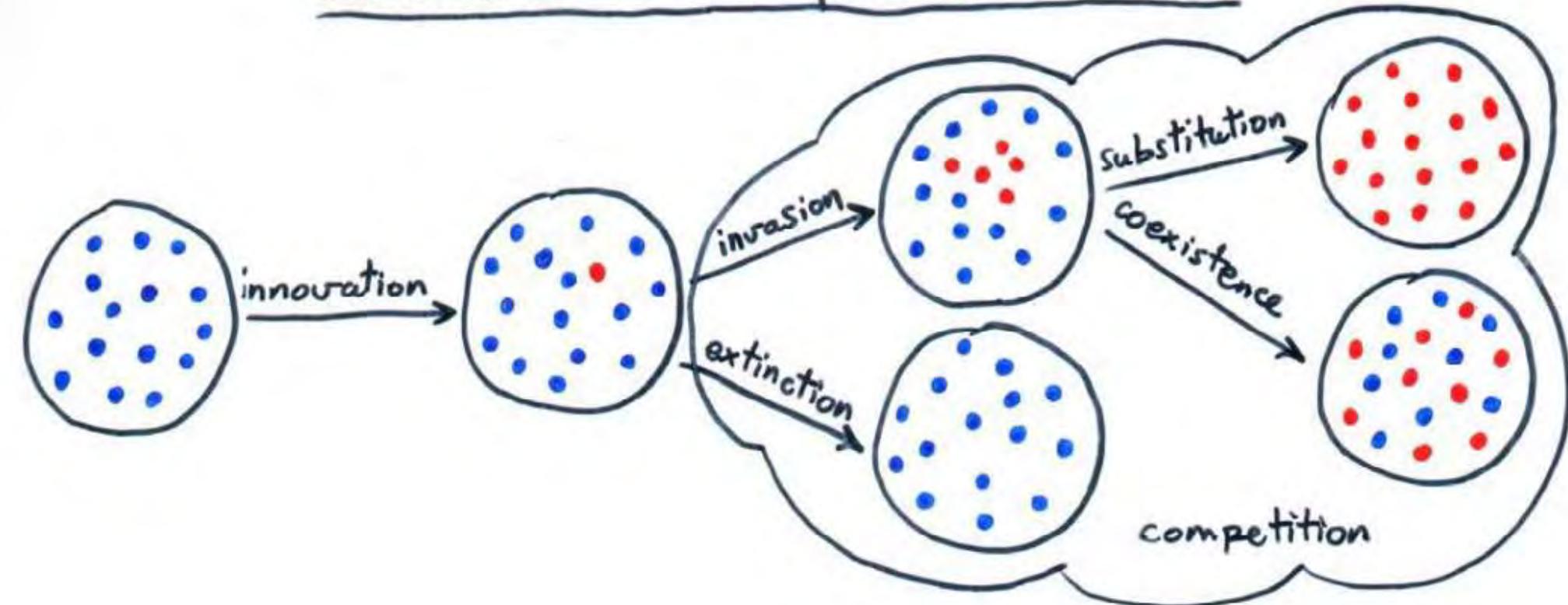


## Теория Решения Изобретательских Задач Theory of Inventive Problem Solving



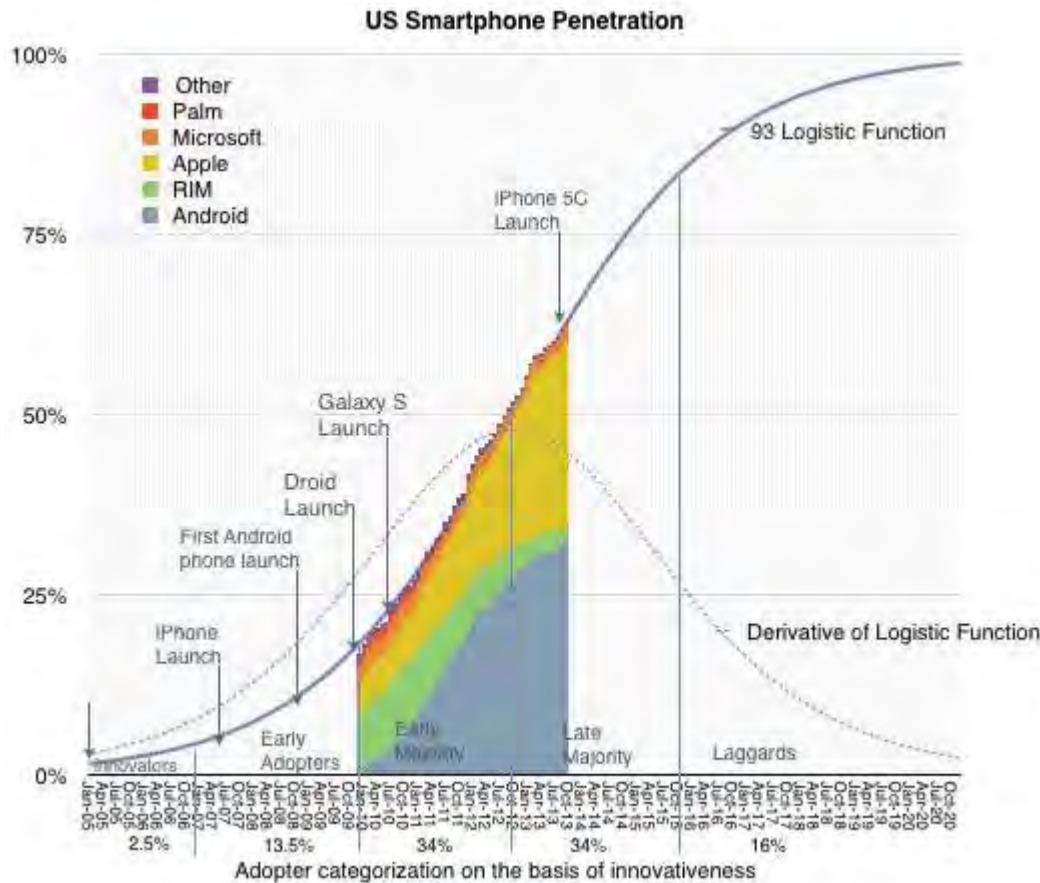
# Reference models

## Innovation and Competition Processes



Source: Carlo Piccardi

# Reference models

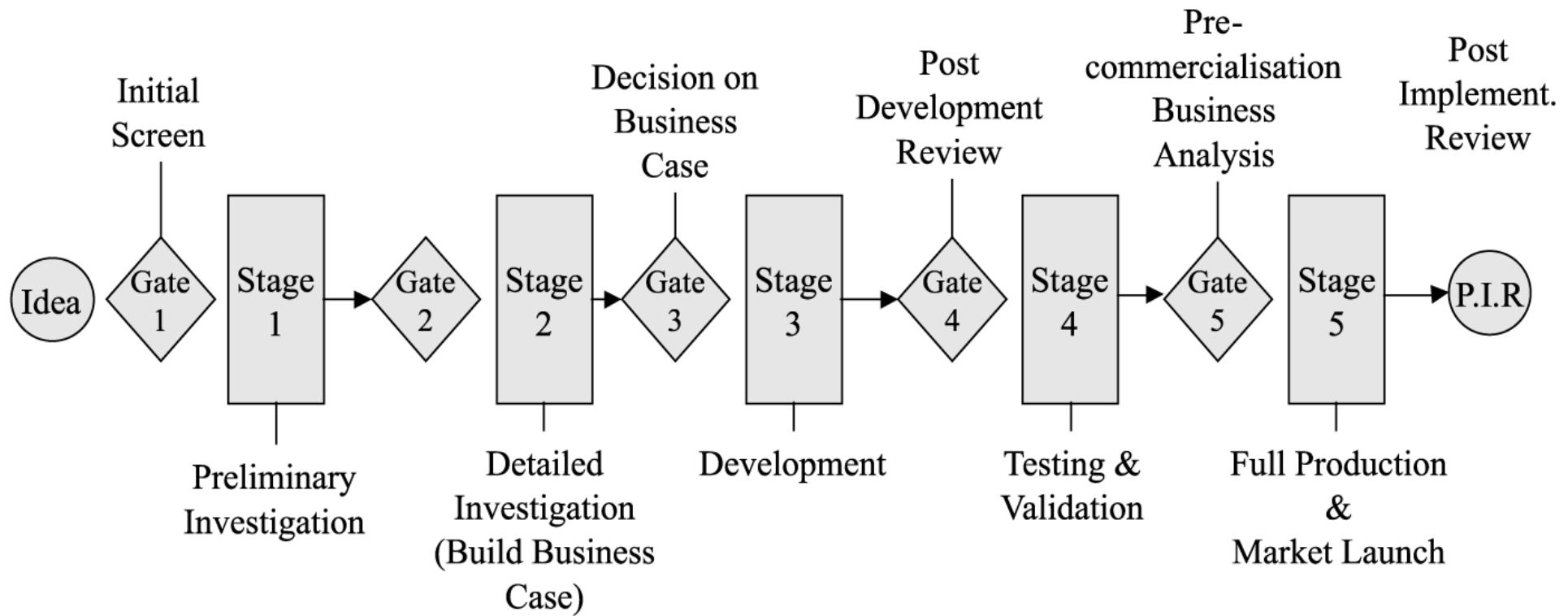


## Growth under competition

- Natural growth of autonomous systems in competition might be described by LOGISTIC EQUATION and logistic S-curve

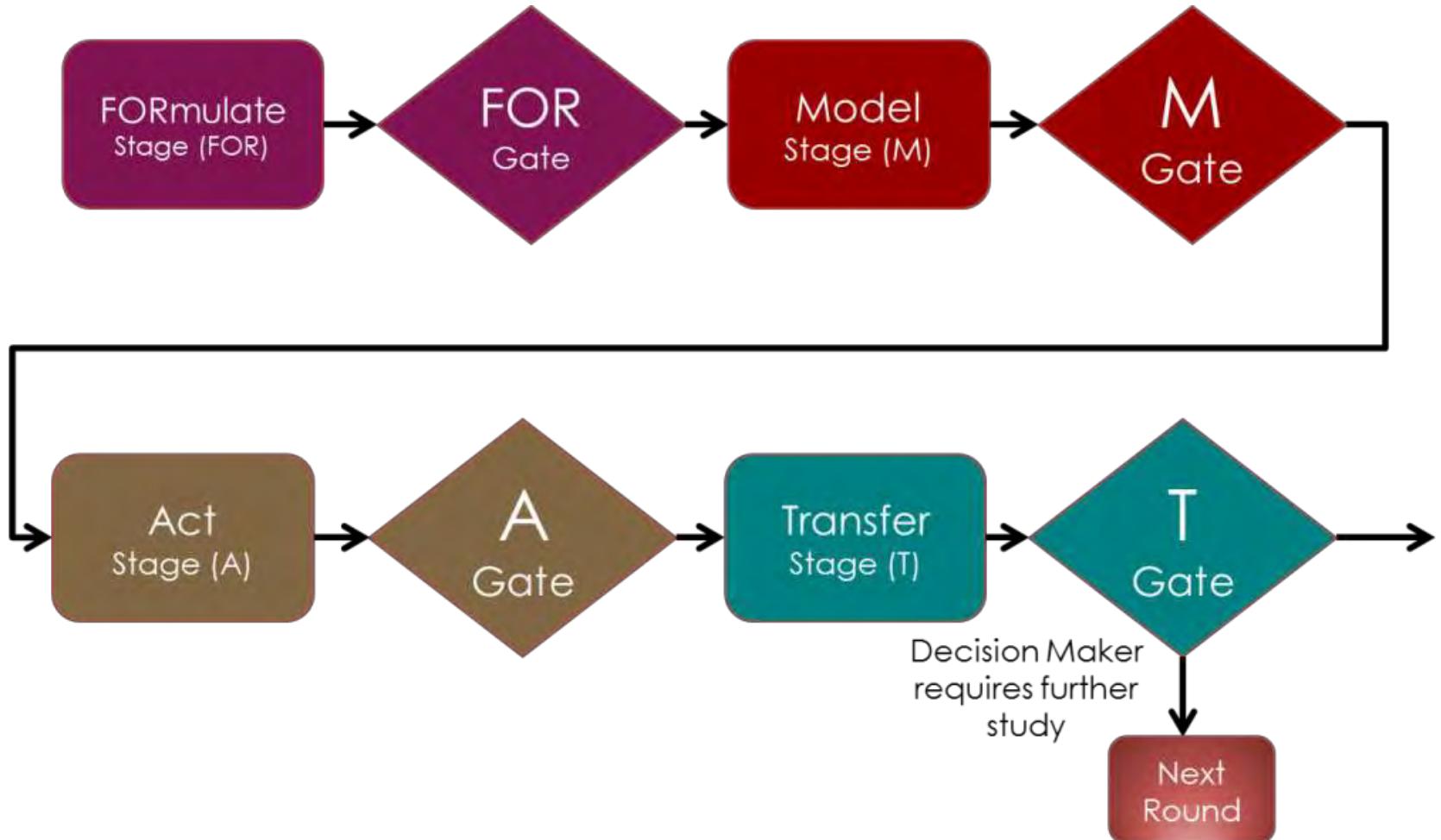
- Natural growth is defined as the ability of a 'species' to multiply in finite 'niche capacity'

# Reference models



**Source:** Cooper (1994)

# FORMAT Methodology: Stages and Gates



# FORMAT Methodology: Stages and Gates

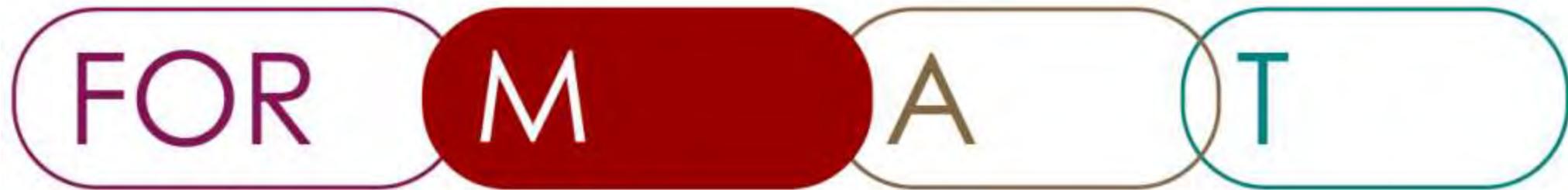


FOR M A T

Diagnose questions and plan project (FOR)

<prepare & make> <decision> <about forecasting project>  
<define> <boundaries / resource> <of forecasting project>

# FORMAT Methodology: Stages and Gates



Define the system for forecast  
and study contexts (M)

<review> <existing knowledge> <about system>

# FORMAT Methodology: Stages and Gates



FOR M A T

## Develop forecast for defined system and contexts (A)

<identify> <a system of problems> <that drives evolution of system>  
<recognize> <evolutionary trends> <for identified system>  
<identify> <changes of performance characteristic in time>  
<aggregate and validate> <results of qualitative and quantitative studies> <into forecast>

# FORMAT Methodology: Stages and Gates



FOR M A T

The letters "FOR", "M", "A", and "T" are arranged horizontally, each enclosed in a rounded rectangular frame. The frames overlap slightly, with "FOR" in purple, "M" in red, "A" in gold, and "T" in teal.

Prepare report and present results (T)  
<transfer> <results of study> <to decision makers>

# Il Laboratorio della Camera di Commercio di Treviso

## Programma



<b>31 Gennaio</b> (14.30 -17.30)	Workshop introduttivo IL TECHNOLOGY FORECASTING: OBIETTIVI, APPROCCI E METODI A SUPPORTO DELLE STRATEGIE D'INNOVAZIONE
<b>14 Febbraio</b> (ore 9 -18)	I principali metodi di previsione tecnologica METODO DELPHI; STRUMENTI SW (FREE) PER CRESCITA E SOSTITUZIONE LOGISTICA
<b>28 Febbraio</b> (ore 9 -18)	Il TRIZ applicato al Technology Forecasting LEGGI DI EVOLUZIONE; ALBERI EVOLUTIVI; IL SYSTEM OPERATOR; LE RETI DI CONTRADDIZIONE
<b>7 Marzo</b> (ore 9 -18)	La metodologia FORMAT (1/2) FORMULAZIONE DEL Modello stage-gate per il technology forecasting. Metodi e strumenti per gestire un progetto di Technology Forecasting: a. PROGETTO b. MODELLAZIONE DL SISTEMA TECNICO E IDENTIFICAZIONE DI FATTORI-DRIVER E BARRIERE
<b>14 Marzo</b> (ore 9 -18)	La metodologia FORMAT (2/2) a. ANTICIPAZIONE DI SCENARI EVOLUTIVI b. TRASFERIMENTO DELLE INFORMAZIONI RILEVANTI AI DECISION-MAKER
<b>Aprile-Giugno</b>	SPERIMENTAZIONE PRATICA DEI METODI E DEGLI STRUMENTI DI TECHNOLOGY FORECASTING
<b>Luglio 2014</b>	WORKSHOP FINALE DI PRESENTAZIONE DEI RISULTATI DEL LABORATORIO



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[www.format-project.eu](http://www.format-project.eu)