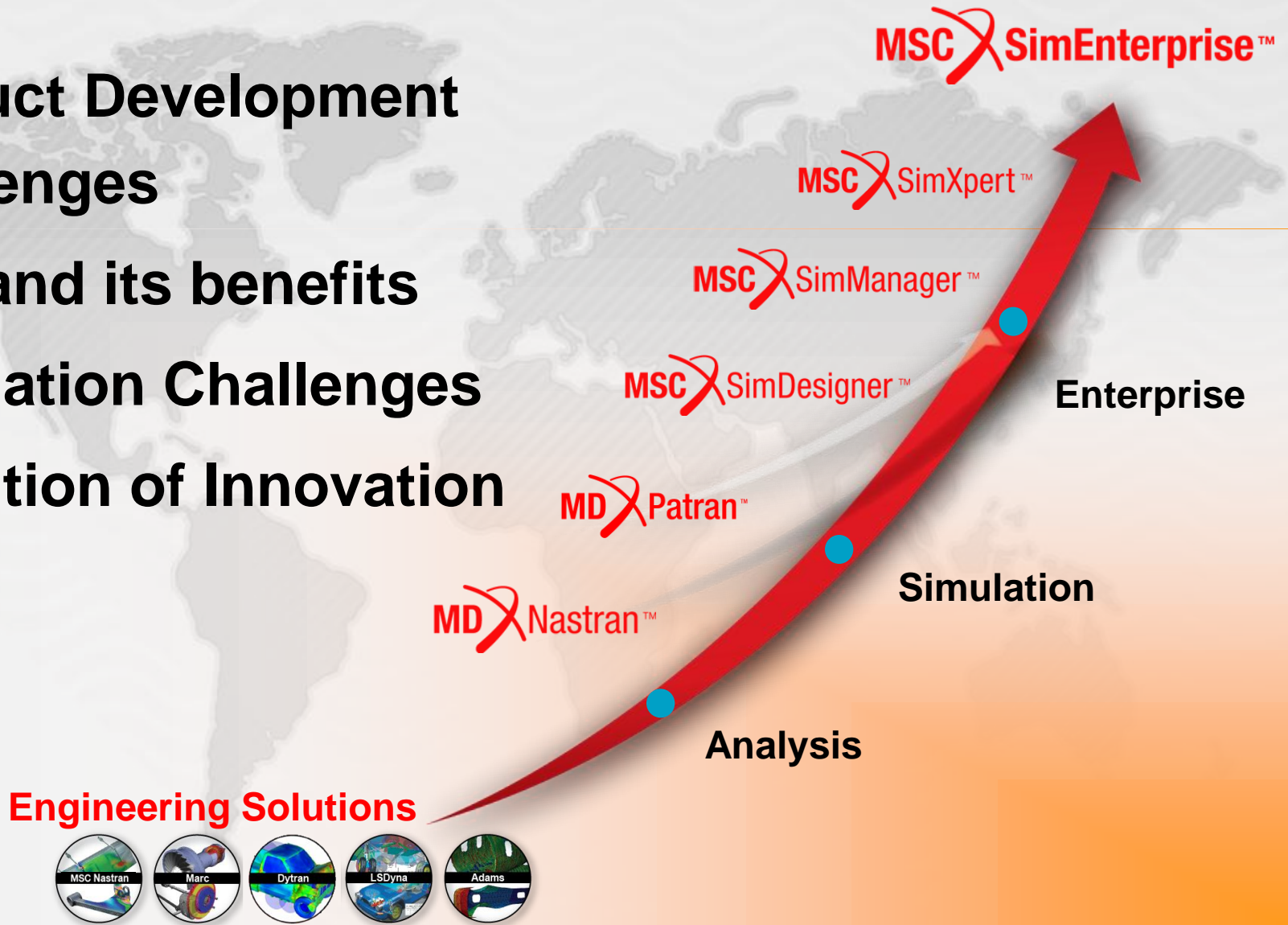# VPD: Virtual Product Development come Soluzione per l' Innovazione

MSC.Software
Massimo Montenegro
Country Manager

Agenda

- **Product Development Challenges**
- **VPD and its benefits**
- **Simulation Challenges**
- **Evolution of Innovation**

MSC SimEnterprise™

MSC SimXpert™

MSC SimManager™

MSC SimDesigner™

MD Patran™

MD Nastran™

Enterprise

Simulation

Analysis

Engineering Solutions

MSC Nastran — Marc — Dytran — LSDyna — Adams

Product Development Challenges

- *Custom solutions*
- *High risks in profitability*
- *Performances is a key factor*
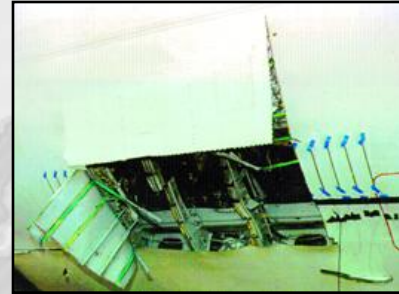- *Manufacturability is an issue*
- *Product Life and Durability Demands*

Product Development Challenges

Can I build it?   **Is it durable?**   **Will it fail?**   **Is it safe?**

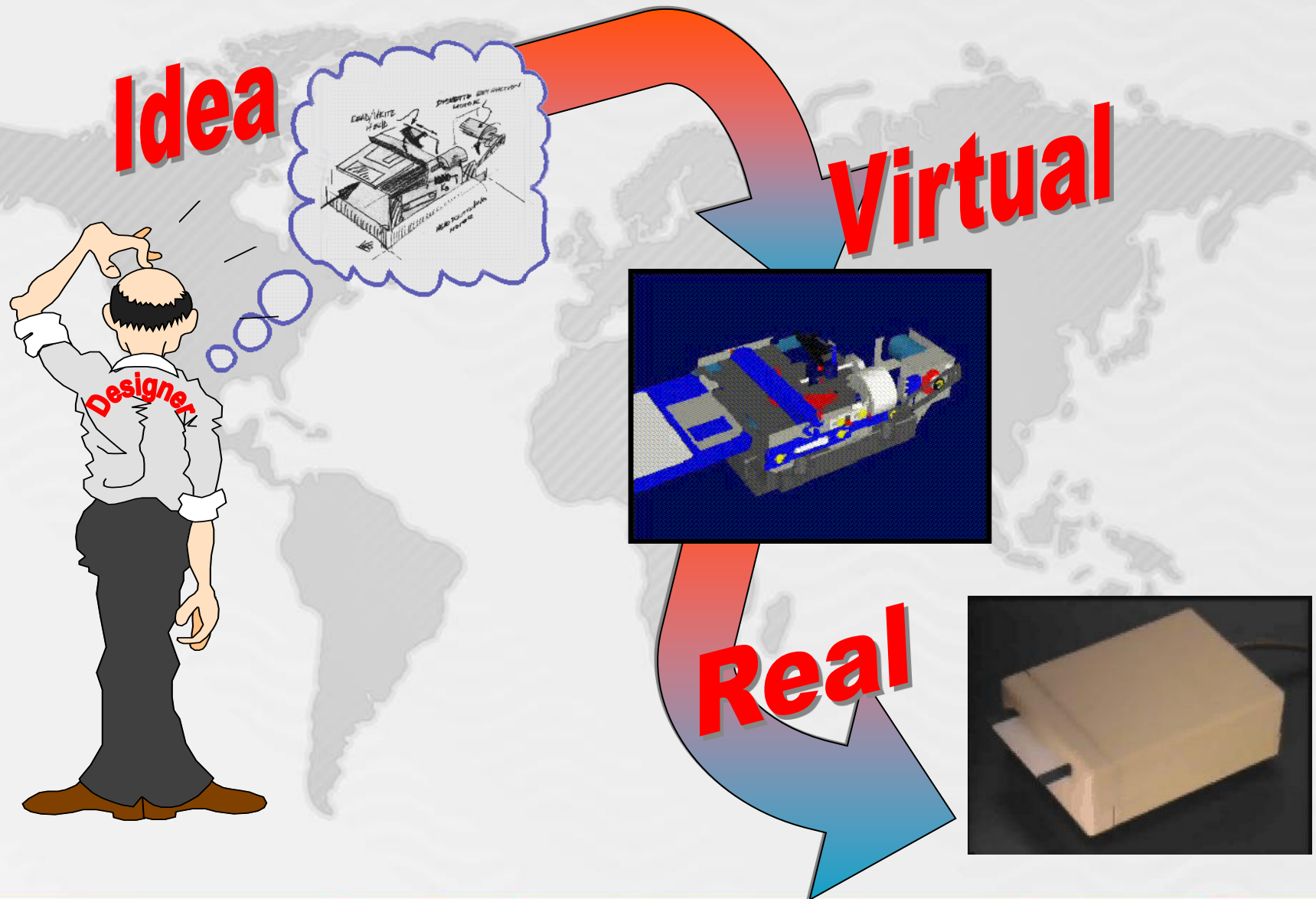**Can I test it?**   **Will it perform?**   **Is it crashworthy?**   **Why did it fail?**

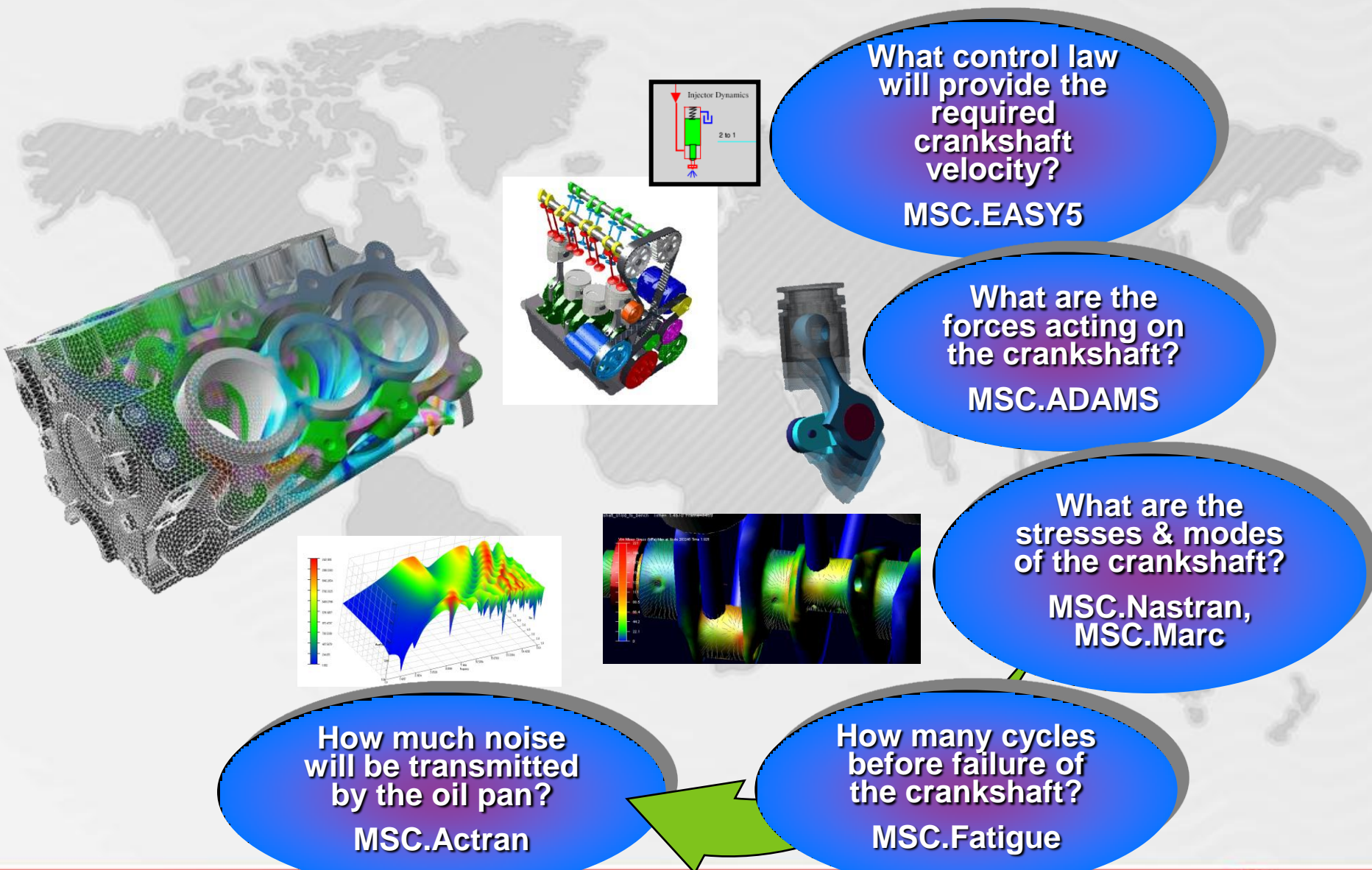# Physical prototyping and testing of products

- is typically an iterative and increasingly expensive process.
- often involves dynamic experiments (sometimes destructive).

Need to minimize physical test cycles—without sacrificing quality

"Virtual Product Development"…

Integrated VPD Environment

What control law will provide the required crankshaft velocity?

MSC.EASY5

What are the forces acting on the crankshaft?

MSC.ADAMS

What are the stresses & modes of the crankshaft?

MSC.Nastran, MSC.Marc

How much noise will be transmitted by the oil pan?

MSC.Actran

How many cycles before failure of the crankshaft?

MSC.Fatigue

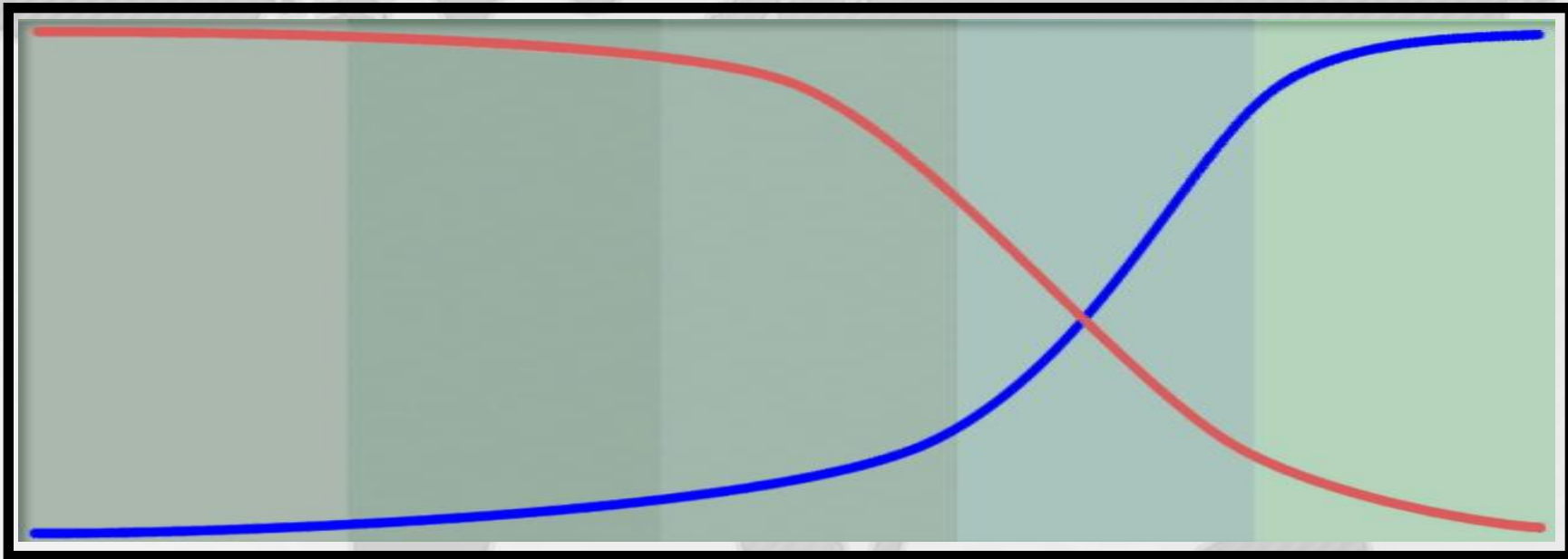# Benefici del "VPD"

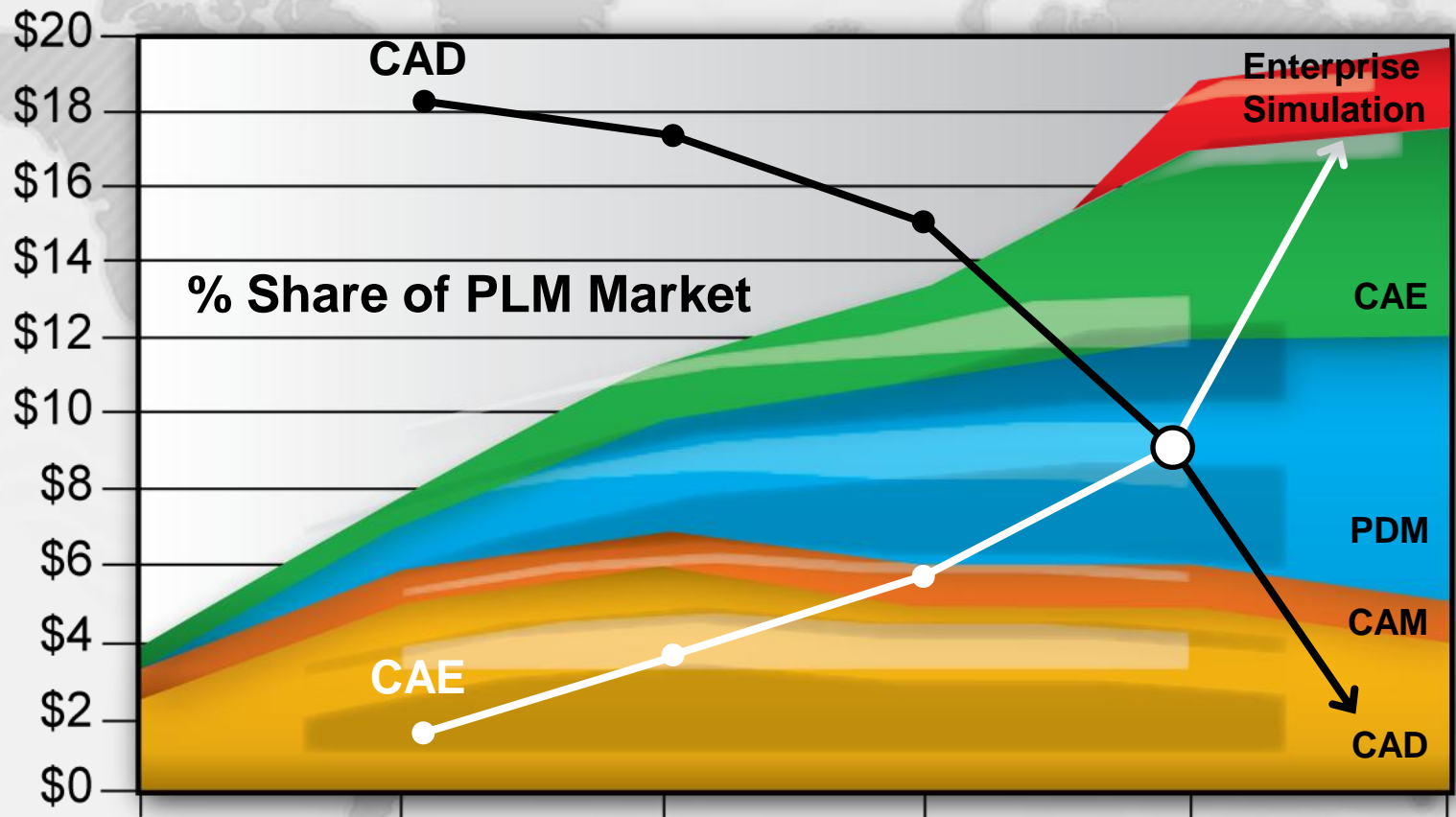Concept → Design → Validate → Assembly → Service

Risk

Information

- ➢ Anticipare la "Conoscenza del Prodotto"
- ➢ Incrementare i "Cicli di Progetto" migliorando Affidabilità e Qualità
- ➢ Ridurre le modifiche "all'ultimo minuto" !
- ➢ *Risparmio di Tempo e Costi rispetto ai metodi tradizionali*

MSC Addressing the Engineering Enterprise
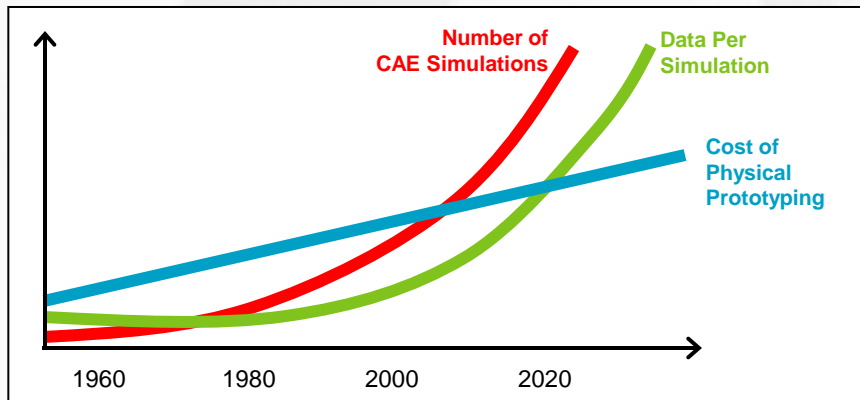## Accelerating CAE to Enterprise Simulation
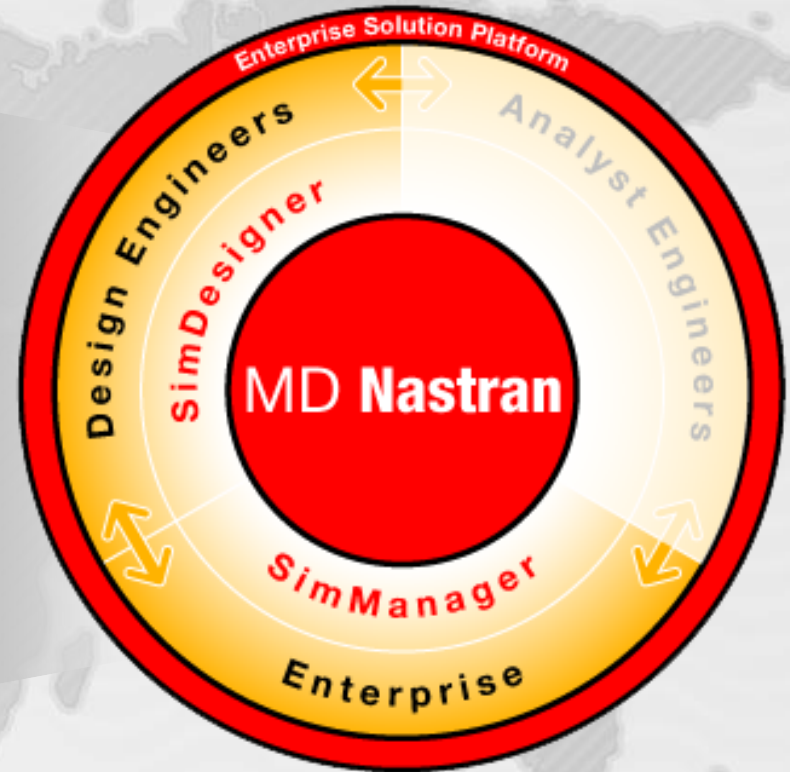

Source: Daratech

The Simulation Challenge
Demand for Productivity

⇧ **# of engineers performing simulation**

⇧ **# of simulations**

⇧ **Complexity of simulations**
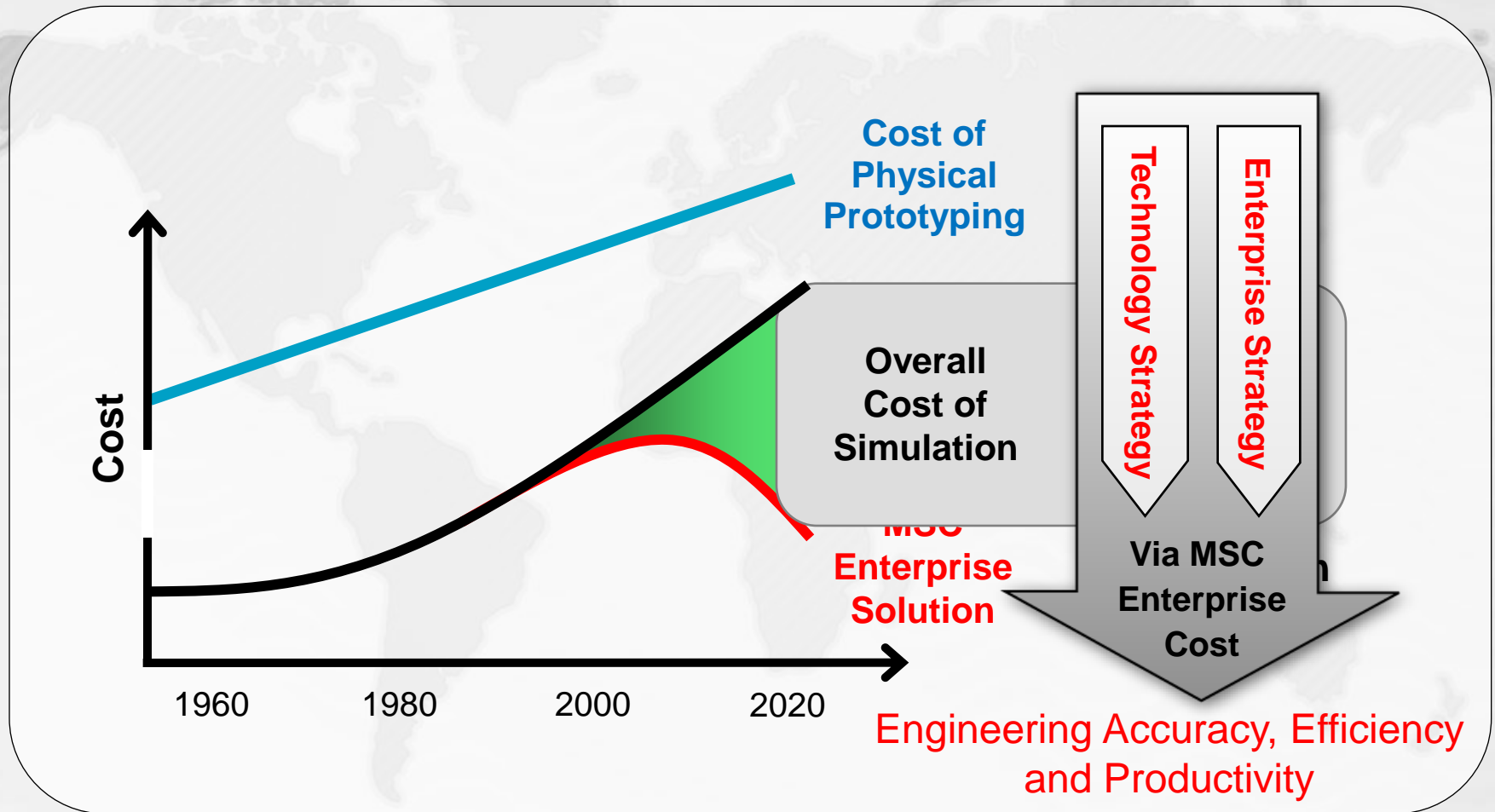
+ **Offshore Development and Integration**

Number of CAE Simulations

Data Per Simulation

Cost of Physical Prototyping

1960   1980   2000   2020

Source: BMW

Enterprise Solution Platform

Design Engineers

Analyst Engineers

SimDesigner

MD **Nastran**

SimManager

Enterprise

New MSC Strategy
Addressing the Enterprise Simulation Challenge

Cost of Physical Prototyping

Overall Cost of Simulation

MSC Enterprise Solution

Technology Strategy

Enterprise Strategy

Via MSC Enterprise Cost

Engineering Accuracy, Efficiency and Productivity

Cost

1960   1980   2000   2020

Evolution to Enterprise
Steps to Improved Productivity

Business Impact

Enterprise Simulation

Methods Development

Simulation Driven Engineering Business

Correlation & Validation

Predictive Analysis on System-level Models

Simulation Technology Introduction

Predictive Analysis on Components

Troubleshooting

1970   1980   1990   2000   2008
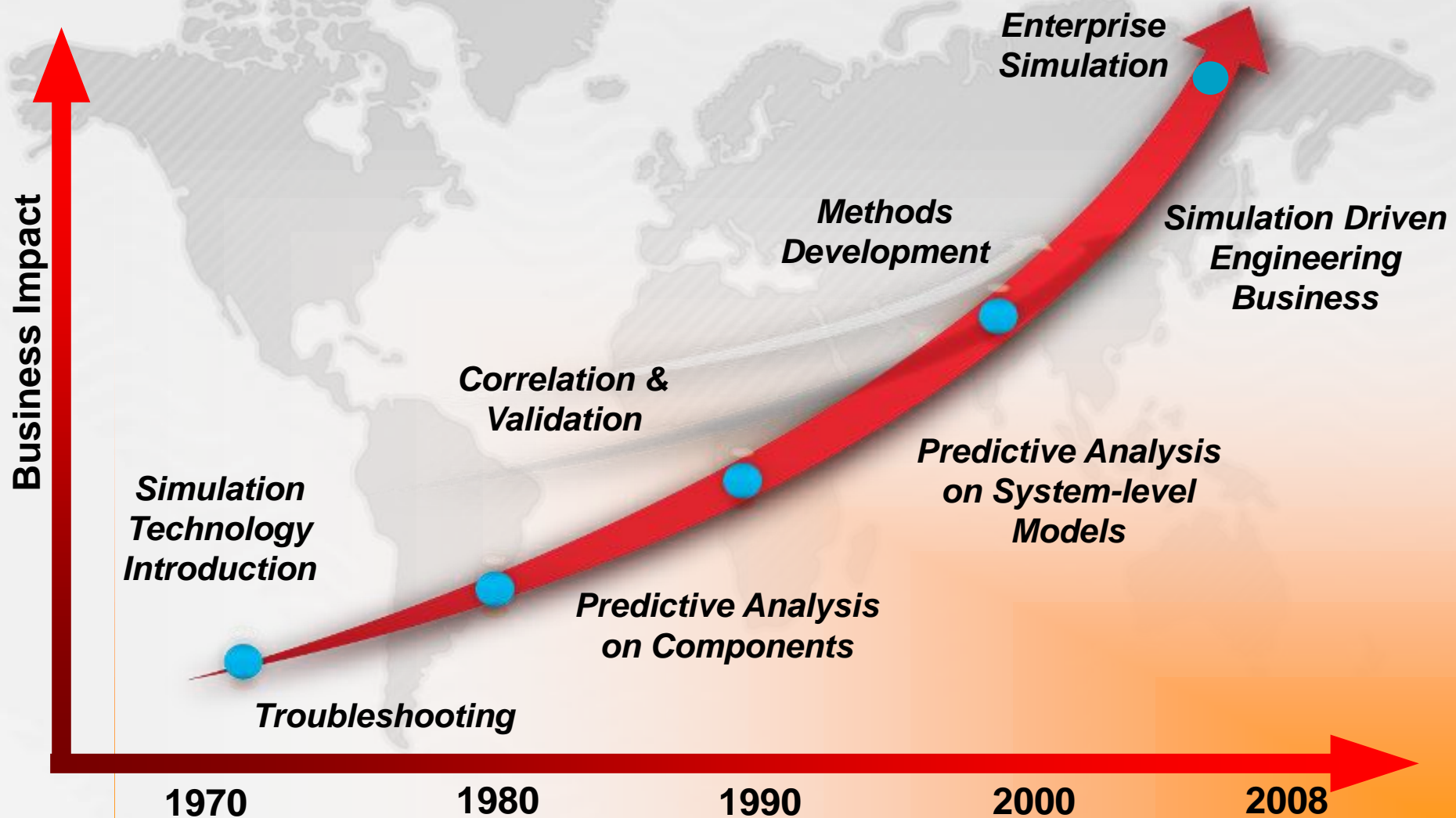
Today's Simulation Challenge
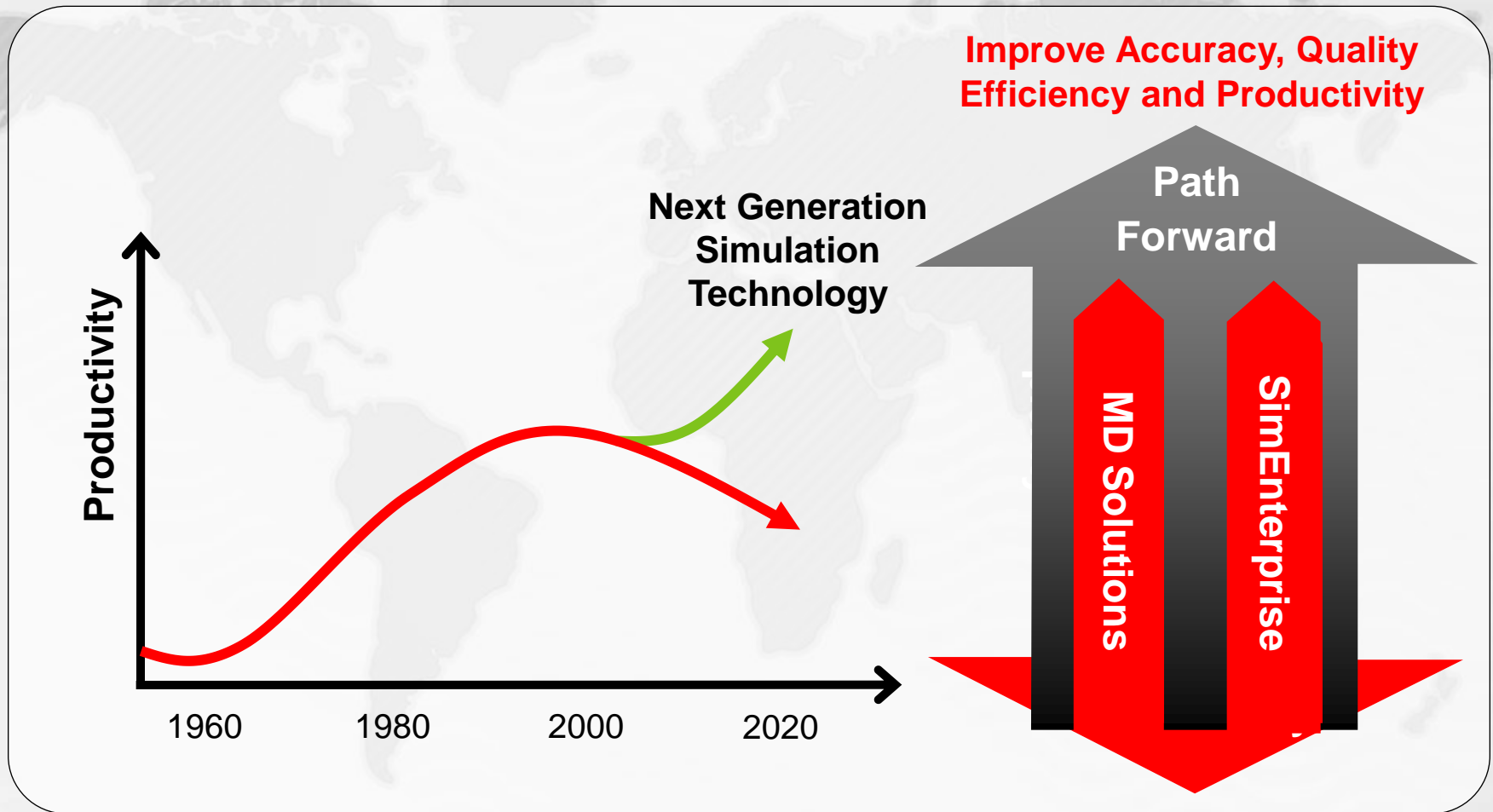## Barriers to Productivity

- **Non-integrated engineering applications**
  - Multiple proprietary systems
  - No common user paradigm

- **Data translation losses**
  - Incompleteness of CAD/CAE integration
  - Numerous data models
  - CAE discipline/tool translations

- **Enterprise limitations**
  - Numerous global data silos
  - Incomplete knowledge capture/re-use
  - Manually dependent processes

Expert Group 1 **Expert Group 2** **Expert Group n…**

Translation Barrier

Globalization Barrier
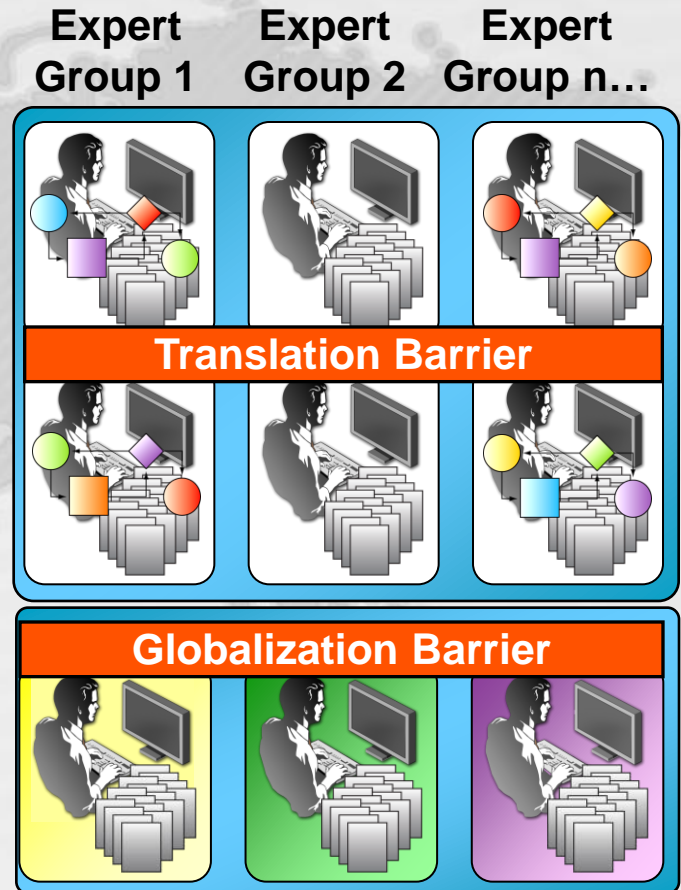
Nearly 100 CAE Technologies Deployed Per Corporation

MSC Strategy

Evolution of Efficiency = Integrated Enterprise

Improve Accuracy, Quality Efficiency and Productivity

Path Forward

Next Generation Simulation Technology

Productivity

1960   1980   2000   2020

MD Solutions

SimEnterprise

Evolution of Innovation

From	To	Barriers
• Product improvements	• **Rapid Innovation**	**Reliably access historical data (input data, test results)**
• Monolithic program funding	• **Shared program funding**	
• Single-point focus for new programs	• **Multi-point focus for new programs**	**Eliminate time consuming data and storage management**
• Isolated Developments	• **Interdependent development**	**Better manage security issues with sharing data and resources**
• Localized R&D teams	• **Globalized R&D teams**	**Automate iterative simulation and analysis runs**
• Centralized know-how	• **Knowledge capture and reuse**	
• Build to forecasted demand	• **Rapid response to customer expectations**	**Detect design problems earlier in the development cycle**

Overcoming these Barriers = Increasing Productivity and Innovation

Evolving from Tools to Enterprise

Point Tools	Enterprise Solutions
• Rigid - procedures for specific tasks	• All levels of services available on-demand
• Hard-coded - slow to respond to business changes	• Respond with speed and flexibility to a changing business environment
• Different models for different tools/needs	• Common, consistent data model across functional domains
• Requires translation and enforces barriers	• Open – no translation, supports collaboration for people & applications
• Focused on individual productivity, yet diminishes organizational effectiveness	• Enterprise focused, enhance organizational effectiveness

Traditional Tools

Enterprise Solution
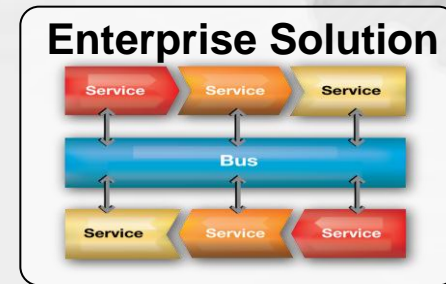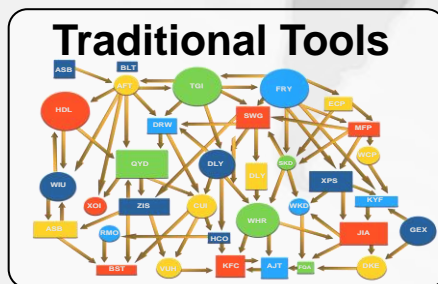
MSC Leadership
VPD Functionality and Future Vision

- **40 years building the foundation**

  - Largest provider of structural simulation software

  - Industry standard in automotive and aerospace

  - Embedded in every major global OEM and supplier

- **Leading the path forward**

  - Multi-discipline solver technology

  - Expert analyst all-in-one desktop

  - Ease of use templates for CAD

  - Best-practice process automation

  - Ease to use desktop solution

- **Superior user and enterprise value**

Thanks for your attention