

Global Product Development —

It's Context within the Product Lifecycle Management Marketplace

The *Aggregate Parts and Systems Design and Manufacture support software and Services*
Product-Market DEMAND OUTLOOK– *related to Parts Design – Manufacture – Assembly*



Source: “PLM Market Growth In 2007 : A First Look in 2008 – Exceeding Expectations” **CIMdata White Paper** , Ann Arbor, MI, March 2008, pg 2

* Includes PLM Tools , collaborative Product Definition management and Digital Manufacturing Systems product-market segments

3/26/2009

SRG Hampton U's Global Modeling and Sim RC Competitive Industry Analysis

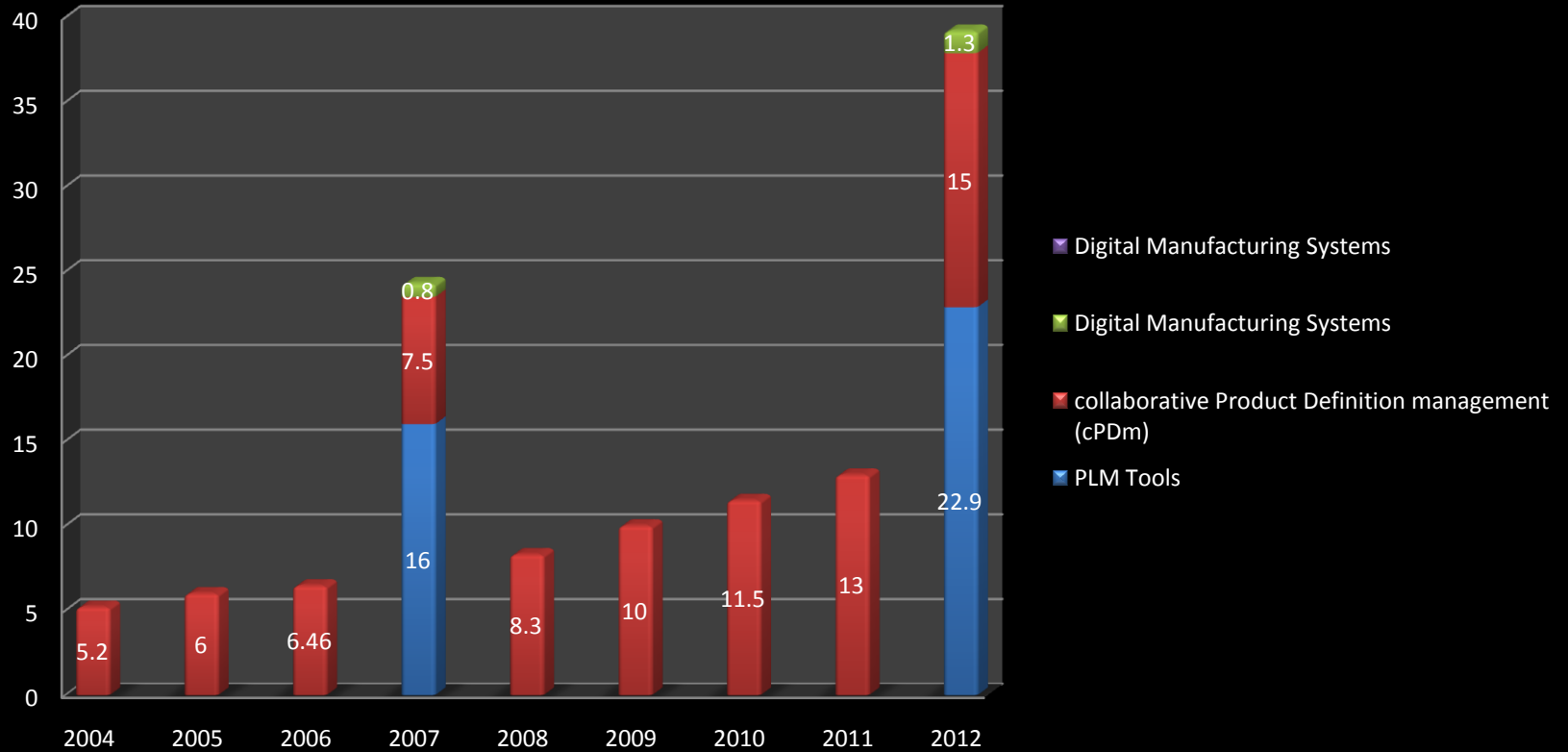
1

11/19/2009 rbsii

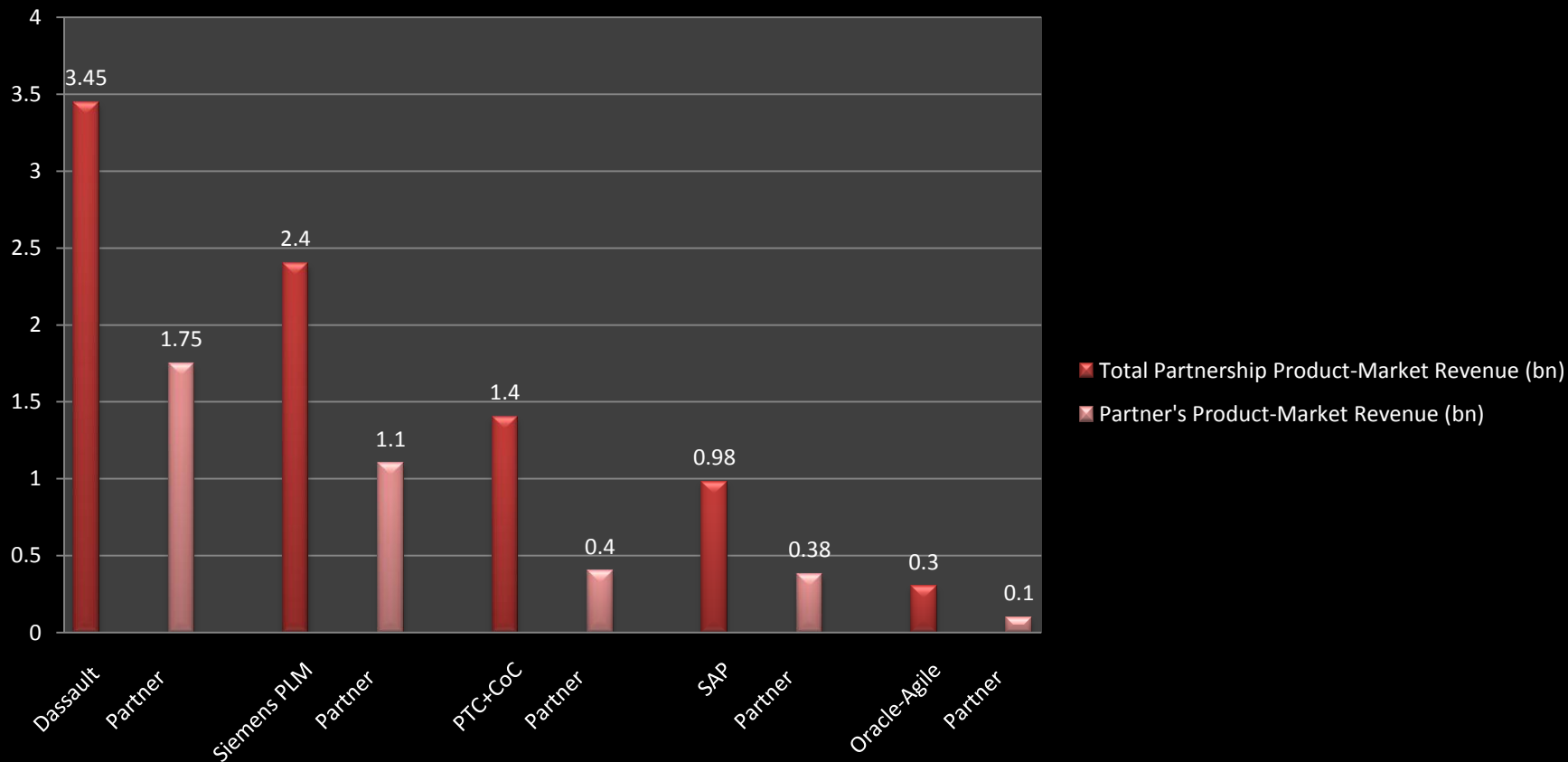
SRG Presentation Materials -- **Confidential** -- do NOT distribute without Copyright permission

2

Aggregate PLM Global Market (Reference Yrs) Forecast

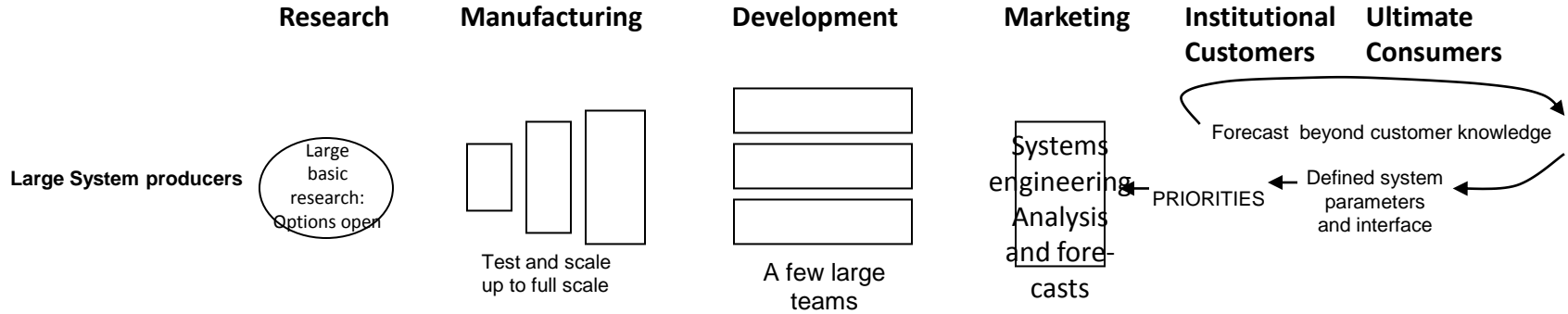


Global Product-Market -- PLM OEMs



Innovation Structures *(as adapted from Quinn et al. 1997)*

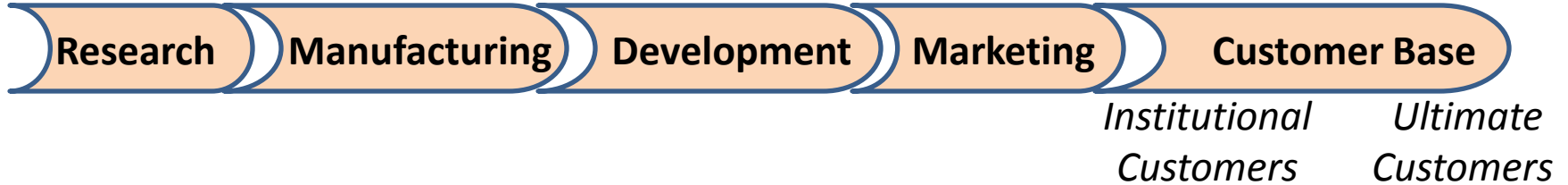
Reference Parts Manufacture Systems Infrastructure Industry Structure



IT -- Product Life Cycle Management (PLM) Suite Functionality Mapping

Or, *Translating further*, *see next page*

Quinn's Model Industry Structure --Functional Flow Diagram



Generic Industrial Structures -- New Product Development (*PLM informed*) Flow Diagrams – **Commercial Shipping**



Source: <http://usa.autodesk.com/industries/autotive-transportation/commercial-recreational-transportation>

Generic Industrial Structures -- New Product Development Flow Diagrams – **Commercial Automobile**



Source: <http://usa.autodesk.com/industries/automotive-transportation/automotive>

Table: Commercially Available (and dominant) Product Offerings by Competitive Product-Market Sub-segment

PLM Tools (Product Lifecycle Management Tools)	Auto-desk	Dassault SolidWorks Apps suite	Cadence	IBM (NET)	Seimens PLM	Synopsys	PTC = CoC	Mentor Graphics	SAP	Bentley	Ansys	T-Systems	Accenture	CSC	Intergraph	EDS Corp	Oracle-Agile	Open Text	HP Consulting
...																			
n																			
Collaborative Product Definition Management		TaskSolutions																	
..																			
n																			
Digital Manufacturing Systems		DFMXpress																	
n																			

Major Vendor's Approach to Sub-segment application R&D and Innovation

By Product Market Segment Market Leader

Intentionally Left Blank , Client Proprietary Information

Background

Abridged Glossary of Terms

AGV	Automated Guided Vehicles. Battery powered, automatically steered vehicles that follow defined pathways in the floor. They are used to move unit loads between load and unloaded station**
ASRS	Automatic Storage and Retrieval System. A storage system that performs storage and retrieval operations with speed and accuracy under a defined degree of automation**.
cPDM	Major Market Category of the overall Product Lifecycle Management Aggregated market that by CIMData’ definition, this category addresses managing the complete product or plant definition lifecycle, including all of the mechanical, electronic, software, and documentation components and the processes that are used during the lifecycle including in-service operation and maintenance. Sub-segments include: Comprehensive Technology Suppliers, Focused Application Suppliers (including visualization and collaboration, content and document management, etc.) and SI’s/Resellers/VARs.
CAD: definition)	Computer Aided Design (inclusive of: Part as well as product design; AND Tools and Fixtures
CAM: Planning (CAPP). as well as,	Computer Aided Manufacturing (export code). Includes: Production programming. Production machine and Assembly control
CAPP:	Computer Aided Production Planning
CAX:	any number of variations on Computer Aided manufacturing- application (or ‘x’) Areas
CAT	Computer Aided Testing
CLDATA	Central Location Data¹
CNC dedicated computer.	Computer Numerical Control. Numerical control machine-tools whose operation is based on a
cPDM work process and development of a	Collaborative Product Development (Collaborative Product Design) (CPD) is a business strategy, collection of software applications that facilitates different organizations to work together on the product. It is also known as collaborative Product Definition Management (cPDM)¹
Digital Manu- processes used to produce facturing environments used to product August 2008)	Digital Manufacturing (according to CIMdata) refers systems that support definition of the including supporting simulation and analysis of those processes and the manufacturing including production equipment and lines (see, The CIMdata’s, PLM Market Analysis Report)
DWF easily e-mailed to clients, vendors	Design Web Format (an Autodesk trademarked) format, is a format for digital files that can be

¹ As google.com search result performed 11/22/2009: see: http://en.wikipedia.org/wiki/Collaborative_Product_Development

Abridged Glossary of Terms -- *cont'd*

- Robotics simulation
- High-performance graphical visualisation
- Medical simulation
- Virtual-Reality (VR) application kernel
- Scientific visualisation

Robot	General-purpose, programmable machine possessing certain anthropomorphic characteristics, the most obvious of them is the mechanical arm.
Post Processor	A hardware device or software program that utilizes a set of instructions already in the software program or hardware device. For example, a machine may have a postprocessor that it utilizes in developing a product or a part used in a product.
PAC	Production Activity Control. To control and evaluate production activities. It interfaces with resources like AGV, ASRS, CNC machine-tools, and with applications like process planning. Ne of its roles is to download process instructions generated by CAPP applications and transfer them to processing resources in the shop floor (Browne et al. , 1992)
PDM	Product Definition Model: inclusive of process of creation, dissemination and use; and management of the product
PLM	Product Lifecycle Management (PLM). Not just a set of technologies, but a strategic business approach that applies a consistent set of business solutions in support of the collaborative creation management, dissemination, and use of product definition information cross the extended enterprise from concept to end of life . PLM is comprised of three (3) major Market Categories (PLM <i>Tools</i> , collaborative Product Definition management
NC	Numerical Controlled. Conventional NC programming codes: -G and -M (both java-based code(s) (ISO 6983)
STEP	(ISO 10303-1) ST andard E xchange of P roduct data
STEP-NC	an operation command for machine tools which have been standardized to substitute for G-code
<i>Tools</i>	Tools, segment of the Aggregated Product Lifecycle Management Market, (according to CIMdata, Inc.'2, 2008 Market Forecast Report, referenced here) refers to those applications used to create, analyze and simulate products and plants and associated documentation. Sub-segments include: mechanical computer-aided design (MCAD), simulation and analysis (S&A), non bundled numerical control (NC), electronic design automation (EDA), architectural, engineering, and construction (AEC), and other tools such as computer aided software engineering (CASE).

Key Concepts: *Cycle of Technology Development*

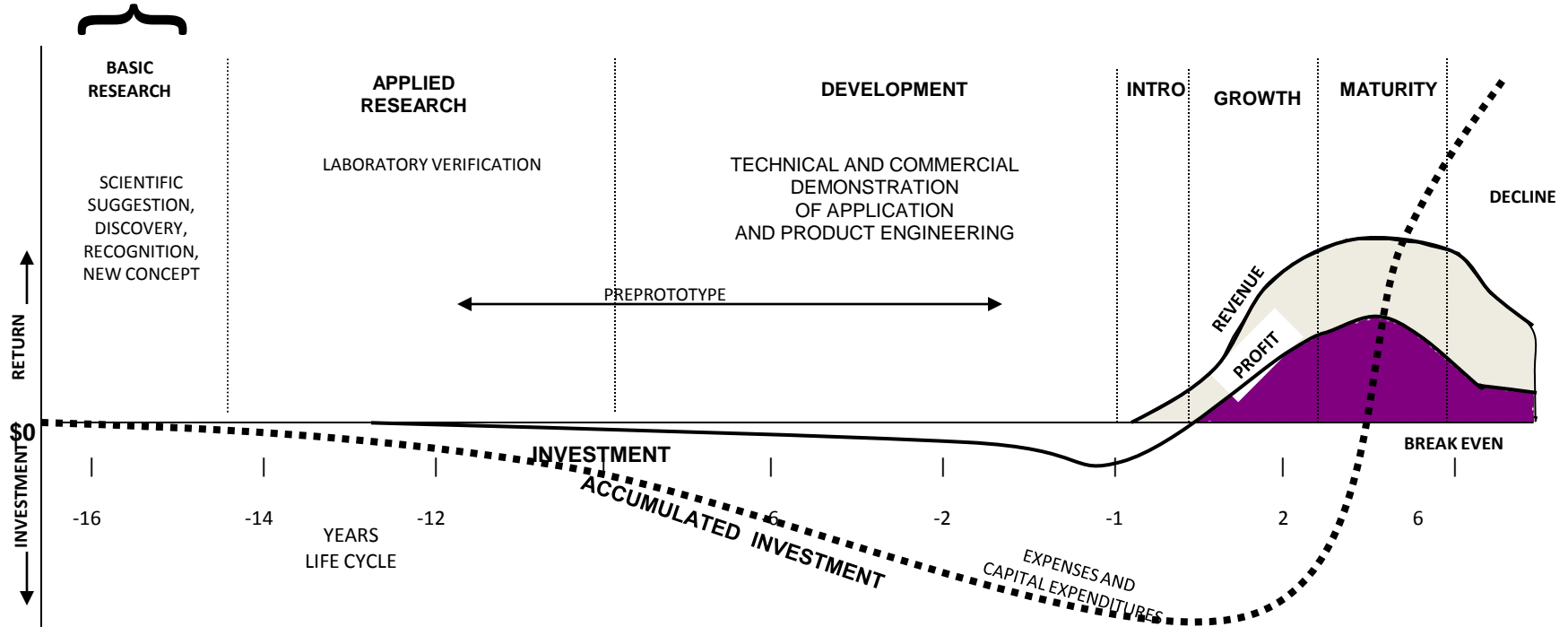


FIGURE 1. Technology Research and Development Process (adapted from Boos 1976; Renault 1996)