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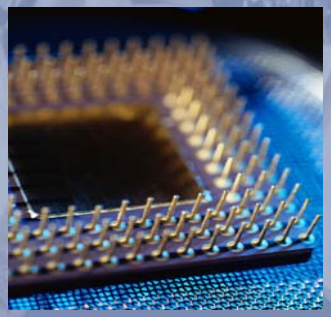
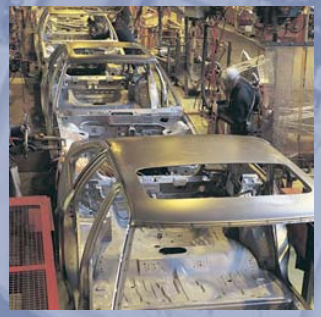
Can ISO, CMMI and Agile Co-exist?

Peter R. Hennessey

Solutions for the Real-Time Enterprise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Agenda

- Introduction to Brooks Software
- Challenges in Culture and Change
- Industry Trends and CMMI
- An Agile Experience
- Q&A

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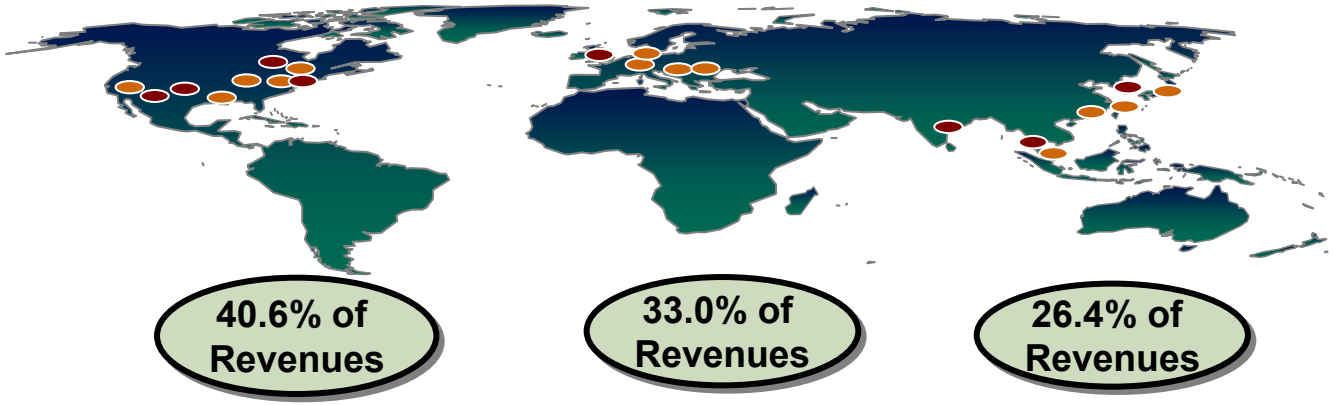
Brooks Software

- "In the fiscal year ended September 30, Brooks Software generated just under $120M in revenue out of the company's total revenue of $539.8M. This makes Brooks Software the largest MES software company and one of the 50 largest enterprise software vendors. "
  - Source: Bruce Richardson
  - AMR Alert January 7, 2005
- Brooks Software
  - 11 major acquisitions (1998-2003) into a consolidated, real time solution footprint
  - Organic business growth over 50% in 2004
- Largest Discrete Plant Operations Software Supplier
  - $120+ million in software revenues -- profitable and growing
  - $30+ million in R&D investment – strong product pipeline
  - Deep domain expertise: 660 software professionals



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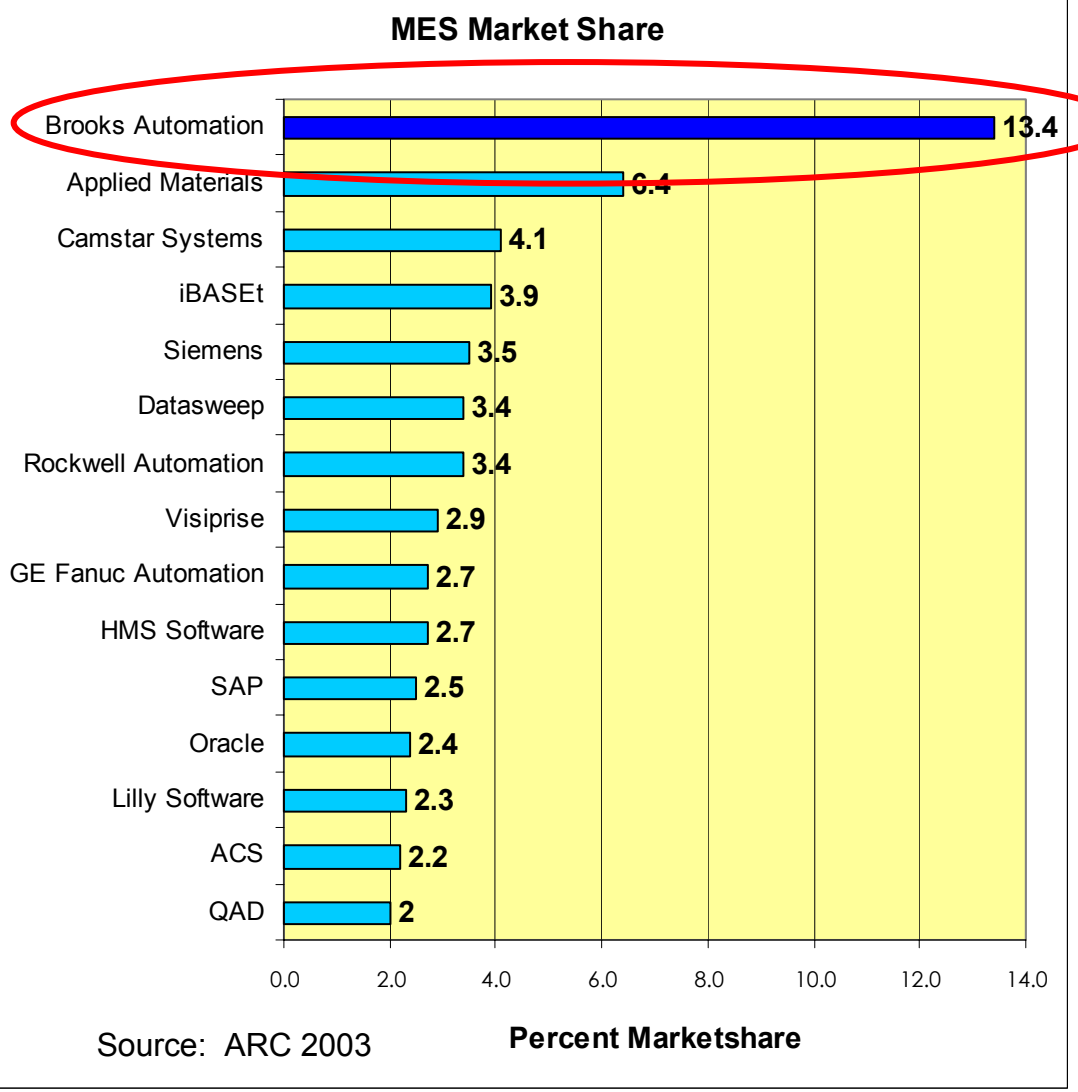
Brooks Software: Discrete Market Leader



Source: ARC 2003

- 51 of Industry Week's Top 100 manufacturers
  - 10 of top 10 Semiconductor
  - 6 of top 10 automotive
  - 6 of top 10 A&D
  - 10 of top 10 electronics
- Largest Marketshare in…
  - MES (AMR '03)
  - Plant Operations (Gartner '04)
  - MES (ARC '03)
  - Discrete SCE (ARC '03)
  - Factory S/W (Dataquest 04)
- Largest Passive RFID Supplier
  - Multiple 1,000+ reader installations

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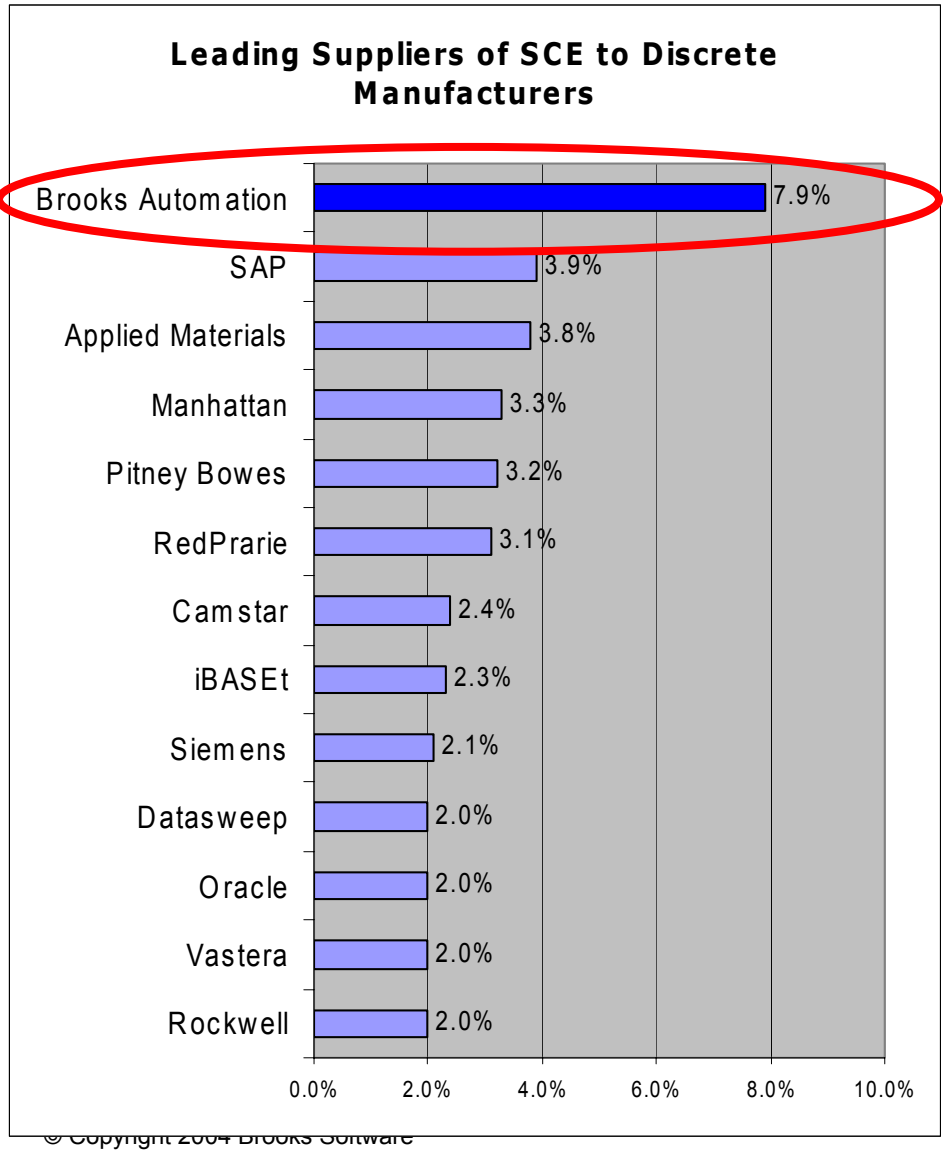
Brooks Software: Discrete SCE Market Leader



SCE Overall Market Sizing

- $3.2 billion market
- 38.7% licenses
- $5.2 billion market in ‘08
- 9.7% CAGR
- 33.5% licenses

Discrete SCE Market Sizing and Growth:

- $878.8 million in 2003
- 26.8% growth in 2003
- $1,621 million forecasted in ‘08
- 13% CAGR forecasted through ‘08

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Product Operations

- 4 Software Product Groups (Tier 1)
  - Logistics and Simulation
  - Manufacturing Execution Solutions
  - Equipment Engineering Solutions
  - Automation Robotics Systems and Components
- Specialized Products (Tier 3)
  - Support customer specific requirements
  - Specialized for market segments
- 7 Software Development Centers
  - Chelmsford, MA USA
  - Seoul, Korea
  - Salt Lake City, UT USA
  - Phoenix, AZ USA
  - Toronto, Canada
  - Reading, United Kingdom
  - Chennai, India

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So what is Process?

A **Product** = A Result of a **Process**

Quality = Measure of a process and how effectively people can execute it to meet business goals

"Great software doesn't come from tools, it comes from people."

Larry Constantine "Peopleware"

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It Starts With Strategy

- Gartner… “companies should not try to implement business processes or cultural and IT changes that are not aligned in a viable strategy”
  - Knowledge Reports Feb 2005

- Software Process Improvement (SPI) is a Supporting Strategy for the Execution of Brooks Software’s Core Strategies

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What are the Challenges?

- The only thing that lies between us… and dramatic success is … ***organizational friction***…

  Tom Peters Re-Imagine! Business Excellence in a Disruptive Age

- Effective Software Process Improvement reduces the Friction in the value chain to deliver products and services that meet customer needs!

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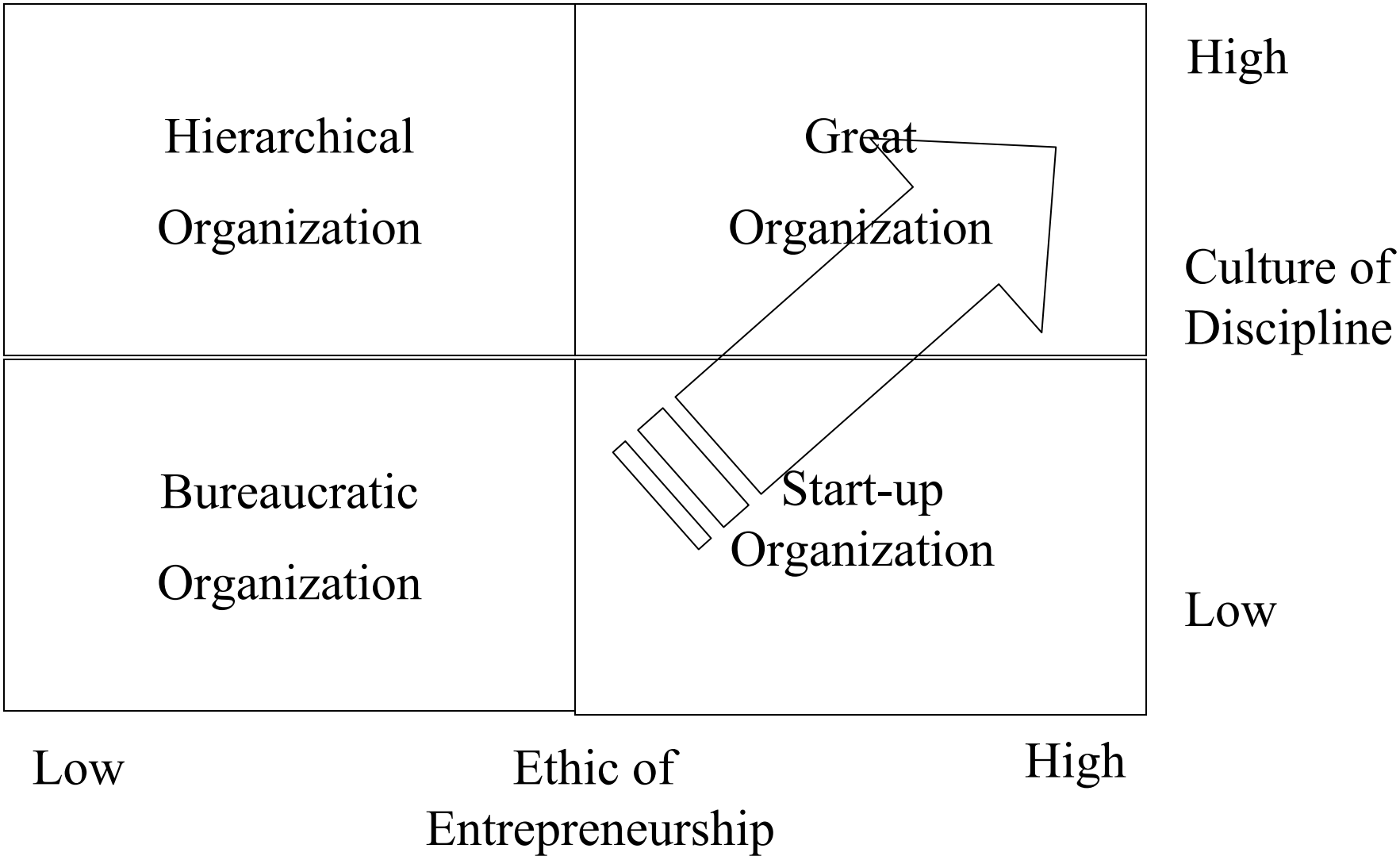
The Good-to-Great Matrix of Creative Discipline



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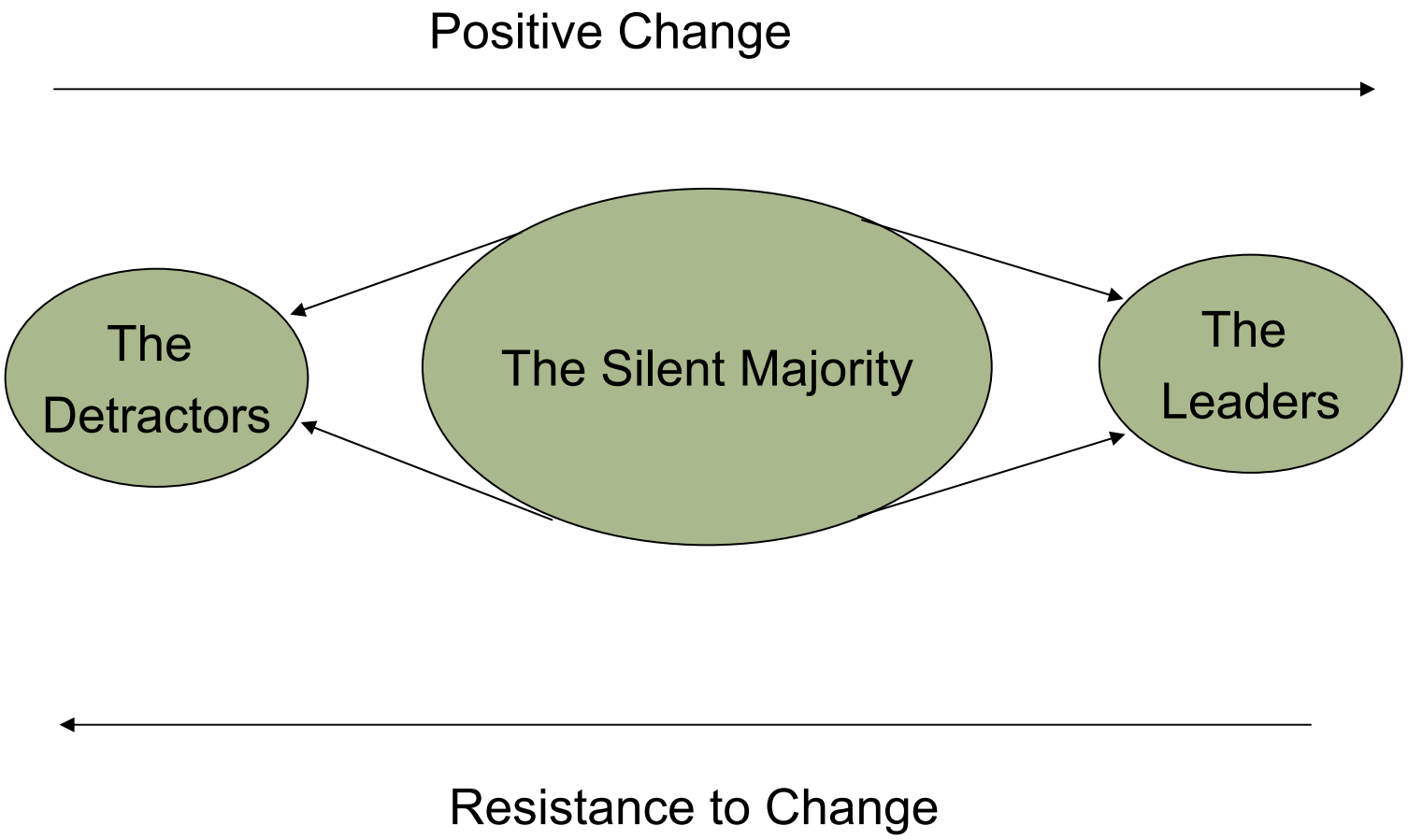
The Battle for Change



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Pushing the Flywheel

- Get the flywheel of incremental improvement rotating as fast as possible
  - Grow leaders, remove detractors
- Problems become opportunities
- At some point the momentum of continuous improvement kicks in your favor…
- Sustainable change comes about only by a cumulative and collaborative effort

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The Soft Skills are Hard

- Cross Functional Teaming
- Common Language and Conceptual Alignment
- Understand the Cultural Paradigm
- Influence Skills
- Thinking Styles and Sensitivity Screening
- Effective Listening
- Negotiation
- Conflict Resolution

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Cross Functional Teaming

- An organizational teaming structure that works cross functionally to define best practices and process improvement.
- A mechanism to align like roles across the global team.
- An enabler for implementing process and quality improvements locally.
- Examples:
  - Root Cause Analysis Teams for creative problem solving
  - Steering Teams
  - Process Teams
  - Infrastructure Tool Selection and Deployments

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Industry Trends

ISO, CMMI and Agile

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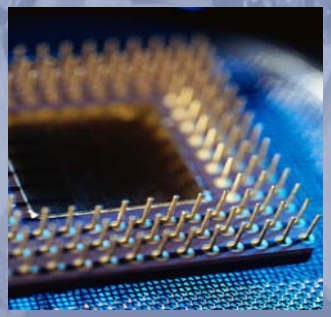
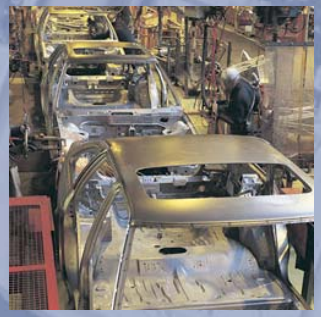


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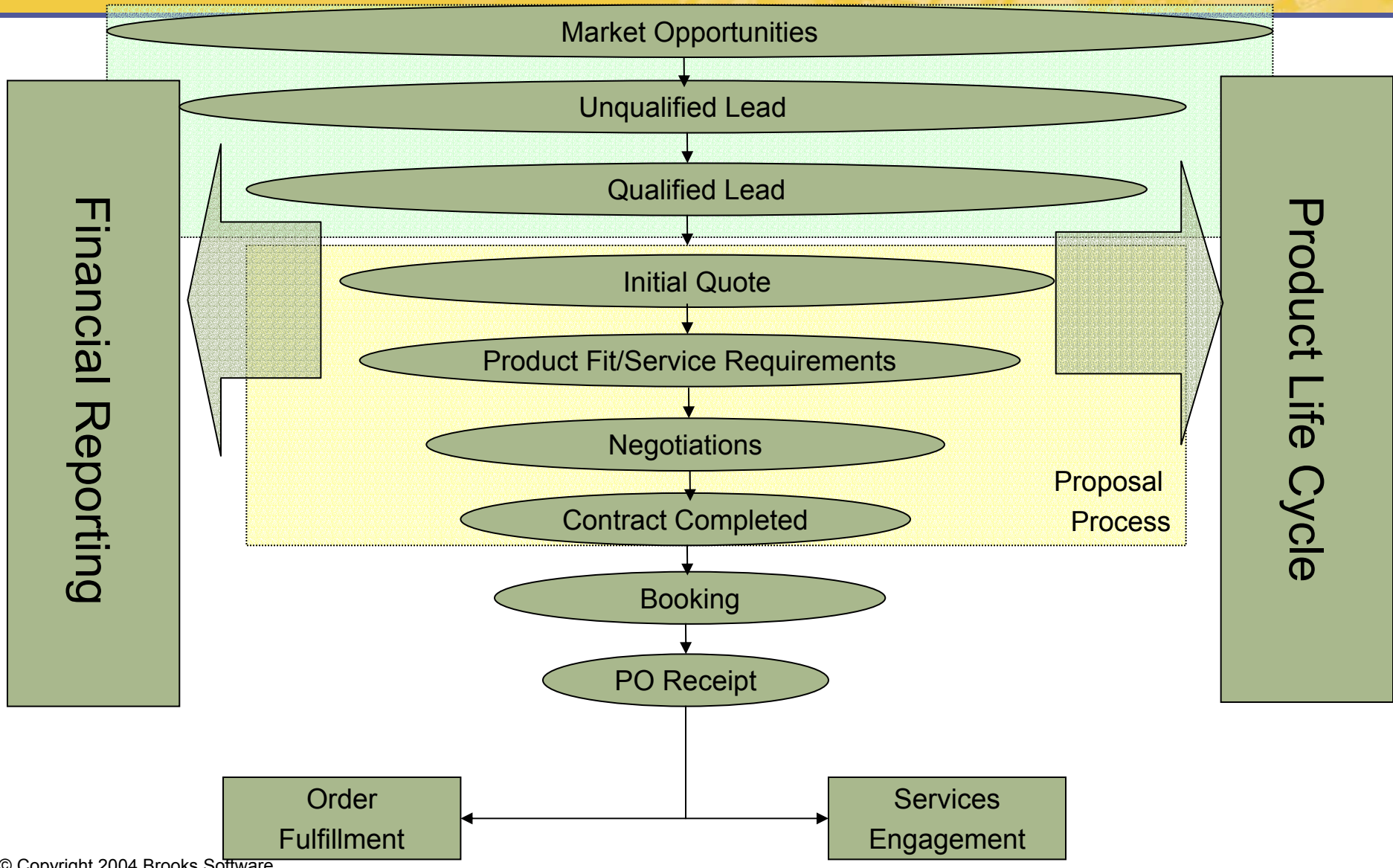
What drives Commercial Software Companies?



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Industry Drivers in Software Process Engineering

- Process Frameworks
  - ISO 9001:2000
  - The SEI Capability Maturity Model Integrated (CMMI)
- Product Planning and Requirements Processes
  - Pragmatic Marketing
- Engineering Processes
  - Unified Modeling Language (UML)
  - Agile Methods and eXtreme Programming (XP)

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ISO 9001:2000

- An ISO family of Quality Standards
- Widely adopted industry certification applicable to all business.. Seal of Approval
- Establishes the Corporate Quality Framework for Brooks Software
  - Quality Management System
  - Internal and External Assessment Processes
  - Management Review Process
  - Root Cause and Correct Action

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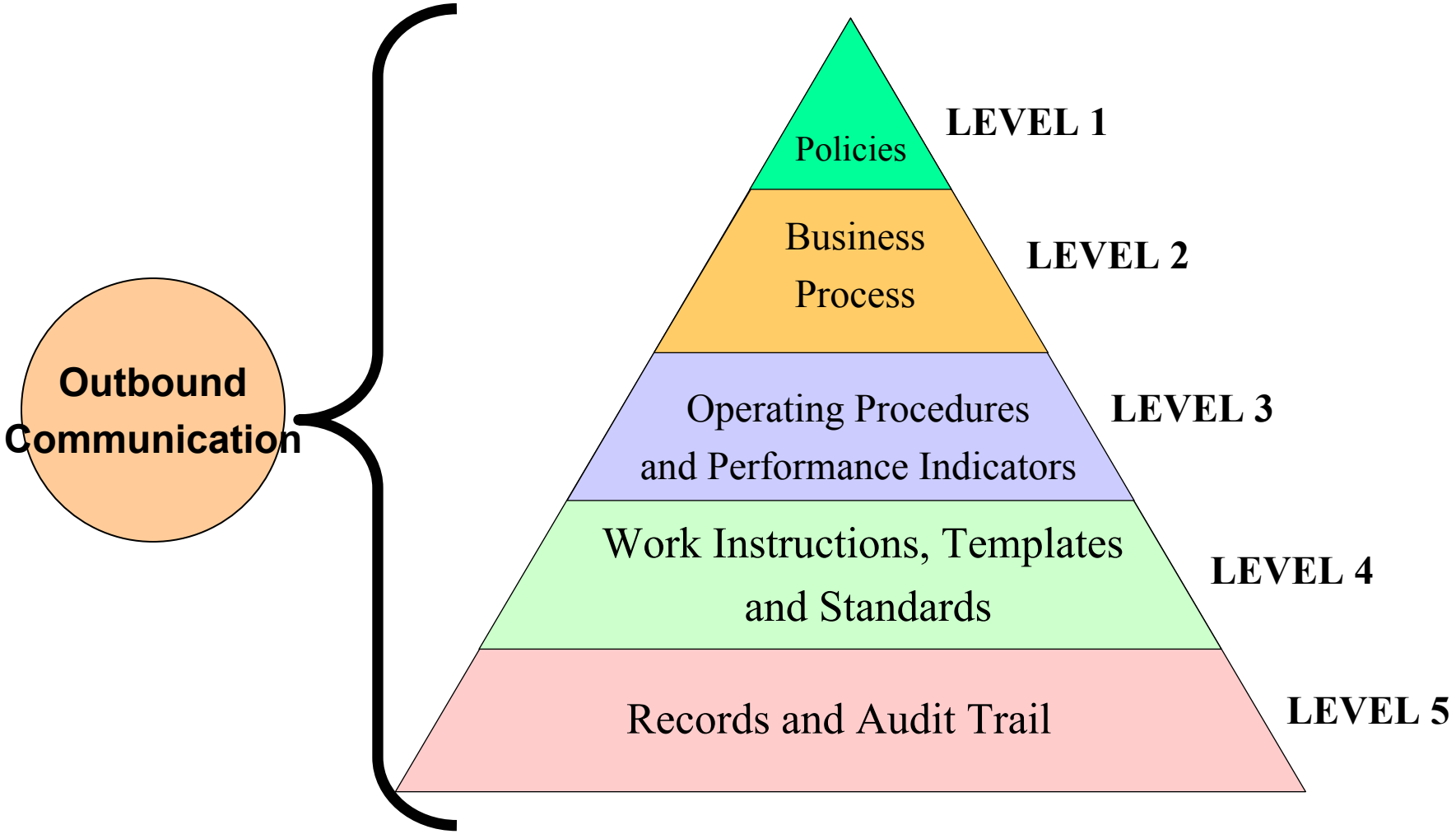
Document Structure



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What Is The Capability Maturity Model?

- A framework for software process improvement which measures the capability of an organization against an industry benchmark
- A knowledge base of best practices
- Defines benchmark capabilities in Key Process Areas (KPA) for Software Companies
- It is NOT a methodology, it allows tailoring of underlying development methods such as Agile, RUP and traditional waterfall.

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What are we trying to achieve with CMMI?

- Use CMMI as a tool to continuously improve the Brooks Software Software Product Life Cycle (SW-PLC) Processes to enable…

A culture of discipline with an ethic of entrepreneurship

Core premise of Good to Great companies, Jim Collins Good to Great 2001

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CMMI Foundation

- Project Planning
- Project Monitoring and Control
- Requirements Management
- Configuration Management
- Product and Process Quality Assurance
- Measurement and Analysis
- Verification/Peer Reviews
- Other L3 KPA's

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Building the Right Thing

- Brooks Software Product Planning utilize the concepts espoused by Pragmatic Marketing.
- These define elements of
  - Product Planning
  - Project Contract
  - Product Launch
- Key Concepts
  - Listen and understand your customers problems
  - Define the value proposition and ROI
  - Understand user roles and goals
  - Communicate to Development
    - Focus on solving customer problems
  - Whole product launch and communication

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Unified Modeling Language

- Used within the Design and Construction Phases of the SW-PLC for Engineering Specifications
- Provides an industry standard modeling language for Software Systems
  - Visualization of the Problem and Solution domains
- Foundations from
  - Object Modeling Technique (OMT) (James Rumbaugh)
  - Use Case Analysis (Ivar Jacobsen)
  - Booch Methodology (Grady Booch)
- Driven by Rational and the Object Management Group (OMG)
- The notational semantics for the Rational Unified Process (RUP)
- Supported by many tools

Unified Modeling Language

- ***What can you Model with UML?***
- UML defines types of design formalisms, a common language for Software Design
- Divided into three categories:
  - Structural: Model types that represent static application structure
  - Behavioral: Model types represent different aspects of dynamic behavior
  - Deployment: Model types represent ways you can organize and manage your application modules.

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Some Key Agile Concepts

- Small Releases and Iteration increase the cycles of learning
- Ongoing Validation
- Continuous improvement and Refactoring
- Customer Advocacy
- Architectural Standards

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Small Releases

- Iterate through baselines, update and validate on short cycles
  - 2 – 4 weeks
- Increase Build Frequency and Cycles of Learning

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Ongoing Validation

- Agile teams focus on validation of the software at all times.
- Develop functional tests that fulfills the requirements reflected in the stories.
- Customers or customer advocates provide acceptance tests that enable them to be certain that the features they need are provided.

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Continuous Improvement

- Refactoring is embedded in the process
- Agile teams improve the design of the system throughout the entire development process

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Continuous Integration

- Agile teams strive to integrate and build the software system as frequently as is feasible
- This keeps all stakeholders and developers on the same page, and enables very rapid progress
- Perhaps surprisingly, integrating more frequently tends to eliminate integration problems that plague teams who integrate less often.

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Customer Focus

- Customer Advocacy is paramount
- An agile project is steered by dedicated individual(s) who are empowered to determine requirements, set priorities, and answer questions as the developers have them.
- Communication improves and drives efficiency in the levels of documentation

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Project Standards

- Architecture and Coding Standards allow focus on project goals instead of technology
- Minimizes technology risk

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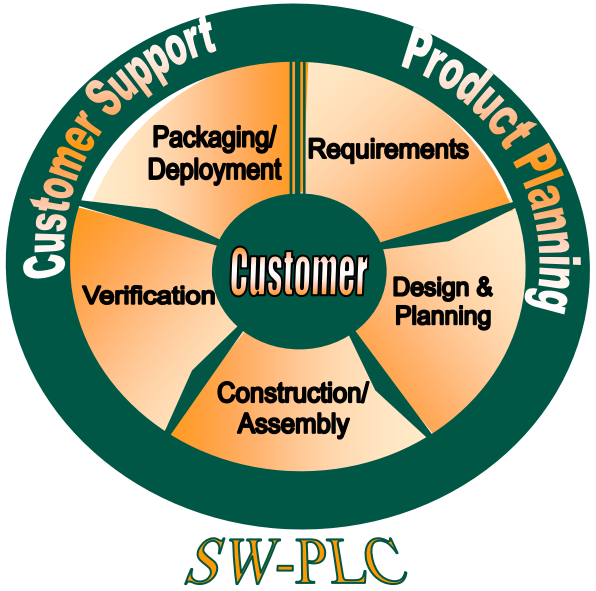
Brooks Software Product Life Cycle

The Software PLC (SW-PLC) process

- A business process model that groups major activities and deliverables for the management and development of software products

The elements of the Brooks SW-PLC process are:

1. Product Planning
2. Requirements
3. Design and Planning
4. Construction/Assembly
5. Verification
6. Packaging/Deployment
7. Customer Support



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Software Product Life Cycle

- Software Product Life Cycle (SW-PLC) business process foundation …
  - Centered on the Customer
  - Governed by Strategy, Goals, and Plans
  - Facilitates customer communication and assessment
  - Common product/project vocabulary and structure for Project Execution
  - Whole Product focus – Concept to Obsolte
  - Embedded Capability Maturity Model Key Process Areas (KPAs)
  - Emphasis on cross-functional teaming
  - A unified foundation for sharing of best practices
  - Aligns with ISO Product Realization requirements

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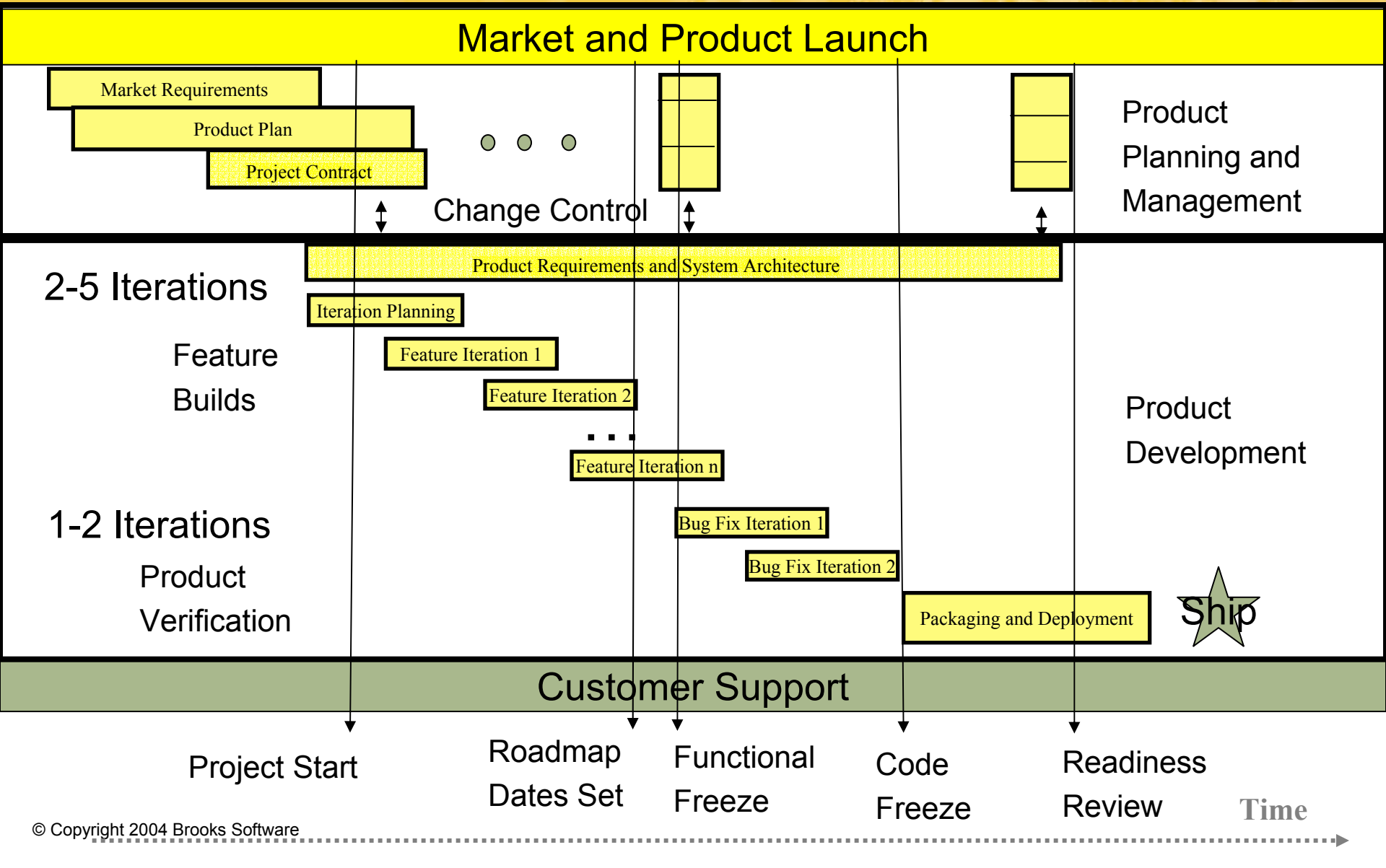
Agile within the PLC Framework



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ADP
3 Week Iteration Cycle (Generic)

Day	Activity	
	Iteration N-1	Iteration N
1 : Monday	Construct - Build & Install Kit	Plan - Initial story elaboration
2 : Tuesday	Verify - Dev build validation PE usability validation Fix issue & rebuild (Optional)	Plan - Start task estimation
3 : Wednesday		Refine - Revise stories (Optional) Based on previous iteration results
4 : Thursday		
5 : Friday	Plan - Update stories in RTS Iteration Completed	Finalize - Enter iteration stories into RTS Commence task estimation tracking
6 : Monday	Verify - Handoff iteration to QA	Construct - Story development Code, Test & Check-In
7 : Tuesday		
8 : Wednesday		
9 : Thursday		
10 : Friday		
11 : Monday	Plan - PE developing iteration stories for ***next*** iteration	Construct - Story development Code, Test & Check-In
12 : Tuesday		
13 : Wednesday		
14 : Thursday		
15 : Friday		

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Thank You

Feedback always welcome

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Thank You!

Questions

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