

Software Product Management

2018-01-18

Outline

- **Context and Challenges, Benefits, Solutions and Drawbacks**
- Definitions, Goals, Traditional Activities
- Product Manager Characteristics; Views and Product Alignment
- Best Practices for SW Product Management
 - Goals and Approach; Analysed Frameworks
 - Identification of Key Software Product Management Activities
 - Process Reference Model for Software Product Management
 - Process Reference Model Integration with ISO/IEC 12207
 - Industry Validation
- Product Roadmapping
- Final Video/Discussion; Q&A; Exam Preparation

Context and Challenges₁

- Software development organizations increasingly confronted with need to develop or enhance their software as a '**product**'
- “Traditional” project-oriented software development approaches reach limits when faced with the *need to develop and maintain software as a 'product'*
- Transition towards product-oriented software development:
 - Implies process and organizational changes throughout the whole organization
 - Requires integration of various additional stakeholders with diverging interests, views, and perceptions into the development and maintenance processes
 - Stresses the importance of business, market, but also (again) technological considerations

Context and Challenges₂

- Specific challenges of product-oriented software development:
 - Coverage of the needs and expectations of existing but also potentially new customers through products and services
 - Alignment of products and services with specific markets
 - Management of existing and acquisition of new customers, including expansion to new markets
 - Handling of increasing product functionality, variability, and complexity
 - Selection of an appropriate product architecture
 - Reuse of existing solutions to provide product variants
 - Alignment of product enhancements with the product portfolio
 - Coordination of interdependent or interacting software products
 - Coordination of software products as part of a other products or systems, e.g. mechatronic systems

Benefits of Product Management

- **Organizations with professional, mature product management:**
 - Grow faster and generate higher earnings compared to competitors
 - Employ a more market- and customer-orientated product development
 - Deal more intensively with customer problems and have better knowledge of the needs and processes of customers compared to competitors
 - Are more innovative than competitors with respect to technical solutions, services, and market presence
 - Master the various phases of the innovation process and are capable to combine strategically important basic developments with customer-specific adaptations
 - Launch more successful products in a shorter time span than competitors

[Kairies2008]

Solutions and Drawbacks

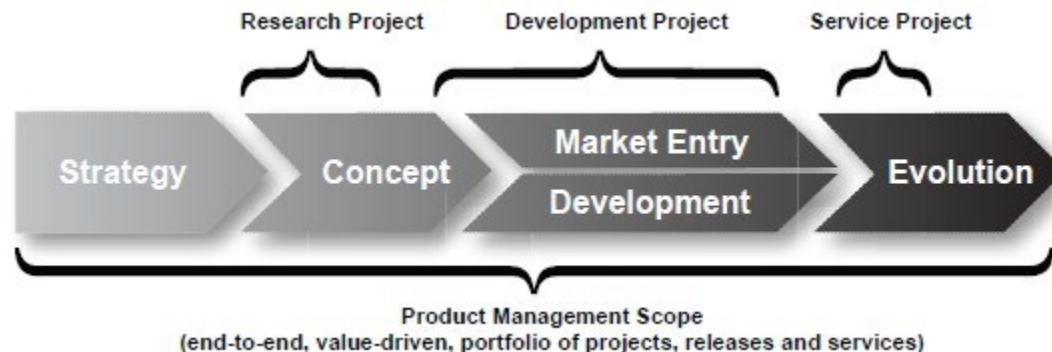
- Approaches to tackle such challenges (e.g. software product line engineering) focus on product-orientation and reuse, but typically have a focus purely on engineering/development aspects
- Process improvement approaches, on the other hand, generally lack explicit or detailed support of product management activities
- Linking **strategic and economic product aspects** (typically derived from or related to overall **business goals** of the organization) with core **software engineering** activities (e.g. requirements eng., architecture eng.) is required for full exploitation of such approaches
- **Product management** is generally considered to act as a **mediator** between **business and product related goals** and **software life cycle activities**, ... but often fails to deliver promised outcomes

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Definitions₁

- **Product management** is the control and coordination of all relevant areas internal and external to the organization, with the goal to sustainably optimize product success. Within an organization this encompasses especially Development, Production, Marketing, Sales, and Logistics. [Kittlaus and Clough 2008]
- **Product management** is the discipline and business process governing a product from its inception to the market or customer delivery and service in order to generate the largest possible value to a business. [Ebert 2009]



- Planning, organizing, executing, and controlling of all tasks, which aim at a successful conception, production, and marketing of the products offered by a company. [Pohl et al. 2005]

Definitions₂

- In a Software Product Line Engineering (SPLE) context – **Product management** "aims to define the products that will constitute the product line as a whole" [van der Linden et al. 2007]
 - Identification of major commonalities and variability among products
 - Planning of the product portfolio
 - Major economic analysis of the products
- **‘Product’** = an application denoting
 - Software or software-intensive system
 - Service, or
 - Solutionoffered to customers. [Sabisch 1996]

Product Management Goals

- Make a major contribution to entrepreneurial success by integrating the development, production, and marketing of products that meet customer needs.
 - Observe sales markets
 - Plan, control, and monitor product lifecycle [Pohl et al. 2005]
- Deliver the right products at the right time for the right market. [Ebert 2009]
- Keep balance in the following disciplines
 - Sales & Marketing
 - Strategy & Product Management
 - Technical & R&D Management [Ebert 2006]

Traditional Activities₁

- **Market and Product Strategy Definition**
 - Concretization of company objectives and strategies defined by corporate management
- **Product Definition**
 - Development, rating, and selection of new product ideas
 - Concretization of ideas by defining the major features of the envisioned products
- **Market Introduction**
 - Identification of suitable distribution channels
 - Announcement and supply of new products to potential customers

[Sabisch1996]

Traditional Activities₂

- **Product Support**
 - Conserving and enhancing the potentials of already introduced products
- **Product Controlling**
 - Monitoring and guiding the product management process
- **Market Observation**
 - Customer groups
 - Current and potential competitors
 - Trends of prices, buying and usage patterns, and technologies
 - Barriers to market entry or exit (e.g. legal restrictions, high investments)

[Sabisch1996]

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Product Manager Characteristics

- Knows all users of the product
- Not attached too closely to one specific user of the product
- Highly experienced in the application domain of the product
- Knows the services accompanying the product
- Ability to mediate in conflict situations
- Ability to properly handle customers and users as well as suppliers
- Takes full responsibility for the product
- Defends the product team against external criticism
- Treats the product team as a competent partner
- Is prepared to make unpopular decisions in favor of the product
- Sets achievable technical goals
- Communicates with the product team on a regular basis
- Does not overestimate the own expertise
- Monitors market developments
- Does not interfere in technical affairs
- Is prepared to reject unfitting customer requests and requirements
- ...

[Rising2003]

Views and Product Alignment

- Product management has to consider various different views
 - Problem view – required functions
 - Solution view – technical solution to the problem
 - Economic view – costs vs. benefit of the product
 - Competitive view – competing products or companies
- Products Alignment Options [Hofbauer and Schweidler 2006]
 - Market alignment
 - Supply markets (technologies, COTS components, platforms, etc.)
 - Sales markets (market segments, distribution channels, buying patterns, etc.)
 - Market appearance (innovator vs. me-too, differentiation characteristics, etc.)
 - Unique selling proposition (develop and improve respective characteristics)
 - Strategic alignment
 - Strategies (Business strategy, Portfolio strategy, Reuse strategy, etc.)
 - Alignment with company's core competencies
 - Alignment with product program (ensure balance in the product portfolio)
 - Life cycle alignment
 - Planning of product innovation and variants
 - Discontinuation of products, removal from portfolio

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Goals of Work and Approach₁

Goal:

... to enable and support the transition of software development organizations towards product- or product-line-oriented software development by providing guidance for establishing product management as the key intermediary between business-related aspects and core software engineering activities

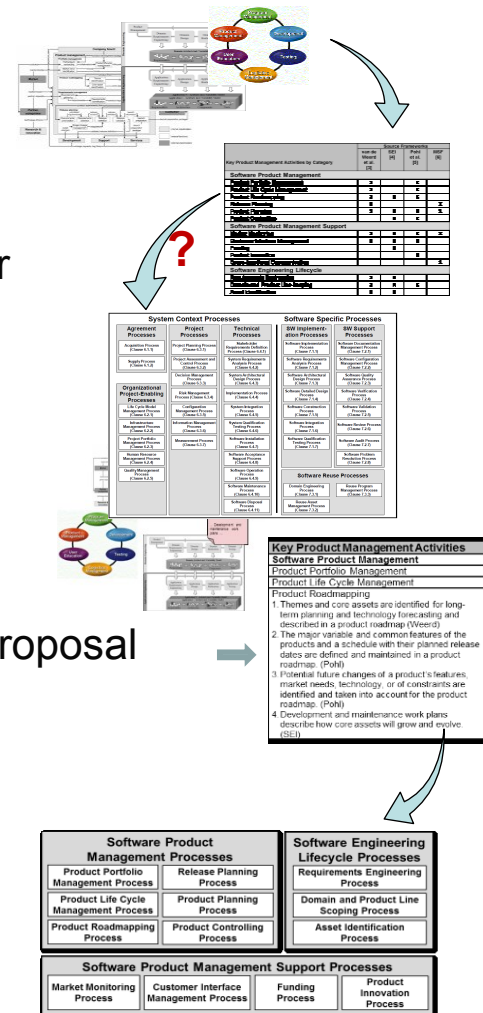
Approach:

... to support the establishment of software product management within software engineering organizations by providing a best practice process reference model for product-oriented software engineering:

- Identification of key product management aspects and practices
- Integration of product management practices with established software engineering best practice models, in particular *ISO/IEC 12270 on Software Life Cycle Processes*
- Conformance with existing process assessment and improvement approaches, in particular *ISO/IEC 15504 on Process Assessment*

Goals of Work and Approach₂

- Analysis of existing product-oriented models and frameworks and identification of key product management activities and outcomes
- Establishment of traceability of these outcomes to respective source models and frameworks
- Comparison with ISO/IEC 12207 and identification of directions for integration
- Extraction and compilation of software product management best practices from selected product-oriented models and frameworks
- Distillation of the identified best practices as first candidates for 'process outcomes' for an envisioned process reference model
- Consolidation and refinement of processes and outcomes into a proposal for a Product Management Process Reference Model (PM-PRM)
- Integration of proposed PM-PRM with ISO/IEC 12207
- Validation and enhancement of PM-PRM through real-world applications
- Development of a respective Process Assessment Model (PAM) and assessment method

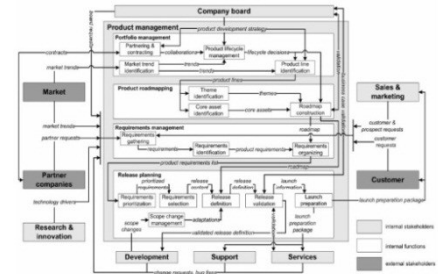


BPs for SW Product Management

Analyzed Frameworks

Reference Framework for Software Product Management

- I. van de Weerd, S. Brinkkemper, R. Nieuwenhuis, J. Versendaal, L. Bijlsma



Framework for Software Product Line Practice, Version 5.0

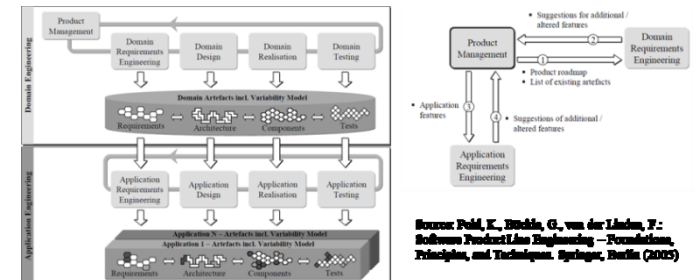
- Software Engineering Institute (SEI)



Source: http://www.sei.cmu.edu/productlines/frame_report/index.html

Software Product Line Engineering Framework

- K. Pohl, G. Böckle, F. van der Linden



Source: Pohl, K., Böckle, G., van der Linden, F.: *Software Product Line Engineering – Foundations, Principles, and Techniques*. Springer, Berlin (2005)

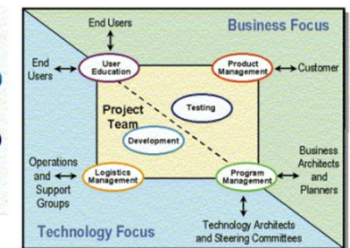
Microsoft Solutions Framework (MSF)

- Microsoft, Microsoft Developer Network (MSDN)



Source: <http://msdn.microsoft.com/MSDN/60779125.aspx>

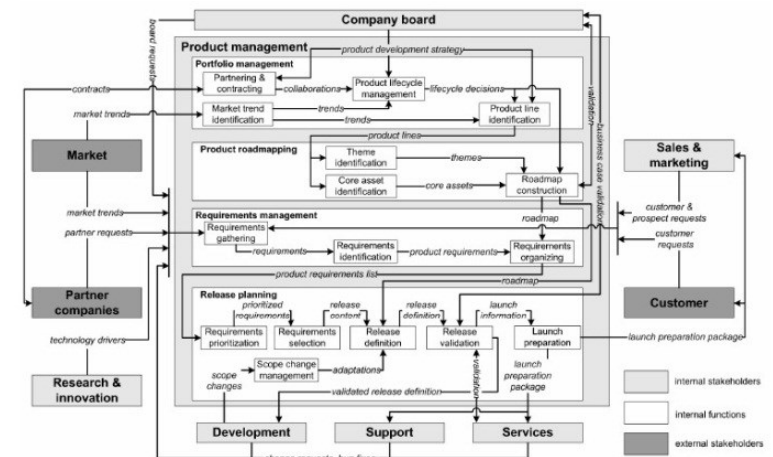
Etc.



Reference Framework for SPM₁

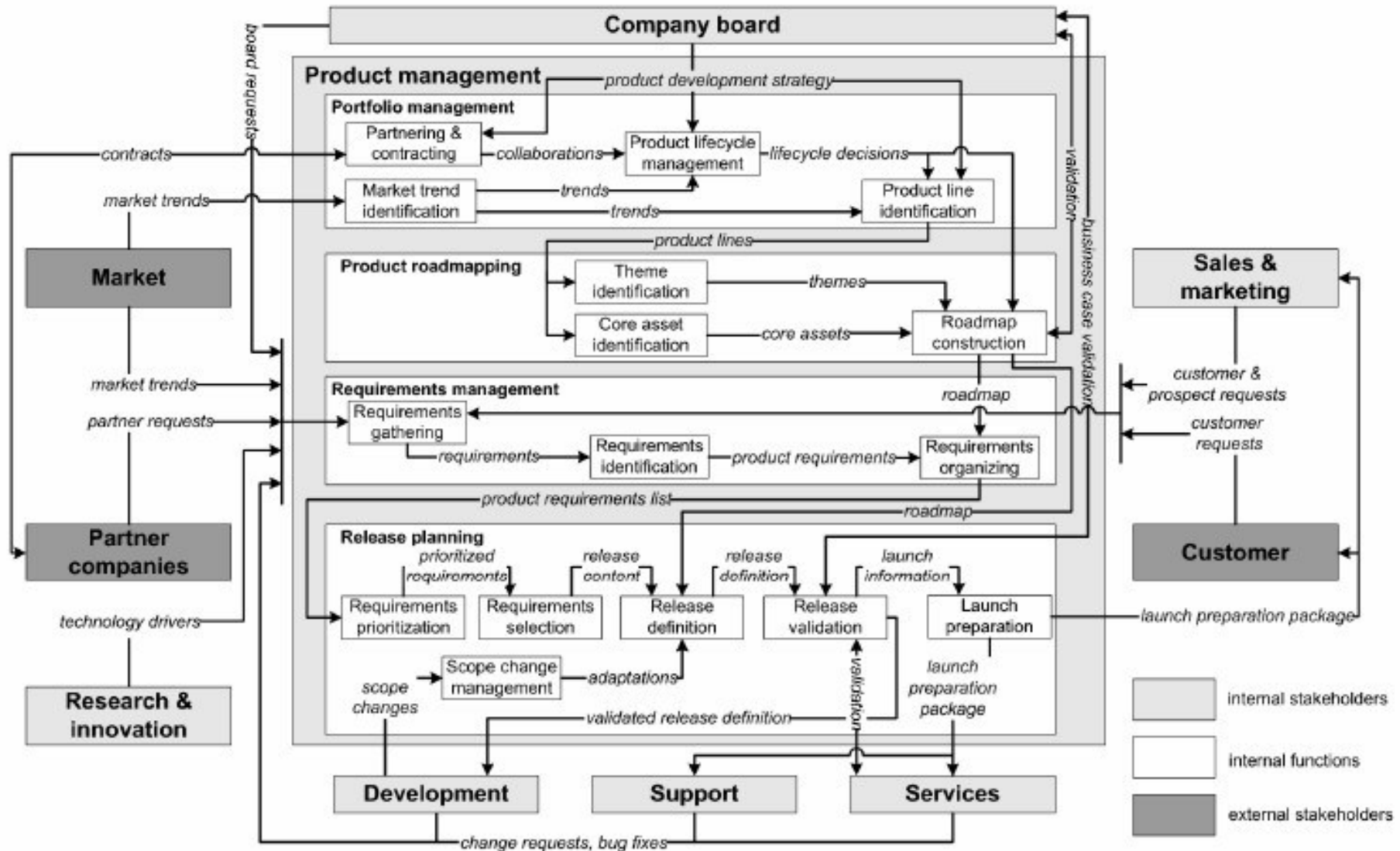
■ Reference Framework for Software Product Management

- Authors: I. van de Weerd, S. Brinkkemper, R. Nieuwenhuis, J. Versendaal, L. Bijlsma
- Based on literature research and field interviews with product management practitioners in the Netherlands
- Four product management *process areas* with *sub-functions*
- Relationships and information flows between internal and external stakeholders
- Validated in a case study



[Weerd et al. 2006]

Reference Framework for SPM₂



Reference Framework for SPM₃

▪ **Process Area: Portfolio Management**

- Decision making about set of existing products
- Introduction of new products considering market trends and product development strategy
- Decision making about product life cycle
- Establishment of partnerships and contracts
- In case of product lines: Product line identification
- Ensure portfolio value, balance, and strategic alignment, right number of products

▪ **Process Area: Product Roadmapping**

- A roadmap provides a layout of the product releases over a time frame of three to five years in terms of expectations, plans, themes, and core assets for the product
- Establish consensus about a set of needs, required technologies, necessary features, and schedules
- Forecast, plan, and coordinate technology developments

Reference Framework for SPM₄

- **Process Area: Requirements Management**

- Manage requirements of a project's products and product components
- Identify inconsistencies between those requirements and the project's plans and work products
- Gathering, identifying, and revising incoming requirements and organizing them by keeping in mind dependencies, existing core assets, product lines, and themes

- **Process Area: Release Planning**

- Make software product available to be obtained by its users
- Prioritization of requirements and assignment to specific releases
- Management of release scope
- Construction and validation of a release requirements document

Framework for SPL Practice

- Framework for Software Product Line Practice, V 5.0
 - Source: Software Engineering Institute (SEI)
 - Captures information on successful product line practices
 - Covers technical and organizational areas
 - Based on studies and direct collaboration with practitioners

■ Software Engineering Practice Areas

- Architecture Definition
- Architecture Evaluation
- Component Development
- Mining Existing Assets
- Requirements Engineering
- Software System Integration
- Testing
- Understanding Relevant Domains
- Using Externally Available Software

■ Technical Management Practice Areas

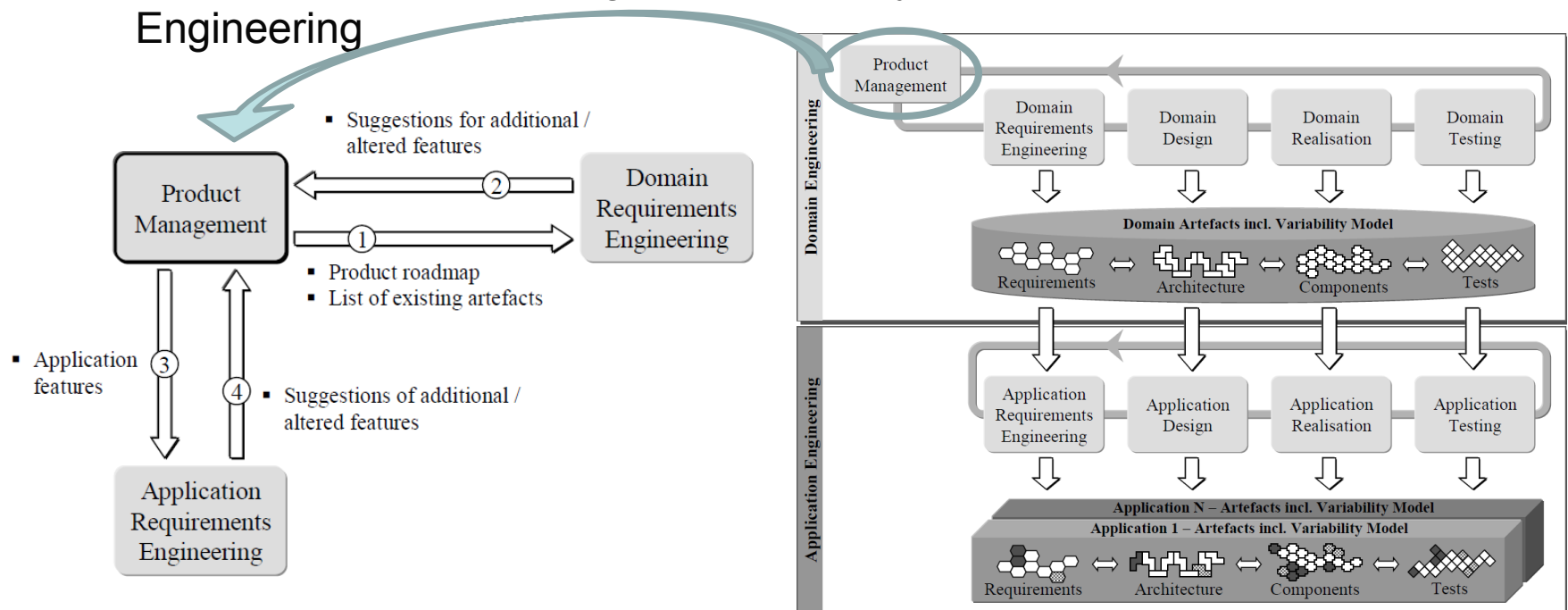
- Configuration Management
- Make/Buy/Mine/Commission Analysis
- Measurement and Tracking
- Process Discipline
- Scoping
- Technical Planning
- Technical Risk Management
- Tool Support

■ Organizational Management Practice Areas

- Building a Business Case
- Customer Interface Management
- Developing an Acquisition Strategy
- Funding
- Launching and Institutionalizing
- Market Analysis
- Operations
- Organizational Planning
- Organizational Risk Management
- Structuring the Organization
- Technology Forecasting
- Training

SPL Engineering Framework

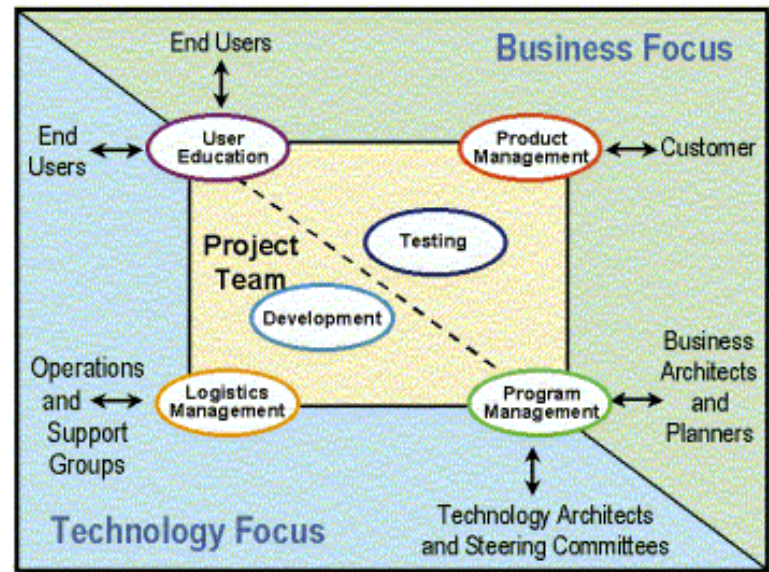
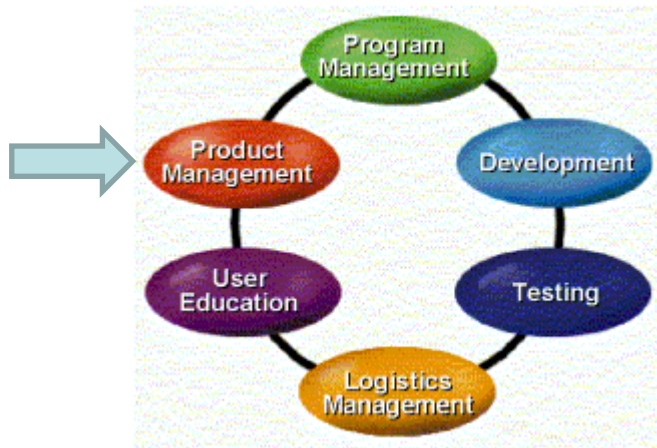
- Software Product Line Engineering Framework
 - Authors: K. Pohl, G. Böckle, F. van der Linden
 - Captures concepts of traditional product line engineering
 - Differentiates between *Domain Engineering* and *Application Engineering*
 - Considers product management as a key sub-process of Domain Engineering



[Pohl et al. 2005]

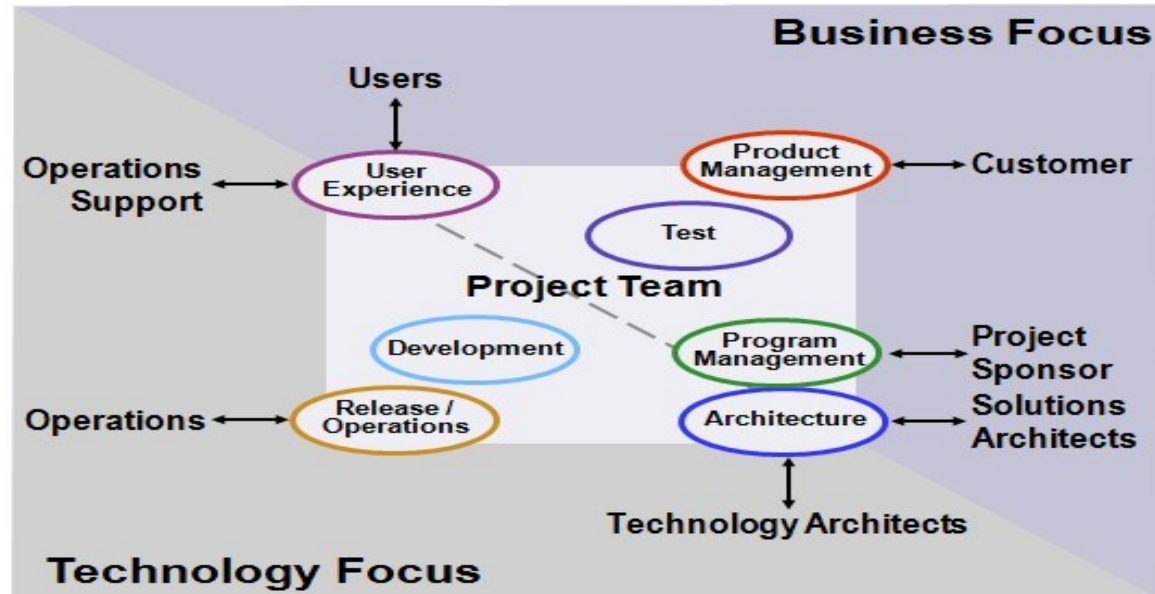
Microsoft Solutions Framework₁

- Microsoft Solutions Framework (MSF)
 - Intended to support organizations in successfully delivering information technology solutions and technology projects
 - MSF Team Model defines interdependent multi-disciplinary roles and responsibilities
 - Product Management is one of these roles



Microsoft Solutions Framework₂

MSF v4 Advocacy Groups Focus



Role	Main Project Goals
Product Management	Satisfied customers
Program Management	Delivery within project boundaries (budget, time, feature set)
Development	Delivery according to product specification
Testing	Release after solving all problems
User Education	Increased user satisfaction and performance
Logistics Management	Smooth deployment and installation

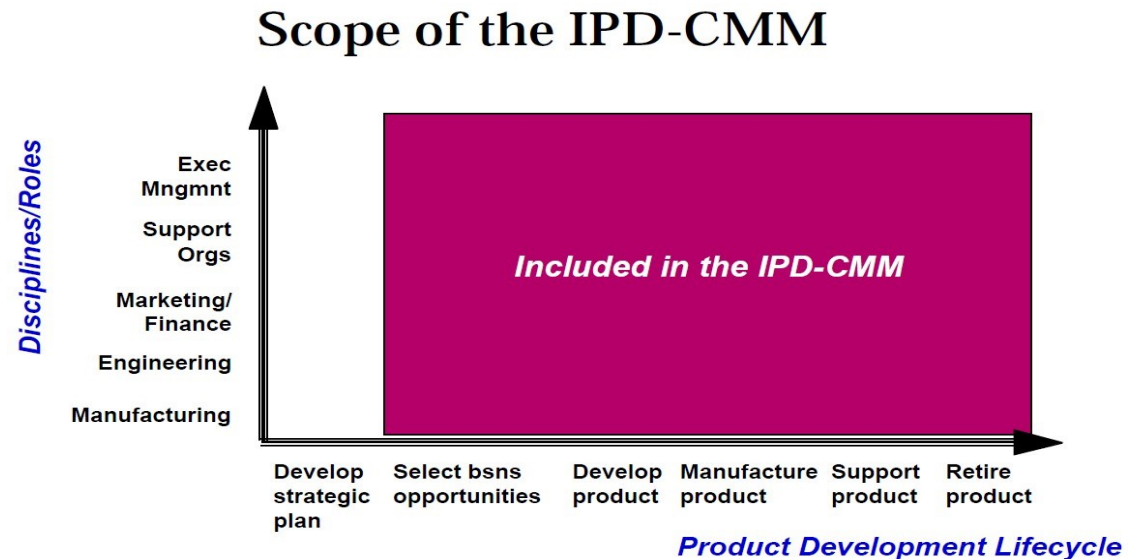
Microsoft Solutions Framework₃

- Product Management Role:
 - Product management describes the role of the “advocate of the customer” within the team
 - Product management represents the customer against the team, but also the team against the customer
 - Product management is responsible for a team-wide project vision and the focus of the team on the next sub-goal to achieve
 - The management of customer expectations is an important task of this role
 - Product management is the driving force when it comes to decision making “features vs. schedule”
 - The understanding of the product economic goals within the team and how to realize it through the project is established and further developed by this role

Other Frameworks₁

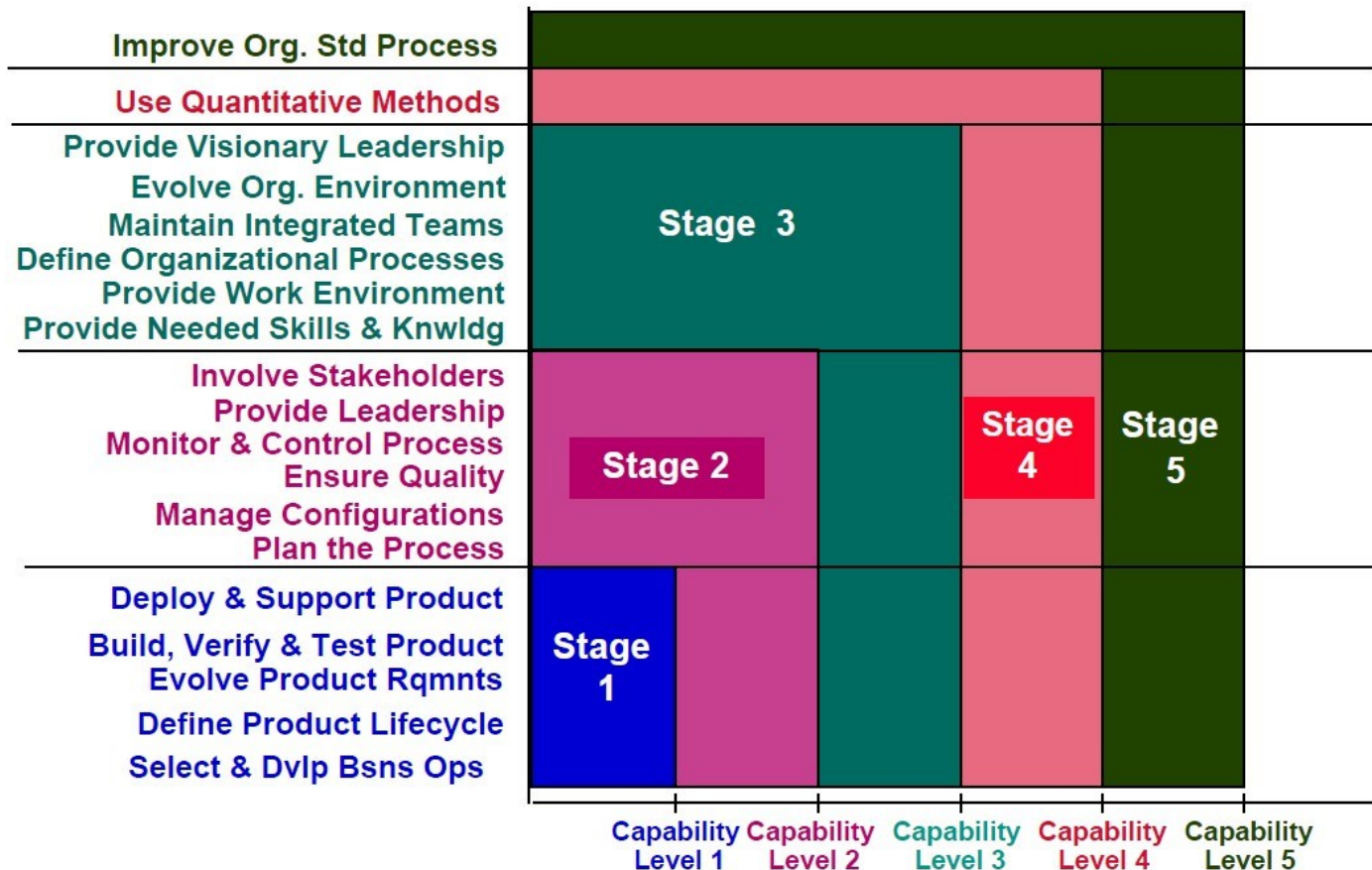
▪ Integrated Product Development Capability Maturity Model (IPD-CMM)

- A systematic approach to product development
- Achieves a timely collaboration of necessary disciplines throughout the product life cycle to better satisfy customer needs
- Describes essential elements of integrated product development
- Is a road map for integrated product development process improvement
- Is a measurement methodology to determine how well integrated product development is being performed within an organization



Other Frameworks₂

IPD-CMM Architecture (V0.93+)



BPs for SW Product Management

Other Frameworks₃

■ Software Product Management Framework [Kittlaus and Clough 2009]

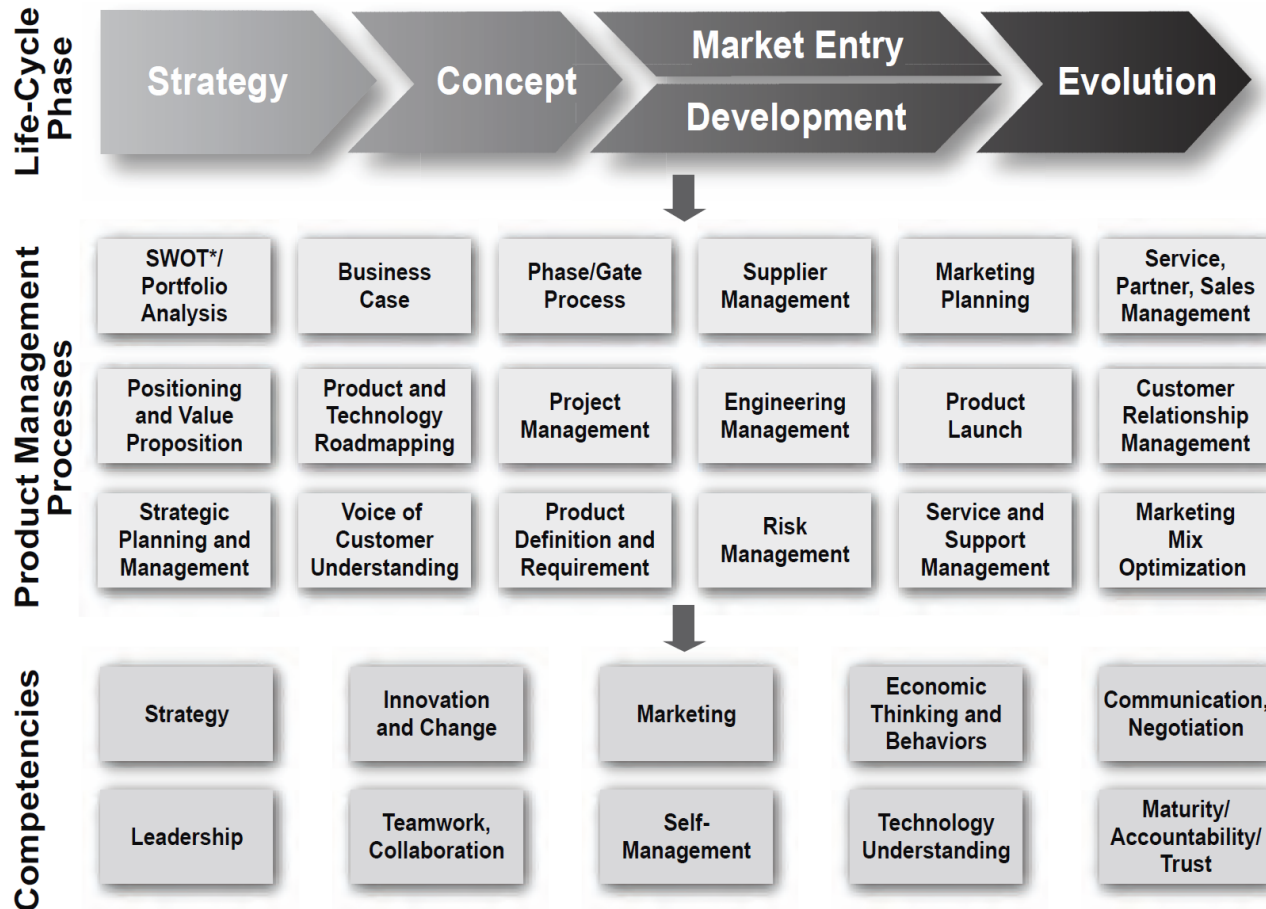
	Market Analysis	Product Analysis	Product Strategy	Product Planning	Development	Marketing	Sales and Distribution	Support and Services
Often on corporate level			Portfolio Management	Resource Allocation	Resource Allocation	Marketing Strategy and Plan	Sales Strategy and Plan	
Product (family) level	Market Research	Product Performance	Positioning	Roadmap	Project Plan	Launch Plan	Channel Preparation	Customer Support
	Market Sizing	Customer Satisfaction	Delivery Model	Release Plan	Technical Specification	Customer Analysis	Operational Sales	Technical Support
	Market Problems	Win/loss Analysis	Pricing Model	Requirements Management	Project Requirements Management	Partner Management	Operational Distribution	Marketing Support
	Technology Assessment	Opportunities	Pricing	Functional Specification	Implementation	Operational Marketing	Material	Sales Support
	Competitive Analysis		Business Case		Quality Assurance	Material		Services Preparation
			Make or buy		Technology			Operational Services Provision
			Ecosystem		Innovation			
			Legal Terms					
			Protection of Intellectual Property					

Fig. 4.2 Software Product Management Framework (Core Product Management, Core Pricing Tasks to participate in or to orchestrate)

BPs for SW Product Management

Other Frameworks₄

- The Software Product Management Framework [Ebert 2009]



* SWOT: Strengths, Weaknesses, Opportunities, and Threats

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Identification of Key PM Activities₁

- High-level activities extracted and consolidated from frameworks

Key Product Management Activities	Source Frameworks			
	van de Weerd et al.	SEI	Pohl et al.	MSF
PM01: Product Portfolio Management	x		x	
PM02: Product Life Cycle Management	x			
PM03: Product Roadmapping	x	x	x	
PM04: Requirements Engineering	x	x		
PM05: Release Planning	x			x
PM06: Market Monitoring	x	x	x	x
PM07: Domain and Product Line Scoping	x	x	x	
PM08: Asset Identification	x	x		
PM09: Product Planning	x	x	x	x
PM10: Product Controlling		x	x	
PM11: Customer Interface Management	x	x	x	
PM12: Funding		x		
PM13: Product Innovation			x	
PM14: Cross-functional Communication				x

- Traceability to source frameworks maintained

[Stallinger et al. 2011]

Identification of Key PM Activities₂

Key Product Management Activities
PM01: Product Portfolio Management
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PM03: Product Roadmapping
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PM06: Market Monitoring
PM07: Domain and Product Line Scoping
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PM13: Product Innovation
PM14: Cross-functional Communication

Strategic function; aims at balancing and value-maximizing the product portfolio; identification, evaluation, selection, prioritization of existing and to-be-developed products

Management of product-related information and knowledge; planning and controlling of relevant life cycle processes; the life cycle describes the idealized progression of a product through various stages

Outline long-term plans and expectations for the product (typically for a strategic time-frame of 3 to 5 years); determines major features, schedule for their implementation, and dependencies to other products or platform technologies

Elicitation, analysis, specification, verification, and management of customer and product requirements; ensure completeness, consistency, and relevance of requirements; manage dependencies and establish traceability

Definition of product releases by prioritizing and selecting product requirements for implementation

Identification of Key PM Activities₃

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PM13: Product Innovation
PM14: Cross-functional Communication

Observation and analysis of external factors in the market (e.g. customers, competitors, trends, barriers to market entry or exit)

Identification of product-relevant domain entities, domain boundaries, product commonalities and variabilities

Identification and definition of particular reusable assets, shared among multiple products

Strategic and technical planning; determine product-related goals, strategies, objectives, resource allocation; definition of a business case and major product features; identification and selection of make-or-buy opportunities and product ideas

Ensure successful achievement of product and organizational goals; define goals, success criteria, indicators, appropriate measures and plans for operationalization and verification of measures

Identification of Key PM Activities₄

Key Product Management Activities
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PM12: Funding
PM13: Product Innovation
PM14: Cross-functional Communication

Understand and manage commitments to customers; identification of customer representatives, information to be communicated and delivered, policies and procedures for customer interaction

Plan and ensure adequate financing of product-related development efforts (e.g. new or updated assets or products; modernization of infrastructure); identification of funding sources, definition of funding requirements and models

Aims at extension of the product portfolio (new or enhanced products); utilization of various innovation sources and strategies (e.g. leader, imitator)

Product management as intermediary between various stakeholders or business functions (e.g. customers, project teams, marketing, sales, upper management, R&D, customer support) and product development

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Process Reference Model Meta-Model

Process Group

Process Name

conveys the scope of the process as a whole

Purpose

describes the goals of performing the process

Outcomes

express the observable results expected from the successful performance of the process

Activities

a list of actions that are used to achieve the outcomes

Tasks

requirements, recommendations, or permissible actions intended to support the achievement of the outcomes

Process Reference Model Construction₁

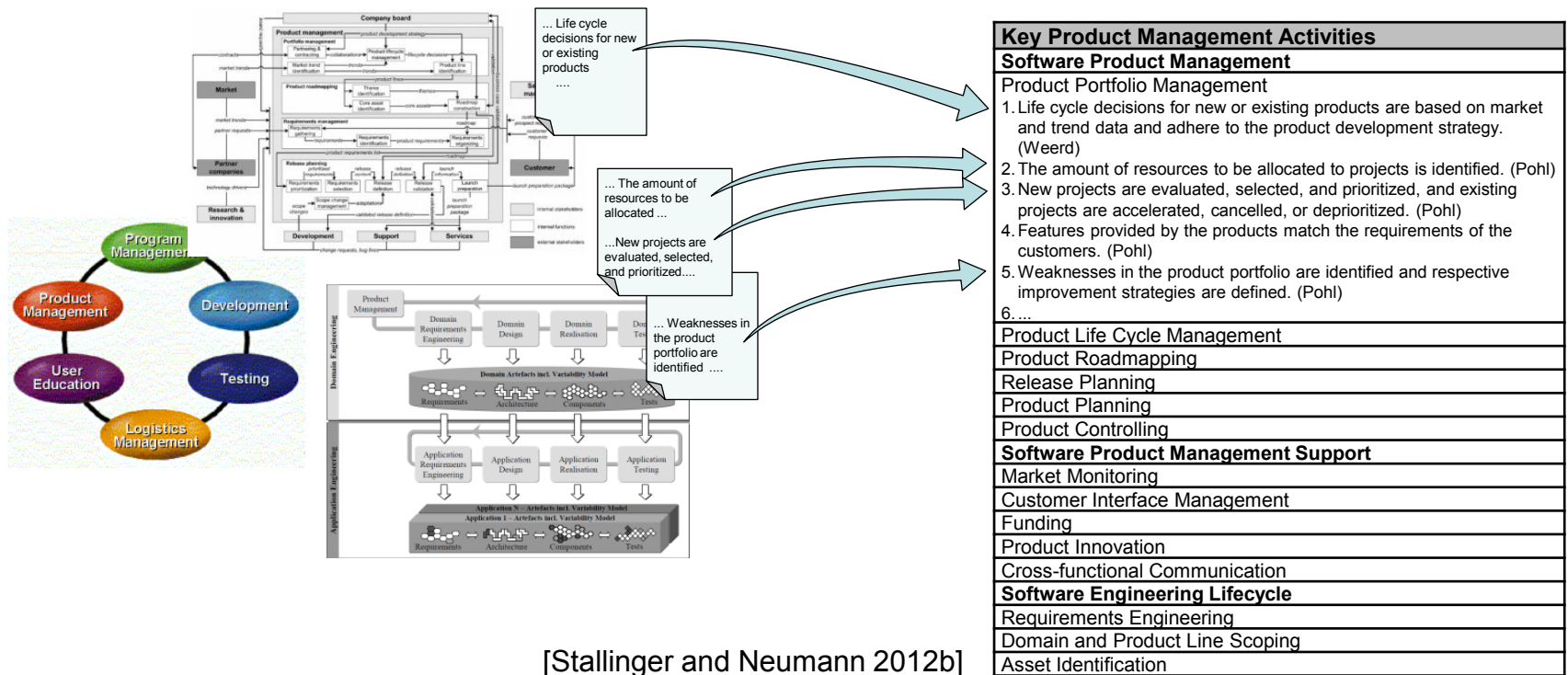
- Key Product Management Activities serve as candidate processes
- Transformation into process groups and processes

Key Product Management Activities by Category	Source Frameworks			
	van de Weerd et al. [3]	SEI [4]	Pohl et al. [5]	MSF [6]
Software Product Management				
Product Portfolio Management	x		x	
Product Life Cycle Management	x		x	
Product Roadmapping	x	x	x	
Release Planning	x			x
Product Planning	x	x	x	x
Product Controlling		x	x	
Software Product Management Support				
Market Monitoring	x	x	x	x
Customer Interface Management	x	x	x	
Funding		x		
Product Innovation			x	
Cross-functional Communication				x
Software Engineering Lifecycle				
Requirements Engineering	x	x		
Domain and Product Line Scoping	x	x	x	
Asset Identification	x	x		

[Stallinger and Neumann 2012a]

Process Reference Model Construction₂

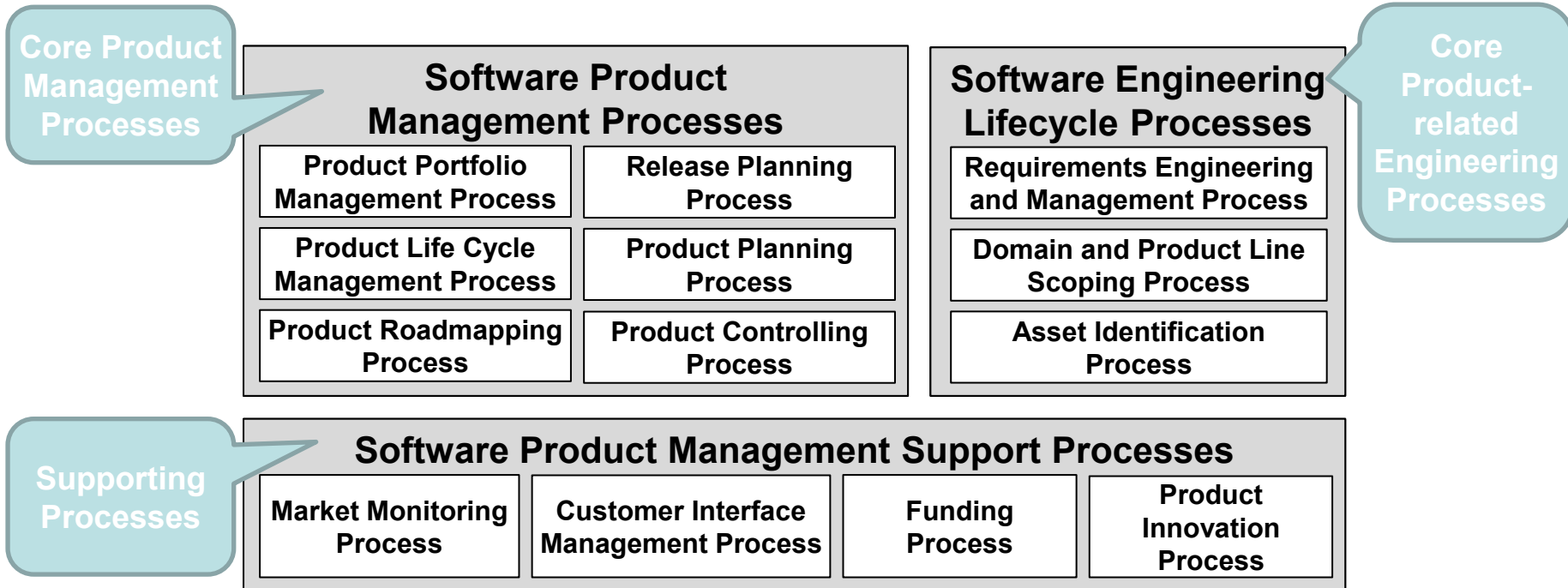
- Distillation of candidate process outcomes from base frameworks
- Allocation of candidate outcomes to key product management activities and respective processes
- Establishment of traceability of outcomes to base frameworks



[Stallinger and Neumann 2012b]

Software Product Management PRM₁

- Consists of three process groups derived from PM activity categories



[Stallinger and Neumann 2012a]

- 'Cross-functional Communication' activity not considered as separate process
→ respective practices are integrated into other processes where appropriate

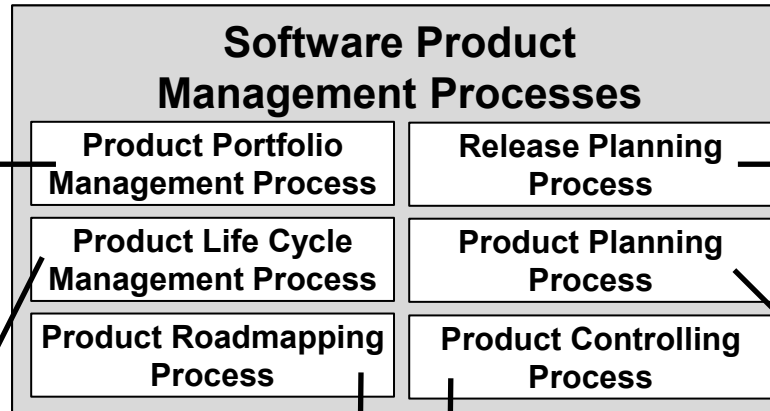
Software Product Management PRM₂

The purpose of the *Product Portfolio Management Process* is to ensure that the **business strategy and goals** of the organization are properly addressed and achieved by the totality of the organization's products.

1. Life cycle decisions for new or existing products are based on market and trend data and support the product portfolio strategy.
2. The amount of resources required for product-related projects is identified.
3. New product-related projects are defined, evaluated, prioritized, and selected.
4. Justification of existing product-related projects is evaluated and projects are sustained, accelerated, slowed down, or terminated in order to maintain a capable product portfolio.
5. ...

The purpose of the *Product Life Cycle Management Process* is to **conserve and expand a product's potentials and attractiveness** throughout its life cycle or – where necessary - to eliminate it from the product portfolio.

The purpose of the *Product Roadmapping Process* is to **outline the plans and expectations** for the products in the product portfolio over a period of time with respect to features, schedules, and dependencies between products.



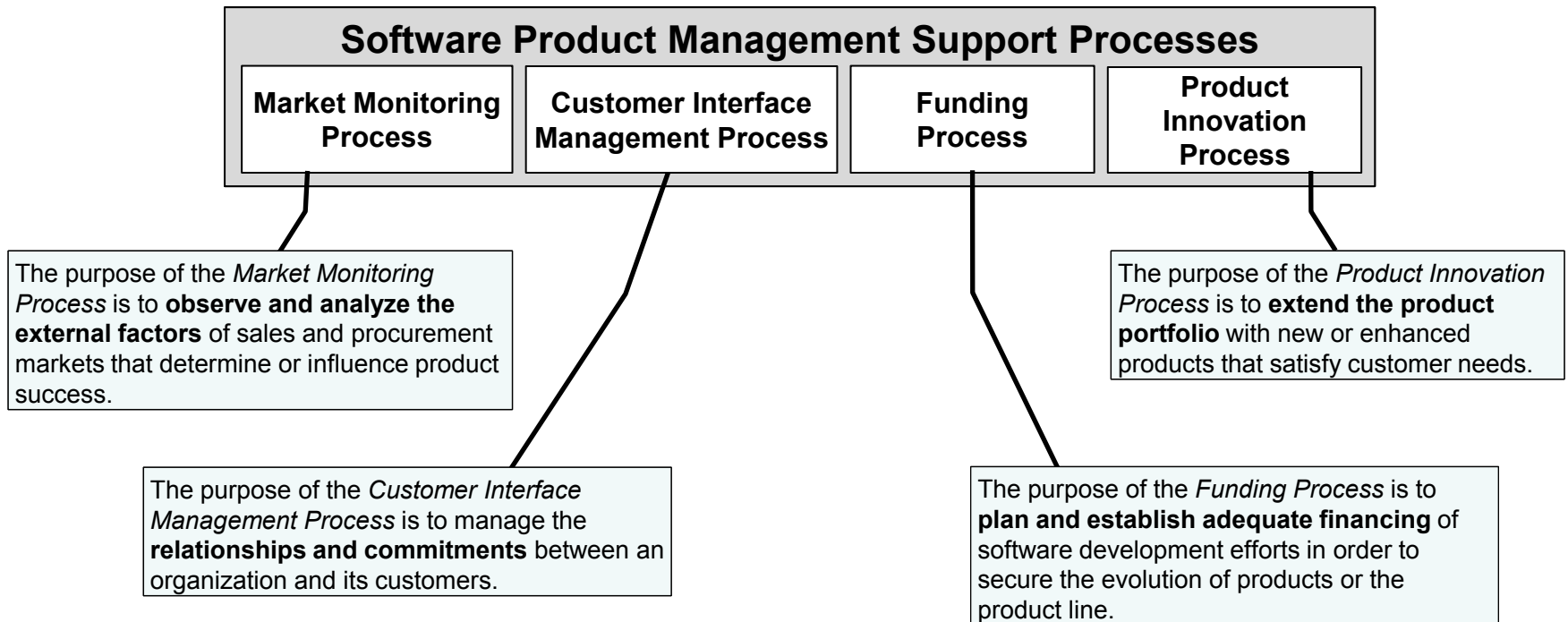
The purpose of the *Release Planning Process* is to **plan and define product releases** and to ensure **smooth deployment to the customer** and on-going operation of the product.

The purpose of the *Product Planning Process* is to specify both the **strategic and technical plans** for a product.

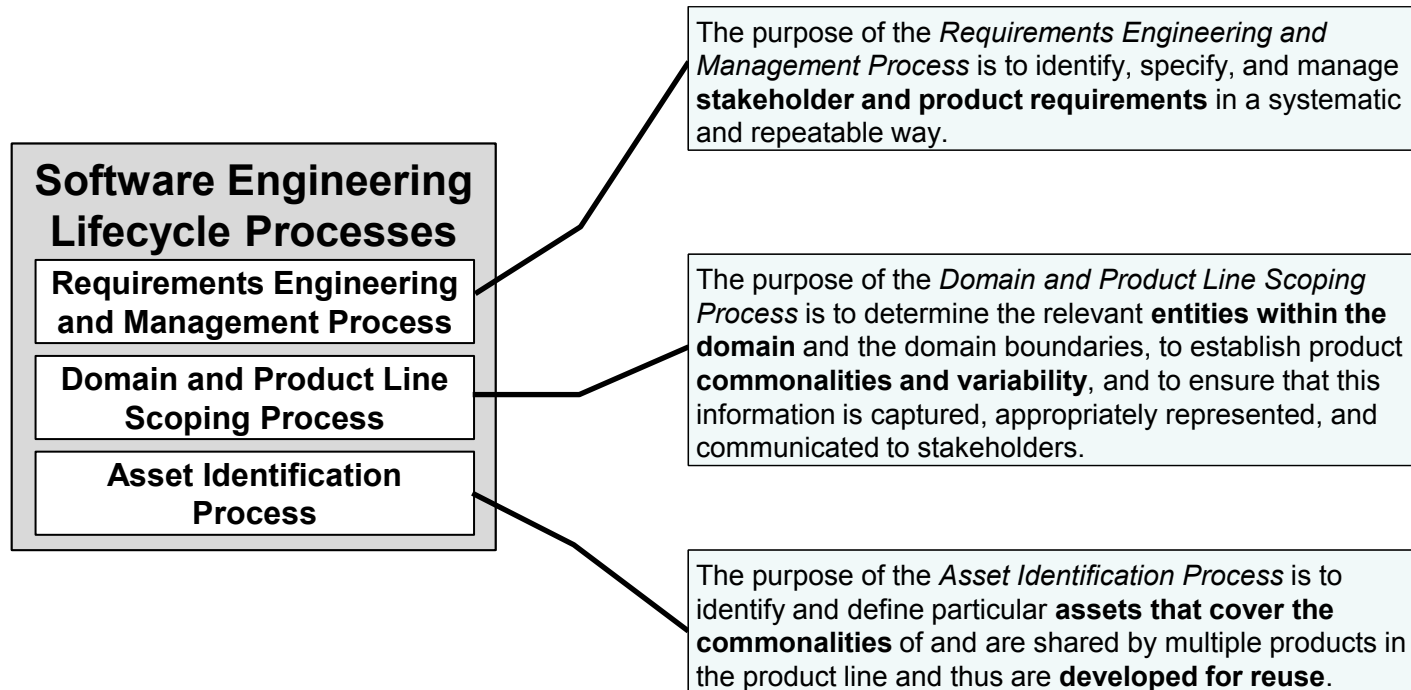
1. A business case is developed and maintained, at least specifying the goals and measures for tracking the product's success, providing a cost and benefit analysis, and a substantiation of the product's ability to support the business strategy and goals.
2. The strategic goals and objectives for the product, required activities and resources, schedules, and links or dependencies to other products and product plans are specified.
3. The product features and requirements are specified based on market and competitive analysis and on analyzed and prioritized customer and business requirements.
4. ...

The purpose of the *Product Controlling Process* is to **track the achievement of product goals and objectives** and to guide product management decision making.

Software Product Management PRM₃



Software Product Management PRM₄



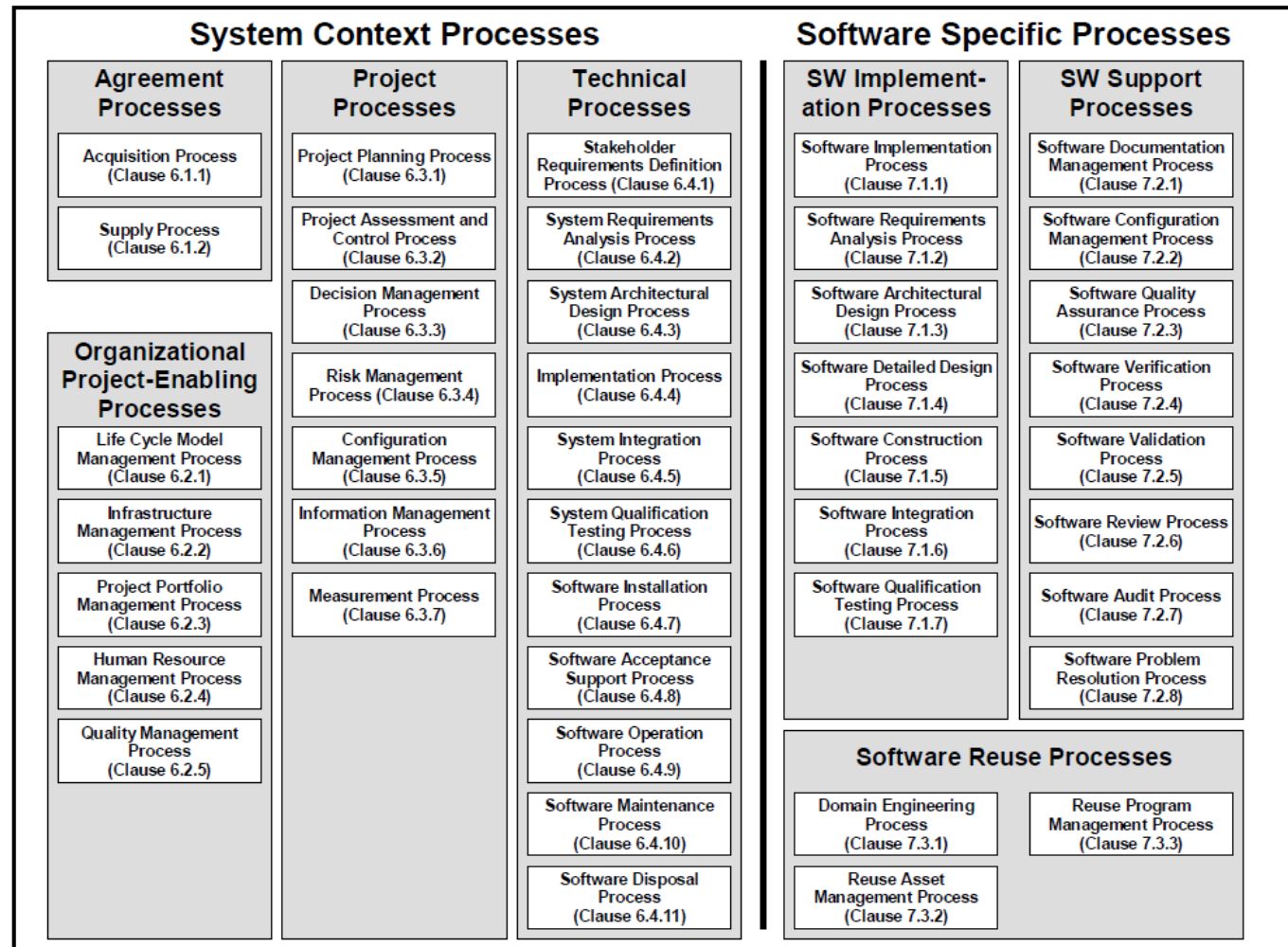
Outline

- ✓ Context and Challenges, Benefits, Solutions and Drawbacks
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BPs for SW Product Management ISO/IEC 12207

ISO/IEC 12207 Systems and software engineering – Software life cycle processes:

- ... provides "a comprehensive set of life cycle processes, activities and tasks for software that is part of a larger system, and for stand alone software products and services"



Comparison of Key Activities vs. ISO/IEC 12207

Key Product Management Activity	ISO/IEC 12207 Processes Mainly Covering the PM Activity		Explanation (ISO/IEC 12207 perspective)
PM01: Product Portfolio Management	P	Project Portfolio Management Process	Basically identical purposes but focused on projects, not on products
PM02: Product Life Cycle Management	F	Life Cycle Model Management Process	
PM03: Product Roadmapping	N	-	Out of scope
PM04: Requirements Engineering	L	Stakeholder Requirements Definition Pr. System Requirements Analysis Process Software Requirements Analysis Process	Diverse relationships of requirements with multiple customers, products, product variants, or assets not addressed
PM05: Release Planning	N	-	Controlling, management, and delivery of releases is addressed – but not planning; existence of a release strategy implied by ISO 12207
PM06: Market Monitoring	N	-	Out of scope
PM07: Domain and Product Line Scoping	L	Domain Engineering Process	
PM08: Asset Identification	F	Domain Engineering Process	
PM09: Product Planning	N	-	Out of scope
PM10: Product Controlling	P	Measurement Process	Principal measurement activities are addressed, but without product or asset consideration; (measurement is a support process, the process it can 'support' to control products is missing)
PM11: Customer Interface Management	P	Supply Process	Project-independent, long-term focused customer relationships not addressed
PM12: Funding	N	-	Adequate project funding is addressed in the Project Portfolio Management Process; product-focused funding is not addressed
PM13: Product Innovation	N	-	Systematic approach to innovation is out of scope; customer requests etc. are addressed
PM14: Cross-functional Communication	P	Stakeholder Requirements Definition Pr. Supply Process	Communication with functions like marketing, sales, etc. not addressed

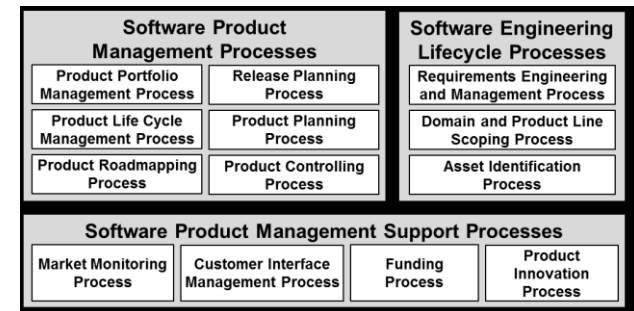
■ → Except for engineering activities, PM not well covered → “additional model” necessary !

[Stallinger et al. 2011]

PM-PRM Integration with ISO/IEC 12207₁

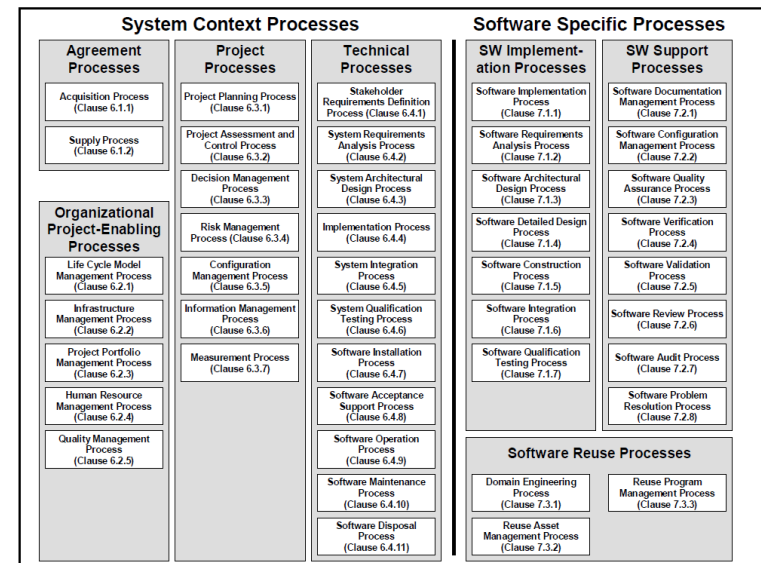
- Different contexts for description of processes or activities

- ISO/IEC 12207: project as “context for describing processes concerned with planning, assessment and control”
 - SW PM-PRM: product or product groups as part of an org's portfolio



- Different definition of 'product'

- ISO/IEC 12207:
 - Product is "the result of process"
 - Software product is "a set of computer programs, procedures, and possibly associated documentation and data"
 - SW PM-PRM:
 - Software, software-intensive system, service, or solution offered to customers



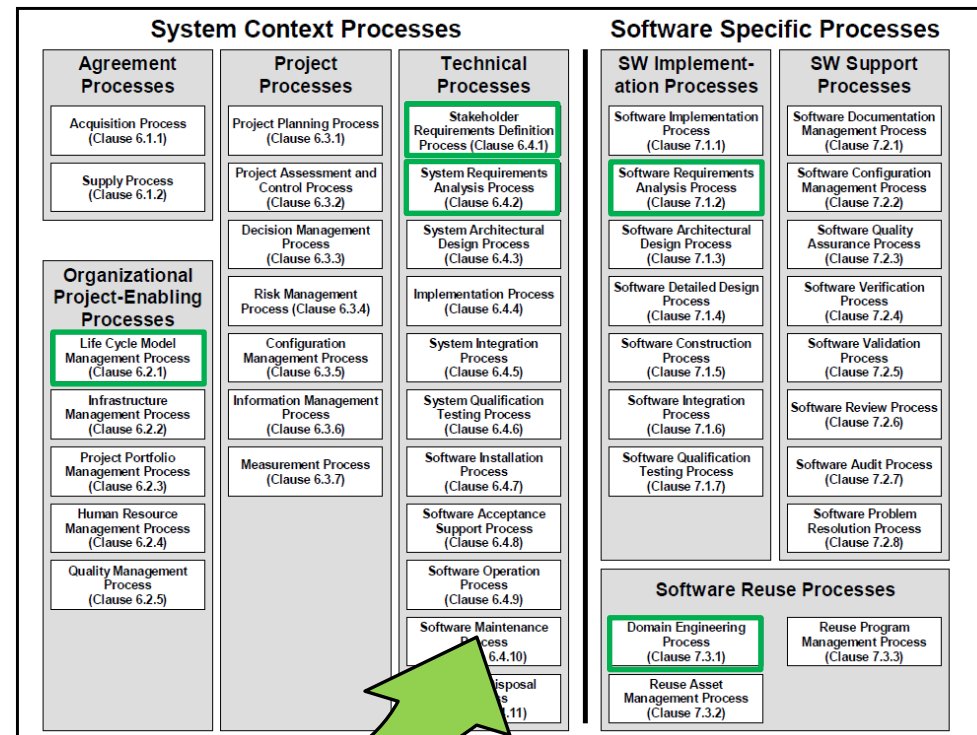
PM-PRM Integration with ISO/IEC 12207₂

Directions for Extending the Standard

- Incorporation of product management activities/topics on outcome level:
 - Adaptation, specialization of existing ISO/IEC 12207 process outcomes
 - Additional outcomes for particular ISO/IEC 12207 processes
 - Additional product management specific processes

PM-PRM Integration with ISO/IEC 12207₃

Software Product Management Process Reference Model	
Software Product Management	
Product Portfolio Management	P
Product Life Cycle Management	F
Product Roadmapping	N
Release Planning	N
Product Planning	N
Product Controlling	P
Software Product Management Support	
Market Monitoring	N
Customer Interface Management	P
Funding	N
Product Innovation	N
Software Engineering Lifecycle	
Requirements Engineering	L
Domain and Product Line Scoping	L
Asset Identification	F



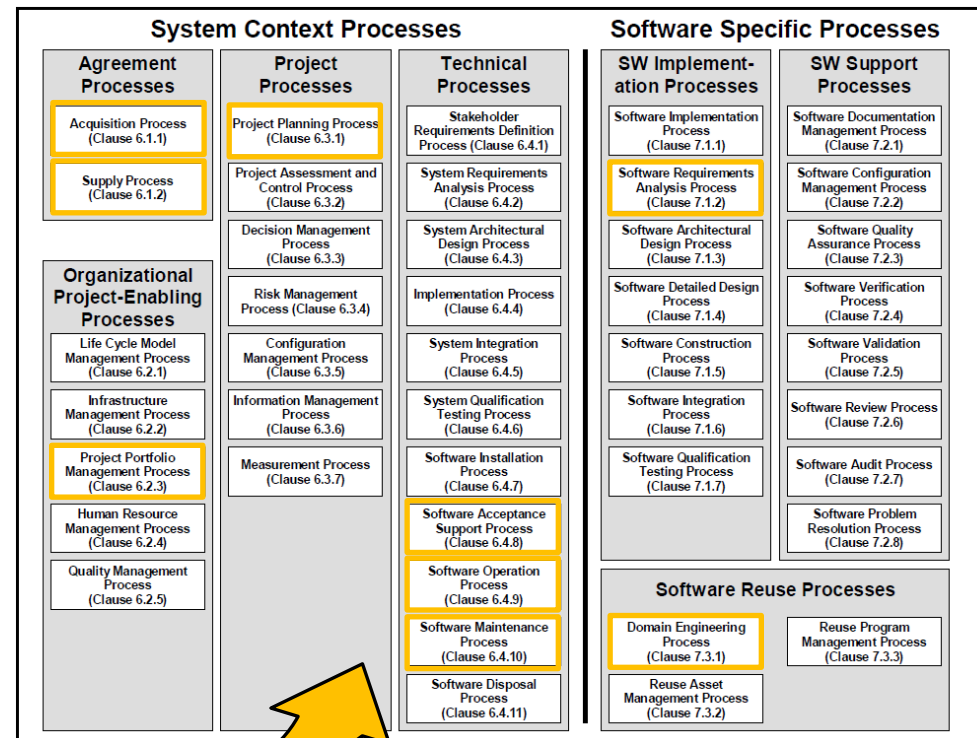
PM practices widely covered

→ No extension required

[Stallinger and Neumann 2012a]

PM-PRM Integration with ISO/IEC 12207₄

Software Product Management Process Reference Model	
Software Product Management	
Product Portfolio Management	P
Product Life Cycle Management	F
Product Roadmapping	N
Release Planning	N
Product Planning	N
Product Controlling	P
Software Product Management Support	
Market Monitoring	N
Customer Interface Management	P
Funding	N
Product Innovation	N
Software Engineering Lifecycle	
Requirements Engineering	L
Domain and Product Line Scoping	L
Asset Identification	F



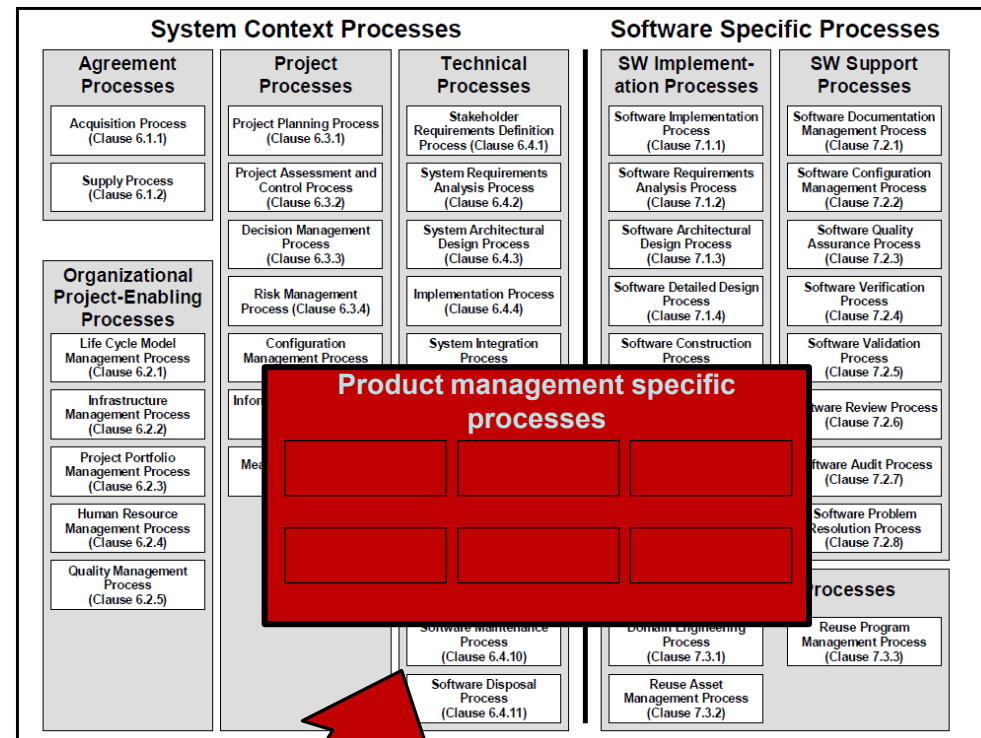
PM practices partially covered

- Integration within existing processes
- Integration as separate processes

[Stallinger and Neumann 2012a]

PM-PRM Integration with ISO/IEC 12207₅

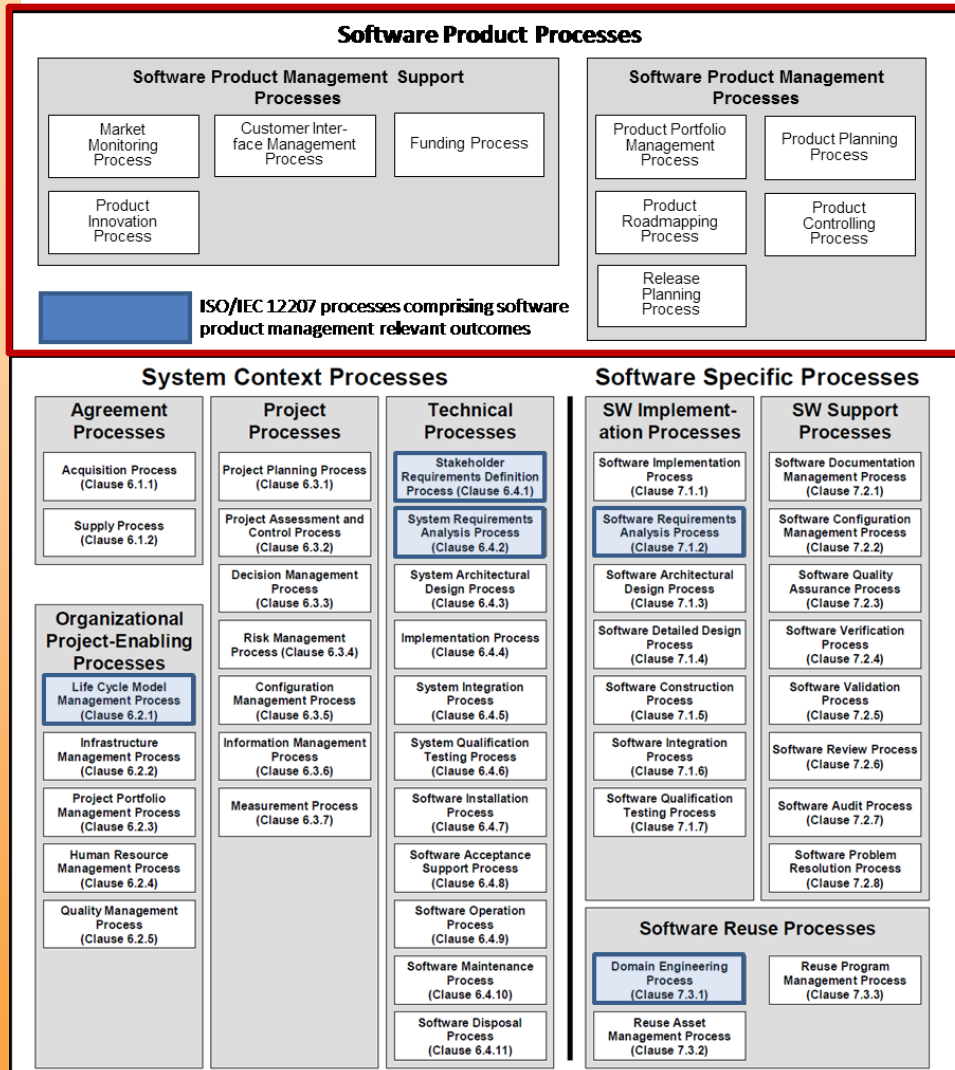
Software Product Management Process Reference Model	
Software Product Management	
Product Portfolio Management	P
Product Life Cycle Management	F
Product Roadmapping	N
Release Planning	N
Product Planning	N
Product Controlling	P
Software Product Management Support	
Market Monitoring	N
Customer Interface Management	P
Funding	N
Product Innovation	N
Software Engineering Lifecycle	
Requirements Engineering	L
Domain and Product Line Scoping	L
Asset Identification	F



PM practices not covered

→ Additional, product management specific process groups and processes required

[Stallinger and Neumann 2012a]

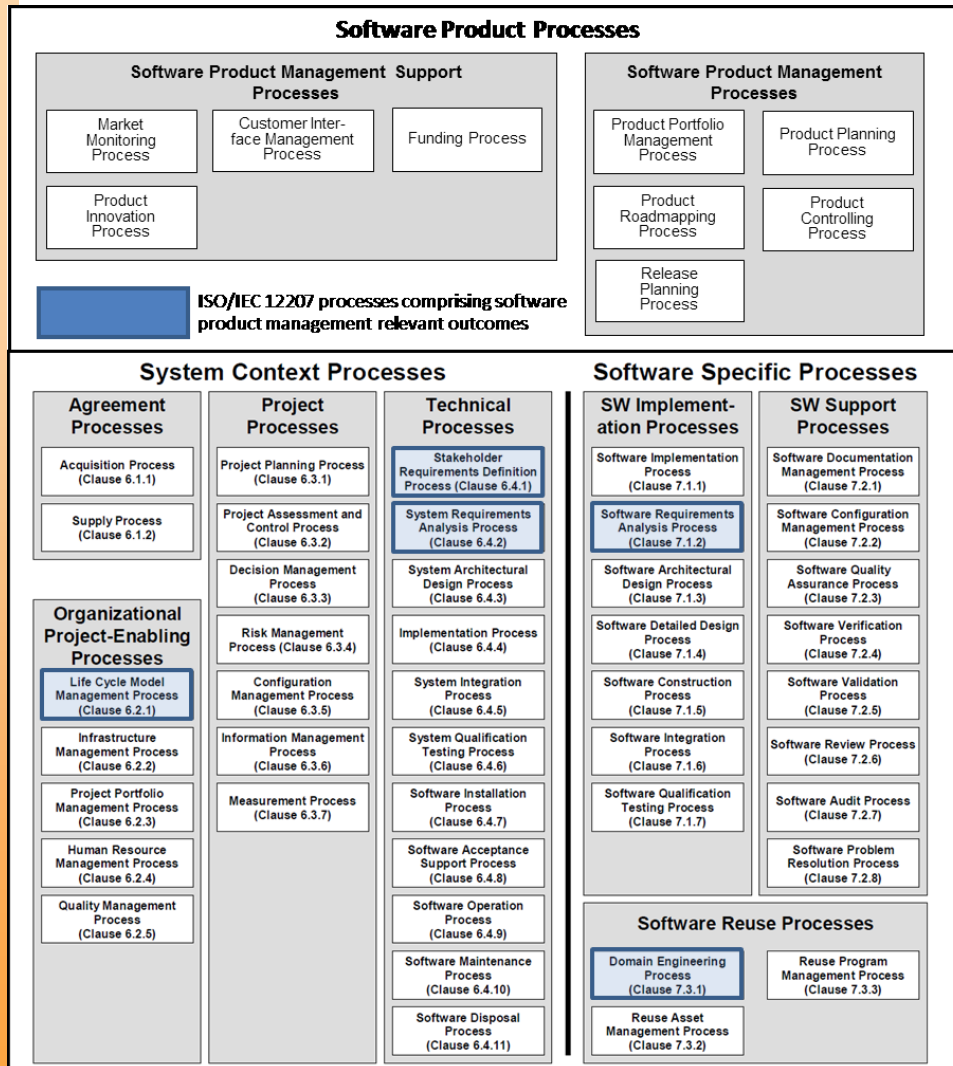


Add-on Model:

- Product Management Processes Group**
 - Processes that directly focus on one or more software products and operate independently of specific projects
- Product Management Support Processes Group**
 - Processes, that support the processes of the 'Software Product Management Processes' group
 - Provide valuable information for any product related process
 - Represent the function of product management as an intermediary between the various stakeholders involved in products and product development

[Stallinger and Neumann 2012a]

PM-PRM Integration with ISO/IEC 12207₇



- Life cycle and engineering related processes of the PM-PRM are well covered by ISO/IEC 12207
- Product management specific processes, concerned with project-independent, product-specific, and cross-product topics are out of the intended scope of ISO/IEC 12207
- Some outcomes of specific PM-PRM processes could be integrated partly into existing ISO/IEC 12207 processes (e.g. *Product Roadmapping, Release Planning, Product Planning, Customer Interface Management*), but are defined as part of additional process groups, in order to:
 - Emphasize product-orientation on process level
 - Better support the inherent characteristic of software product management to be vastly independent of particular projects

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- Product Roadmapping
- Final Video/Discussion; Q&A; Exam Preparation

Industry Validation₁

Assessed Organization:

- Member company of a group operating in Austria, Germany, U.S.
- Provision of products and services in the areas of high performance manufacturing automation, product design suitable for automation, linear feeding systems and entangling devices, manufacturing services, technical software

Assessed Organizational Unit (OU):

- Software engineering department of the organization
 - shop-floor management and data collection systems
 - engineering support for production planning, data engineering and IT concept development
 - stress analysis of manufacturing systems & production system simulation
 - integration of in-house and externally developed software products for the development of individual customer solutions
- Provision of software
 - in form of separate and typically customized products with accompanying services
 - as part of multi-disciplinary industrial solutions for individual customers

Industry Validation₂

- **Assessment Goals:**

- Contribute to the validation of the emerging Product Management Process Reference Model (PM-PRM) through an initial case study
- Validate the proposed PM-PRM with respect to its applicability, completeness, clarity, etc.
- Identify respective enhancements and improvements to the PM-PRM

- **Assessment Characteristics:**

- Assessment of two of the OU's core products
- 1,0-day assessment workshop
- 0,5-day workshop for results presentation and discussion
- Focus on core Level 1 product management practices (Capability levels 2 and 3 only "roughly" evaluated)
- OU's Participants: two high ranking managers and product manager of the OU

BPs for SW Product Management

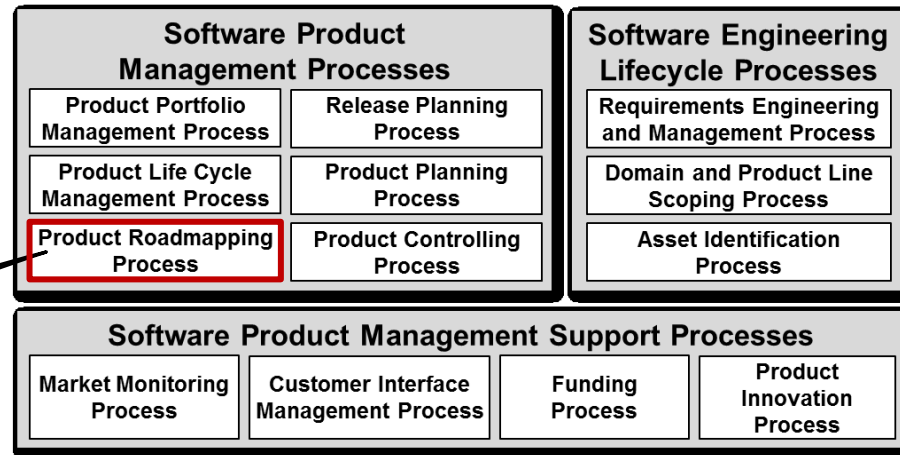
Industry Validation₃

Process Capability Dimension Process Dimension	CL1	CL2		CL3	
	PA1.1	PA2.1	PA2.2	PA3.1	PA3.2
SOFTWARE PRODUCT MANAGEMENT PROCESSES					
Product Portfolio Management Process	P	N	N	N	N
Product Life Cycle Management Process	L	N	N	N	N
Product Roadmapping Process	N	N	N	N	N
Product Planning Process	P	P	N	N	N
Release Planning Process	F	F	L	P	P
Product Controlling Process	P	P	P	N	N
SOFTWARE PRODUCT MANAGEMENT SUPPORT PROCESSES					
Market Monitoring Process	L	P	N	N	N
Customer Interface Management Process	L	P	P	P	P
Funding Process	L	P	N	N	N
Product Innovation Process	L	N	N	N	N
SOFTWARE ENGINEERING LIFE CYCLE PROCESSES					
Requirements Engineering and Management Process	L	L	L	L	P
Domain and Product Line Scoping Process	L	P	N	N	N
Asset Identification Process	P	L	P	N	N

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Product Roadmapping Process



Product Roadmapping Process

The purpose of the *Product Roadmapping Process* is to outline the plans and expectations for the products in the product portfolio over a period of time with respect to features, schedules, and dependencies between products.

1. The themes of the products or product line are devised and described in a product roadmap.
2. The major common and variable features of the products or product line are determined and a schedule for their planned availability and market introduction is defined and maintained in a product roadmap.
3. Potential future changes of market needs, technology, legal constraints, standards, etc. are identified and taken into account in the product roadmap.

Roadmap: Definition

- “... a product roadmap gives an **overview how a product is going to develop over the strategic timeframe of up to 5 years** in terms of **new releases or versions, their schedules and major themes**. Usually **important dependencies** on other products or platform technology are shown.” [Kittlaus und Clough 2009]
- ... **sketches a product line** as far as foreseeable at a certain point in time. It defines **the most important common and variable features** of the products of a product line as well as a **schedule** for their release and delivery (translated from [Pohl 2005])
- “... a product roadmap is the **result of a product strategy process**, which **illustrates the strategic decisions** made.” [Heinola 2011]
- “... provides a **simple, yet powerful visualization of a forecast**. This forecast can be in a number of key areas, such as technology, capability, parameter, features, product, platform, system, environment, threat and business opportunity.” [DeGregorio 2000]

Roadmap: Purpose

- **“... communicate visions, attract resources from business and government, stimulate investigations, and monitor progress.”** [Galvin 1998]
- **“... support strategic and long-range planning.”** [Heinola 2011]
- **“Gives internal and external audiences a product vision for the future, a possible destination”** [Nelson 2003]
- **“Externally the roadmap plays an important role in demonstrating the viability of a product ... bigger potential customers ... market analysts ...”**
[Kittlaus und Clough 2009]
- **„Helps customers integrate product plan into their long-term strategy “**
[Nelson 2003]

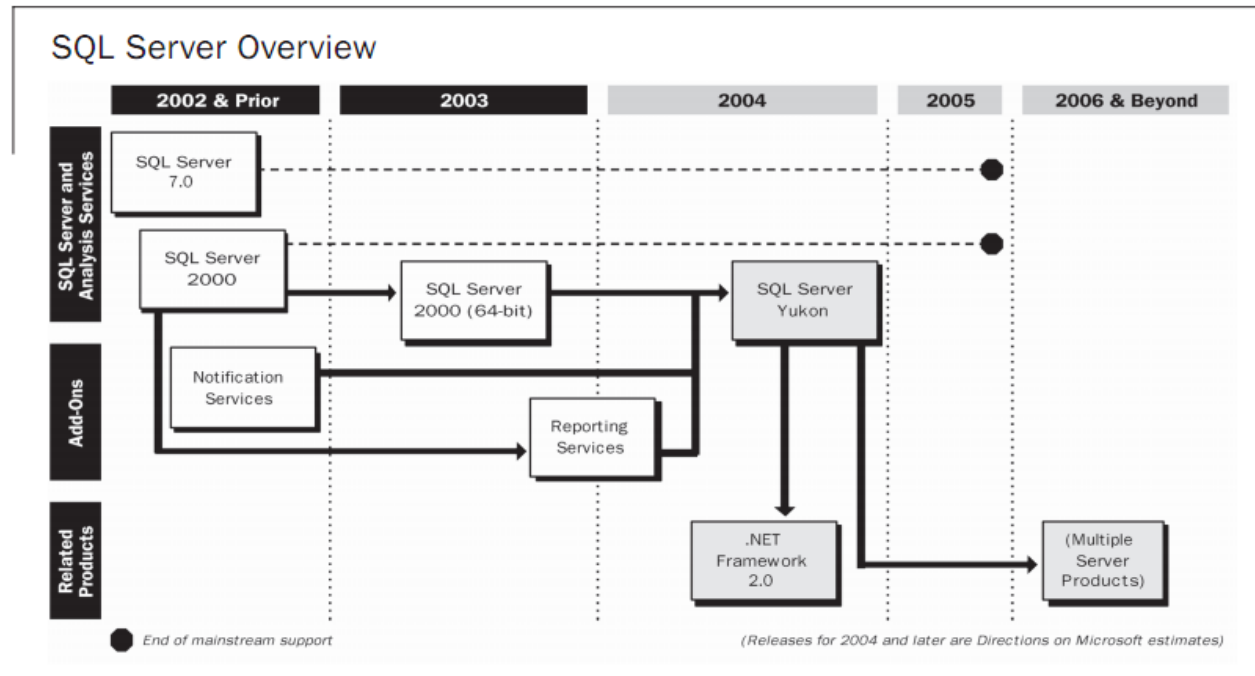
Roadmap Types

Product Roadmap	"to show your audience when your product's new features will be available, what the theme or main and secondary features of the product release or next few releases will be; internal and external roadmaps"
Platform Roadmap	"to showcase what will be in the works for the platform or PaaS (Platform as a Service) that a particular company has under development. They are used to communicate that company's overall platform strategy and the availability of APIs (Application Programming Interfaces, basically plug-ins to and from the company's platform software) and development tools for the company's platform or PaaS"
Vision Roadmap	"to highlight for your audience how your product or products fit into a movement or trend within society in general or your company's industry in particular."
Marketing Roadmap	"communicates to your internal and external stakeholders what market segments your products and services are targeting, and how you plan to enter any of those markets in which you are not currently competing. As such, these types of roadmaps include information on the demographics and opportunity size of each marketplace, and information regarding how you plan to develop products and services to address each market. The timescale involved on marketing roadmaps can span years."
Technology or Engineering Roadmap	"chart out major technology trends that exist in the marketplace, and show how your company's products and services coordinate with those trends over time."

Roadmap Types – Examples₁

- Product Roadmap

- shows when the product's new features will be available, what the theme or main and secondary features of the next release(s) will be



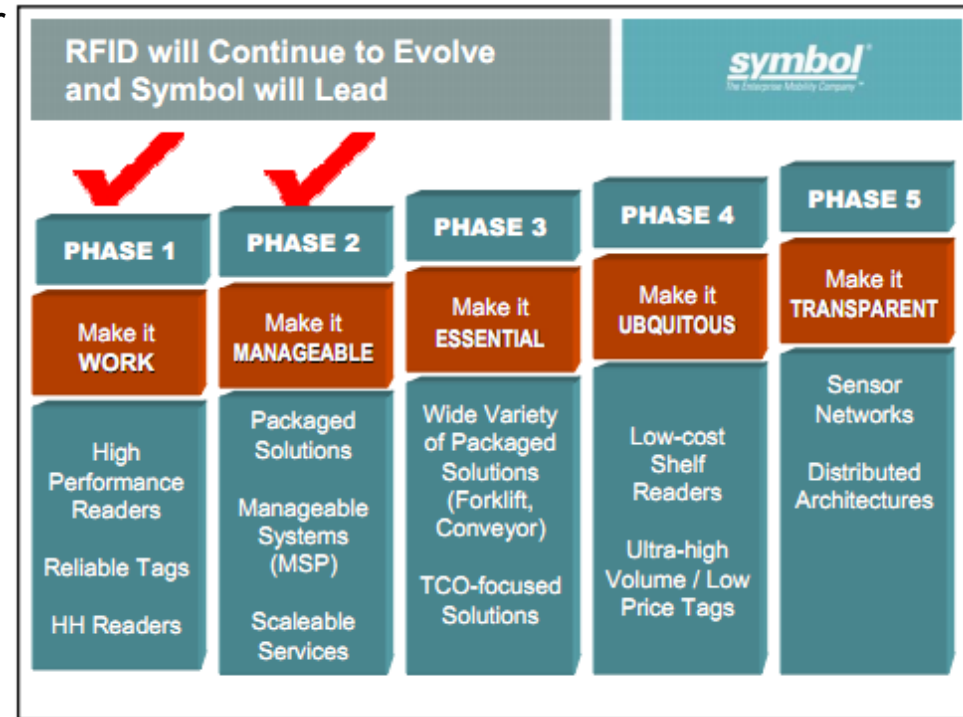
- Platform Roadmap

- communicates the overall platform strategy and the availability of APIs and development tools
- Example Platforms: Amazon S3, Windows Azure, Apple iOS, Android

[Seibert 2011]

Roadmap Types – Examples₂

- Vision Roadmap
 - highlights how the product or products fit into a movement or trend within society in general or an industry in particular

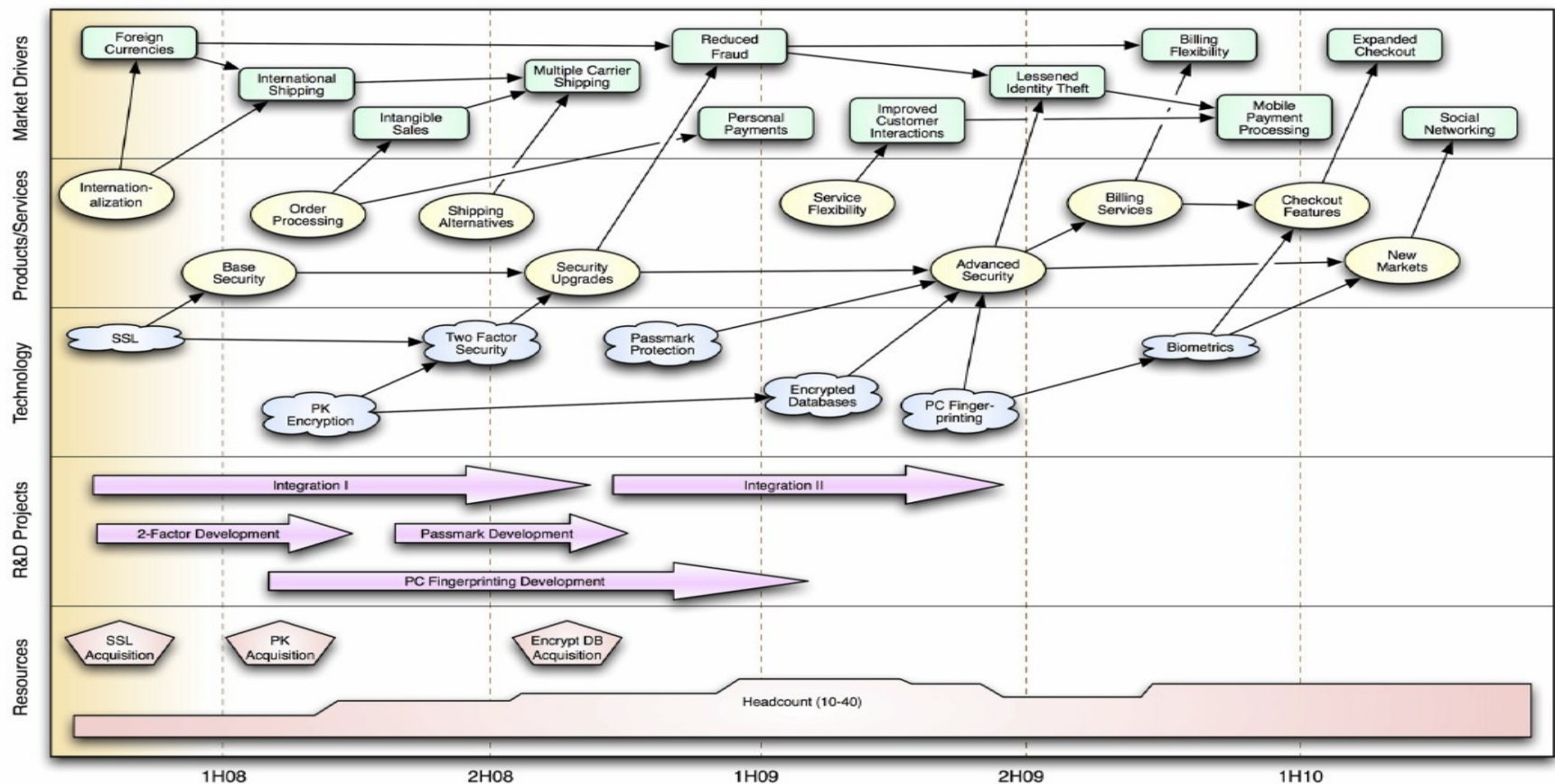


[Seibert 2011]

- Marketing Roadmap
 - communicates what market segments the products and services are targeting, including information on demographics and opportunity size, etc.

Roadmap Types – Examples₃

- Technology Roadmap
 - shows major technology trends in the marketplace and how the organization intends to react with its products to those trends



Roadmapping: Prerequisites

- Know your market
 - Market observation (customers, evaluators, etc.)
 - Quantify market problems
 - Understand total solution
- Establish a competitive strategy
 - Identify promising market segments
 - Focus on your distinctive competence
- Know the technology landscape
 - Research emerging technologies
 - Interview technical reviewers to understand technical compliance and standards they are adopting
- Validate
 - Review with internal cross-functional team
 - NDA review with trusted parties (customers, partners, etc.)

Roadmapping: Pitfalls

- A roadmap is a plan, not a commitment
 - Sales people often tend to communicate „promises“ in order to gain customers
- Ensure that no one makes any promises based on a roadmap without prior authorization by product management
- A defined process is necessary for elaborating a roadmap
 - Avoid frequent and uncoordinated changes to the roadmap
- Roadmaps should
 - Not plan too far into the future
 - Not be too detailed
 - Not be too optimistic
 - Consider respective buffers w.r.t. scheduling

[Nelson 2003]

Roadmapping: Risks

- **Roadmapping does not become part of the on-going management**
 - Roadmaps may be viewed as a stand-alone deliverable that is often initiated in response to a specific perceived crisis or need
 - The desired shared understanding, if achieved, must be continually renewed to maintain the proper foundation for decisions
- **Diminishing incentives to design or implement roadmaps**
 - E.g. through sudden and arbitrary changes to policies or assignments
 - Despite the inherent uncertainty w.r.t. assumptions when elaborating a roadmap, a roadmap should describe a straight-line projection or single scenario
- **Lack of explicit assumptions concerning future needs**
 - ... may shift the focus from the needs of the customers to the fluency of the technology
- **Lack of management experience**
 - E.g. in dealing with vague/imprecise forecasts or information gaps
 - Strengths and opportunities may be overlooked due to lack of information or inadequate environmental monitoring and analysis
- **Lack of communication of important, but often subtle, underlying and contextual factors related to the roadmap**
 - Roadmap presentation and discussion by/with the roadmap developers

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Final Video and Discussion

- Simon Sinek: Start With Why - Simon Sinek TED talk
<https://www.youtube.com/watch?v=sioZd3AxmE>
- What implications does this video's message have on your view of:
 - Requirements Engineering and Management ?
 - Product Management ?
 - Agile vs. Traditional Development Approaches ?
 - ...

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