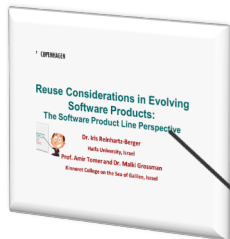




MODELS 2018
COPENHAGEN

**Models and Evolution
Workshop**

Reuse Considerations in Evolving Software Products: The Software Product Line Perspective



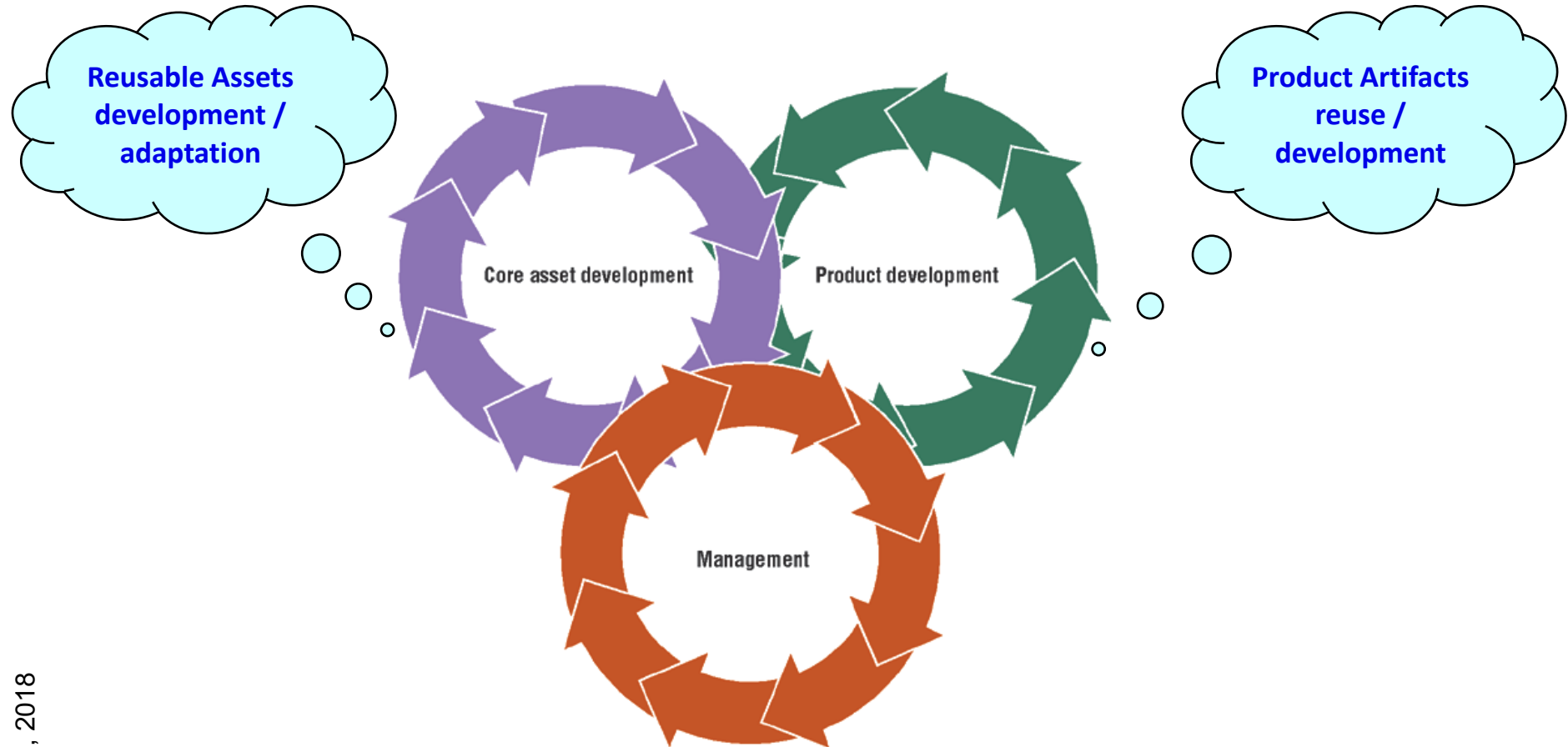
Dr. Iris Reinhartz-Berger

Haifa University, Israel

Prof. Amir Tomer and Dr. Malki Grossman

Kinneret College on the Sea of Galilee, Israel

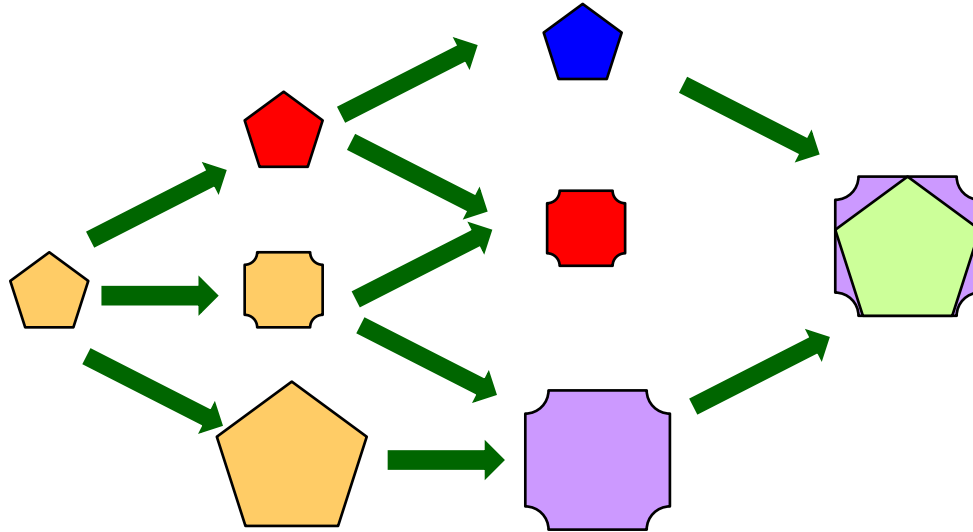
Reuse Decisions in SPL Management



Clements, Paul C. et al, Project Management in Software Product Line Organization,
IEEE Software, V.22, N.05, 2005

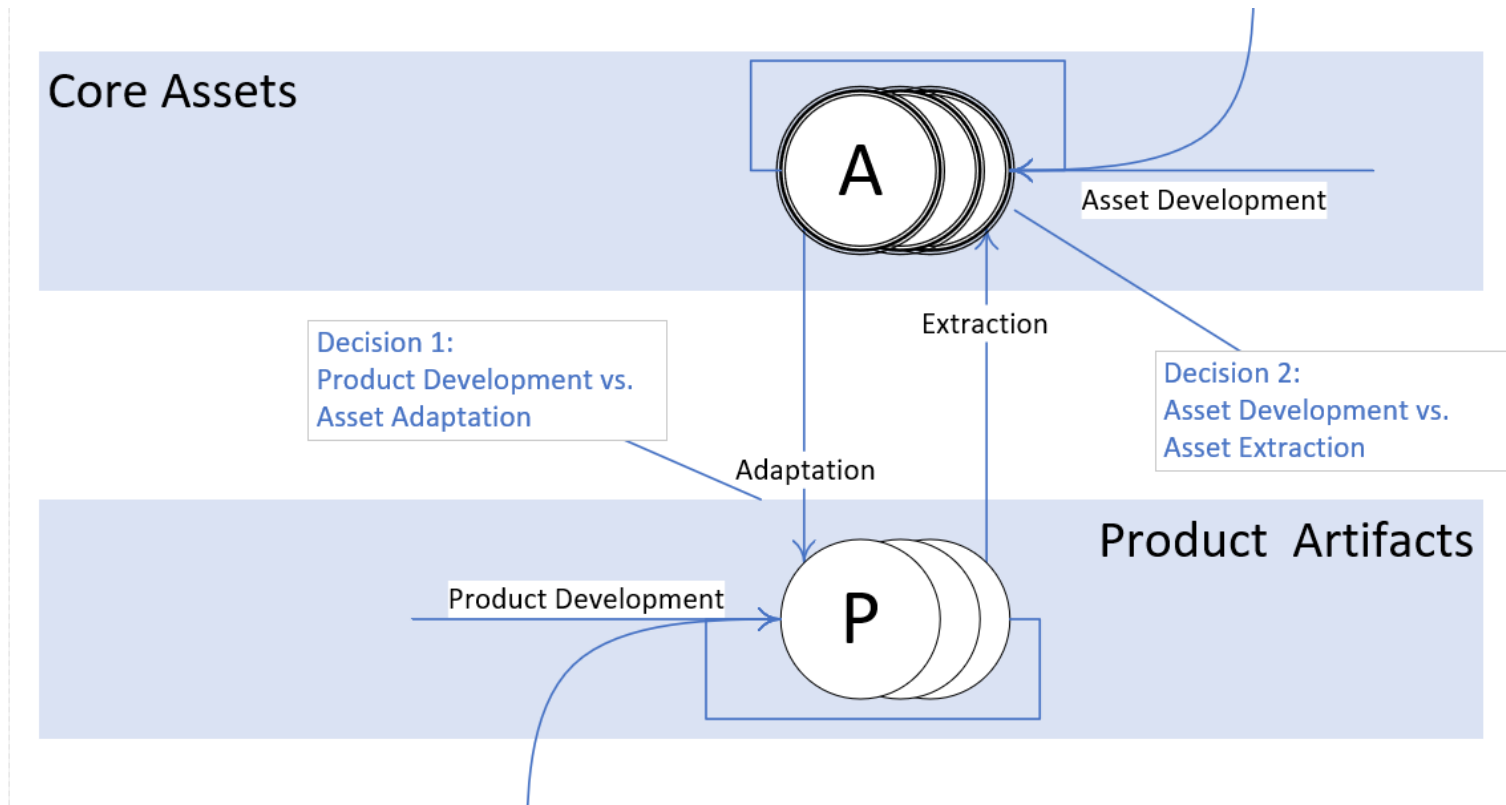
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- **Software products usually evolve in product-line fashion**
 - Not necessarily under a formal SPL management methodology



- **Evolution decisions are taken at various levels**
 - Enterprise level
 - Product line level
 - Product/project level
 - Infrastructure development level
 - Individual level

The underlying conceptual framework for reuse operations



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Aspects of Reuse Decisions

- **Organizational**
 - Decisions driven by vision, mission, strategy, policy, etc.
- **Business**
 - Decisions driven by market, clients, profitability, etc.
- **Engineering**
 - Decisions driven by technology, development effort, quality attributes, etc.



Research Questions

- **RQ1: What are the engineering, organizational, and business considerations relevant to decide whether to**
 - **develop** a product, or
 - **adapt** existing core assets?
- **RQ2: What are the engineering, organizational, and business considerations relevant to decide whether to**
 - **extract** a core asset from existing product artifacts, or
 - **develop** it?

Data Collection: Unstructured Interviews

Comp.	Business Domain	Size	Reuse Processes	Interviewee's Roles
A	Defense systems	Large (6 divisions)	Well established and followed	A1 – Software section R&D deputy A2 – Project manager (previously software department manager)
B	Manufacturing support systems	Large (2 divisions)	Partially established and followed	B1 – Corporate chief systems engineer B2 – Multidisciplinary development team leader B3 – Product manager
C	Data integration & big data management	Medium	Partially established and followed	C1 – Executive vice president, R&D and global technical operations

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Analysis Process

1. Transcribing the interviews
2. Extracting key sentences
 - The key sentences referred to the decision points described above
3. Extracting considerations from the key sentences
4. Review of the outcomes of steps 1-3 of another author
 - each outcome was created by one researcher and approved by another
5. Categorizing *all* considerations according to the two reuse decisions
 - Done independently by each researcher
6. Consolidating and refining the initial set throughout discussions
 - Till reaching consensus

Results: Reuse Considerations (1)

- Decision 1: Product development vs. asset adaptation**

Aspect	Consideration
Engineering	Quality Requirements (of the Product)
	Development Requirements (Time and Resources)
	Extent of Required Adaptation
Organizational	Developer Preferences
	Extent of Success of previous Reuse Attempts
	Management Decisions
Business	Customer Characteristics
	Product Characteristics (Functionality and Quality)
	Competitor Characteristics
	Technological Leadership
	Profitability

Results: Reuse Considerations (2)

- Decision 2: Asset development vs. asset extraction**

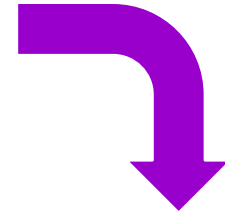
Aspect	Consideration
Engineering	Technological Forecast
	Maintainability
	Extent of Similarity
	Complexity of Variability
Organizational	Knowledge Sharing Support
	Resource Utilization
	(Re)Use Forecast
	Management Decisions
Business	Customer characteristics
	Product Characteristics
	Technology Characteristics
	Market Needs

What next?

- **Data collection using an on-line questionnaire**
- **More interviews**
 - Greater variety of business domains
 - Greater variety of stakeholders

Expected to yield

- **Greater variety and refinements of considerations**
- **A decision-support tool**



Please scan 😊

Thank you for listening!

