sirris

driving industry by technology

Cruising the Bermuda Triangle of Software Development

SVPP08, August 2008

wim.codenie@sirris.be

Agenda

1. Sirris & Sirris Software Engineering
2. Strategic challenges of Software Product Developers
3. Research Initiatives

SIRRIS

- Collective Centre of the Technological Industry
  - Industry driven
  - 2200 member companies in Belgium
- Sirris advises and supports companies on the implementation of technological innovations.
  - Awareness Creation
  - Application of Research Results in the Industry
  - Development Projects and Technological Advise

The Technological Industry

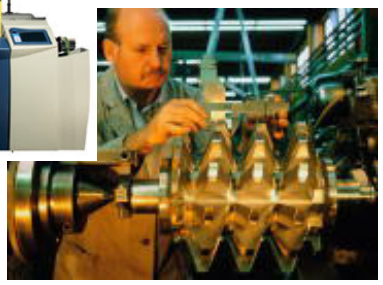
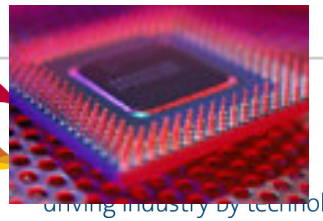
- Metals and Materials
- Metal Products
- Plastics
- Automobile
- Contracting and Maintenance
- Mechanics & Mechatronics
- Electrotechnic and electronics
- Aviation
- Defense & security
- Industrial Automation
- Information & Communication Technology







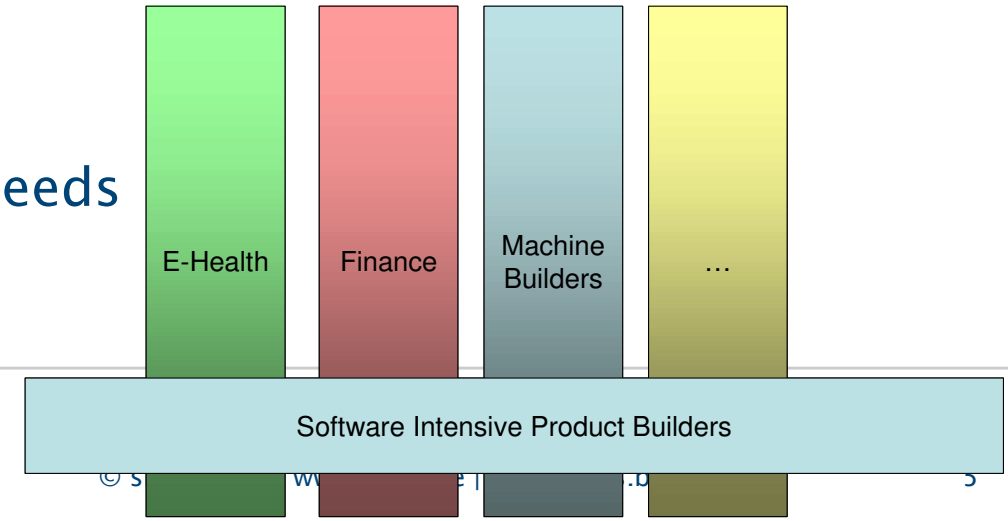




Software Engineering Group

- Target Group
  - Software Intensive Product Builders in Belgium
  - *"All companies which (may) have software in their end products"*
- What
  - Individual service for companies
  - Shared research in software engineering
- How
  - Strongly steered by industrial needs
  - "technological challenges"



Principles

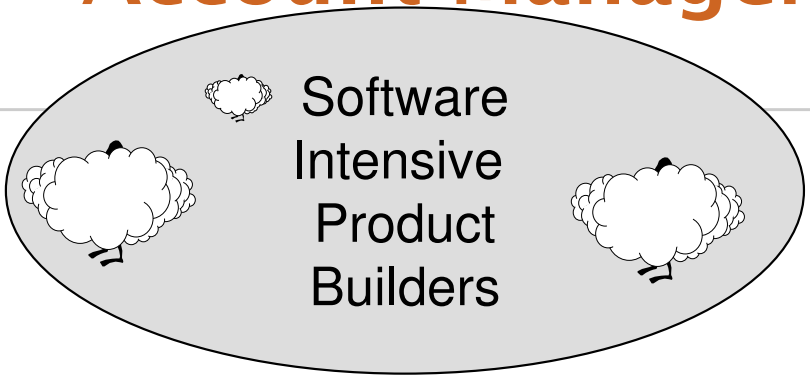
- Focus on relevant industrial themes in Software Engineering
- Focus on non-redundant themes

= criteria for internal functioning

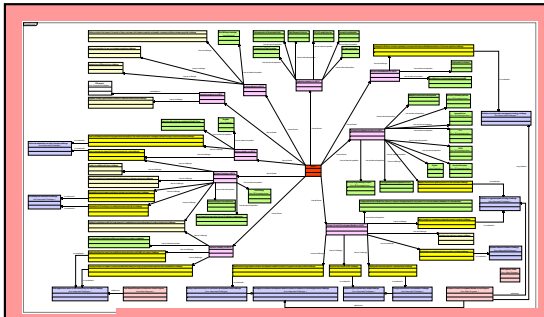
⇒ Means: technological knowledge network

- Not a network of companies
- Rather a network of relevant technological & industrial challenges & expertise
  - on a collective level → basis for knowledge acquisition
  - on an individual level → technological advice

Account Management



Account Management



Themes

Challenges

Expertise

>100 companies

Technological Knowledge Network

Advice

Research
Initiatives

Strategic Challenges

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3. Overview of Software Engineering Initiatives

Observation (1)

- *Increased Customer Intimacy,* i.e. competing on the basis of giving customers exactly what they need
  - This has become a business strategy adopted by 1 out of 2 companies!
- Shift from *mass production* to *mass customization*
  - Producing in large volumes, but at the same time giving each individual customer something different

The different faces of Variability …

Personalization of products

Adaptation of existing products to new markets

Offering Region Specific customizations of a product

Offering same product for different Operating Systems

Offering same product on different platforms

Offering of different version according to "usage level"

Customization (upgrading) of a software product while it is in production

Maintaining different versions of a product

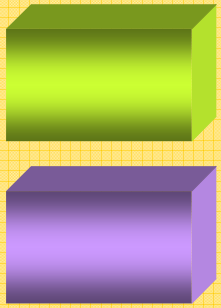
Product Variability

- *Customer intimacy* and *mass customization* lead to a large number of product variants per product base
  - *Product Variability: The ability to offer a large number of variants to customers*
- Because software is “invading” in more products, product variability is mainly situated at the software level

Different ways to realize…

Different products for each Variant

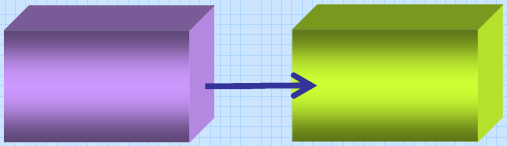
e.g. cockpit software in aviation environment



Consistency?
Time to market?

Evolution

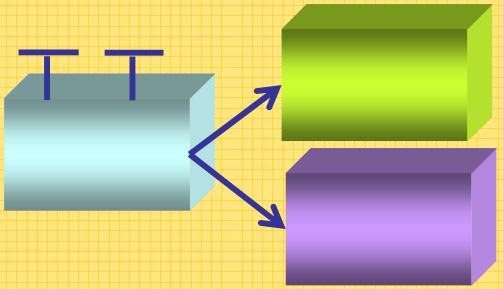
e.g. apply IT solution in a new market



Quality Degradation?
Version Management?

Configurable Product
"Swiss Army Knife"

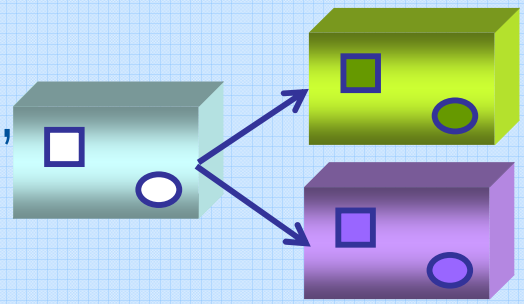
e.g. MS Word



Testability?
Complexity?
Anticipation?

Software Product Line
"semi finished product"

e.g. framework for banking



Anticipation?
Organization?
Reuse Architecture?

Observation (2)

- Many revenue today is generated by products that did not exist 5 years ago!
  - Innovation Dilemma
- Software as a major innovation enabler in many sectors
  - In Automotive software will account for 90% of all future innovations in cars!
- The average software product lifecycle today is less than 1 year!

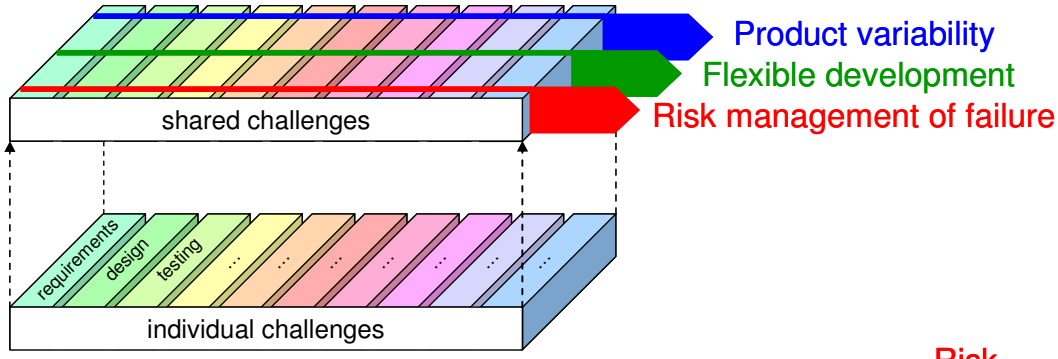
Flexible Development

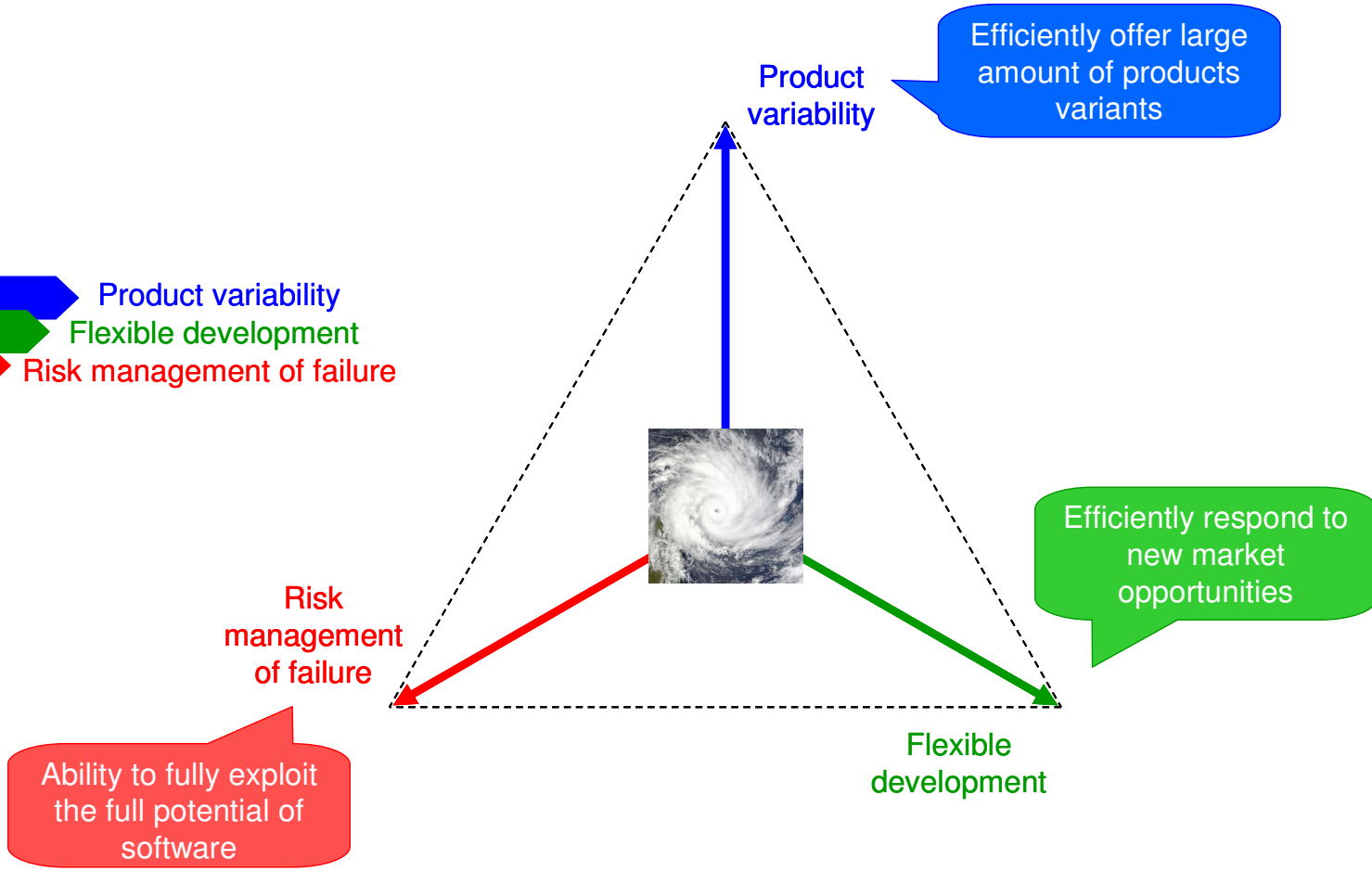
- The *first mover principle*, *rush to market* and the *innovation dilemma* lead to the need for *Flexible Development*
  - *Flexible Development: The ability to quickly response to new market needs and customer requests*
- Because software is “invading” in more products, flexibility is becoming a major issue in software development!

Risk Management of Software Failure

- The high failure rate of software combined with the increasing degree of penetration of software in all kinds of products leads to a need to reduce risks failures caused by software
  - Software is the root cause of many system problems
  - *Risk Reduction of Software Failures: The ability to fully exploit software in products without compromising safety, security, or robustness of mission critical applications*

Qualitative results
The Bermuda Triangle of Software Development





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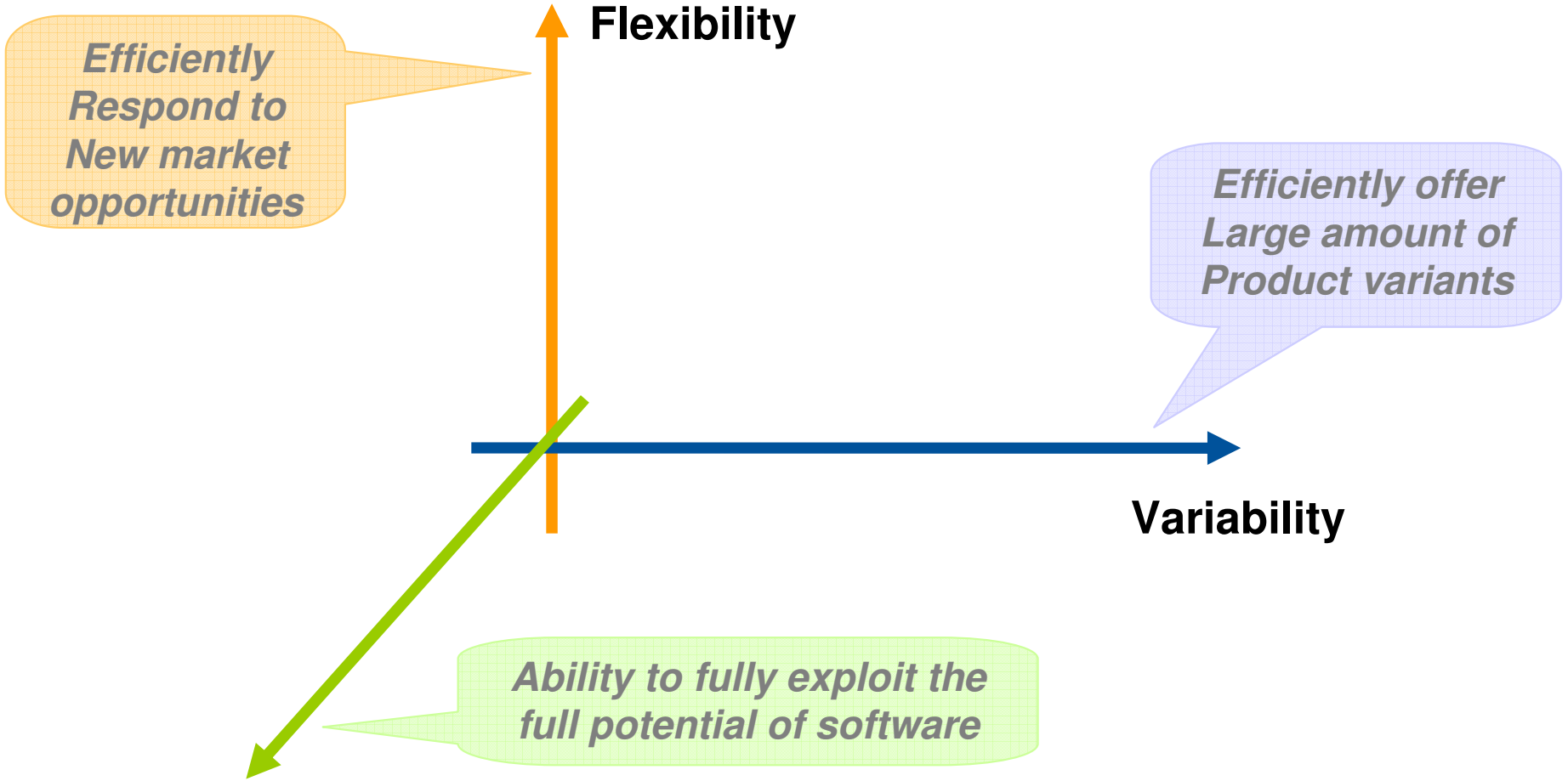
Sirris Software Engineering
Research dimensions & Action programs

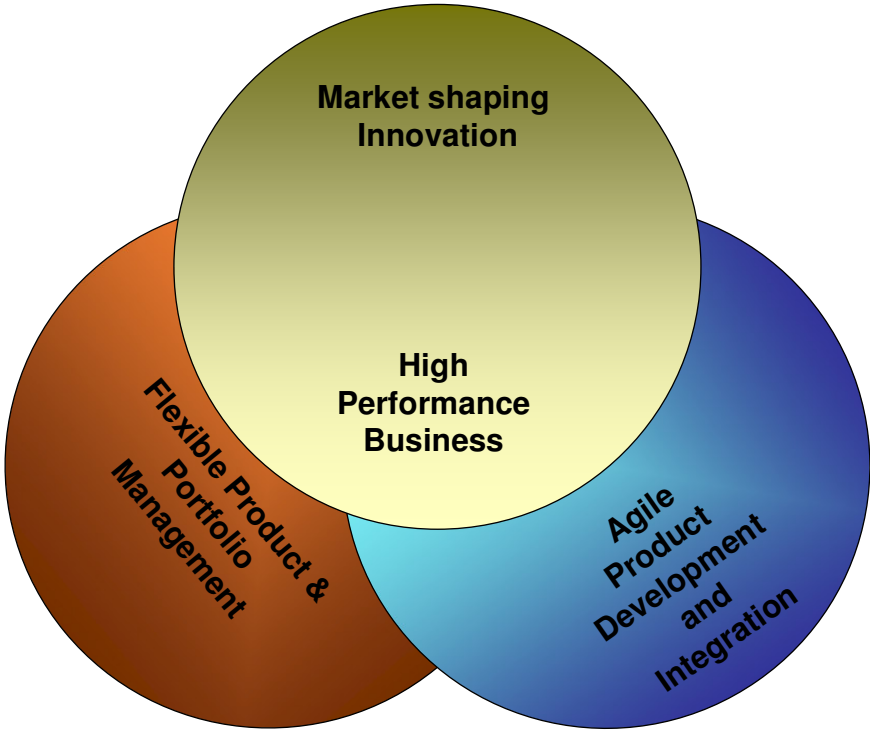


Flexibility
in software engineering

- Research & Development
  - FLEXI project (http://www.flexi-itea2.org)
    - European research with industrial partners (Eureka-ITEA)
    - the largest Research project in the world concerning agile development (representing 279 men year in 3 years, 40 EU companies and R&D centra involved, 4 BE companies involve 6 FTE)
    - Sirris is co-founder and dedicates 2 FTE to the project

Goal of Flexi

- Offer a means to realize high performance business
  - From idea to product in six months.
- Three perspectives:
  - Market shaping innovation: Exploit agility to create an innovative culture and a fast market introduction of innovations in the context of software intensive industry
  - Release definition: Realize a flexible market-driven product portfolio management
  - Agile product development & continous integration: Develop new agile development solutions for large, collaborative, multi-site teams of both SME's and large corporations.



Variability
of software based products

- Research & Development
  - Founder and coordinator of the VARIBRU initiative
    - 10 FTE industrial oriented research for the Brussels Capital Region
    - Sirris is projectleader and involves 2 FTE
    - 6 research units of 4 different Brussels partners
    - http:www.varibru.be

Challenges & Rationale

***Observation**: "Large state of the art in variability management for software development exists. This state of the art addresses variability from various point of views"*

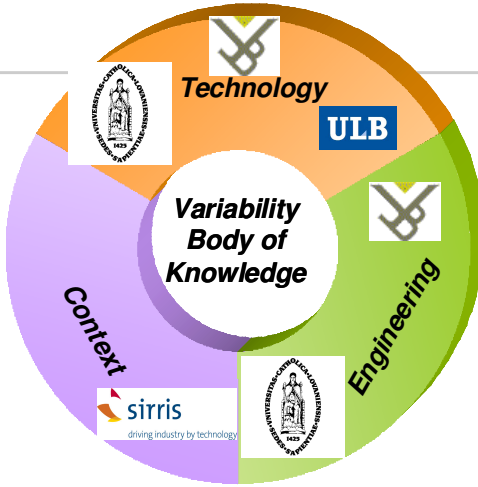
***Hypothesis**: "In order to successfully introduce variability in their software-intensive products, three perspectives need to be mastered: the Technology Perspective, Engineering Perspective and the Context Perspective."*

***Observation**: "It is very difficult to assess the relevance of a variability management solution in the context of a company. What works well in one context might not work well in another."*

***Hypothesis**: "The core of the problem is in decision making: choosing an optimal variability approach, and understanding and managing the intricate interactions between different perspectives of variability."*

VariBRU Research Strategy

1. Build a **Body of Knowledge** across 3 different viewpoints
   - What **technology** to use?
     - E.g. Configuration with XML
   - How to deal with variability during **engineering**?
     - How to manage the risks induced by introduction of variability?
   - How to incorporate **context** information?
     - E.g. Avoiding configuration parameters that are never used

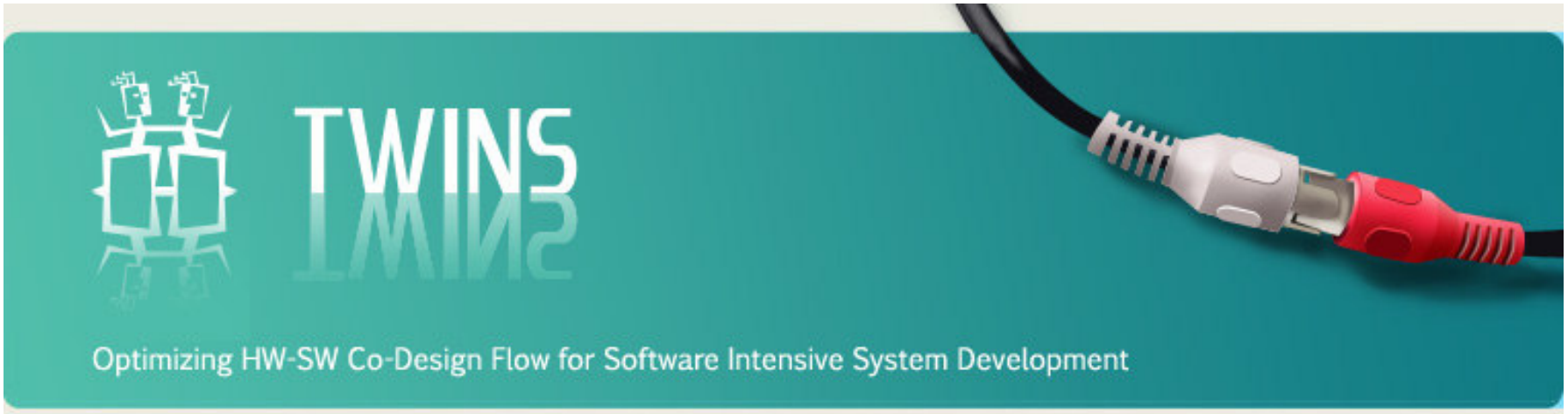


2. Consolidate this into a innovative **Decision Framework**
   - Selecting and adopting variability approaches

3. Deploy a Brussels Variability **Competence Centre**
   - That acts as partner for the ICT industry in the field of variability

Risk management
of software failures

- Research & Development
  - TWINS project (http://www.twins-itea.org)
    - European research with industrial partners (Eureka-ITEA)
    - 25 EU companies and R&D centra involved
    - Sirris dedicates 1,5 FTE to the project



Contact

- Wim.Codenie@sirris.be
  Program coordinator
  Software Engineering

  +32 2 706 79 44