

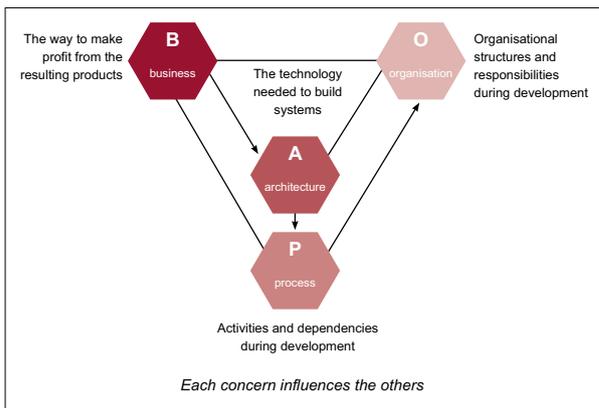


PROJECT RESULTS

# From concepts to implementation

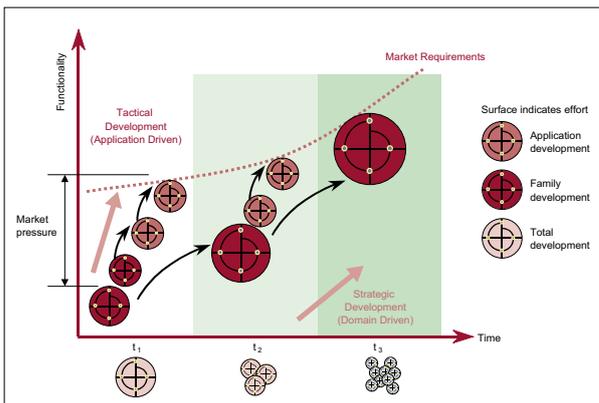
## Developments in System-Family Engineering

**ITEA project, CAFÉ, extended the results of its earlier ESAPS project by producing new methods and processes with which to support the whole life-cycle of system-family development. CAFÉ achieved this by bringing together the separate concepts of ESAPS into a unified whole.**



System-Family Engineering software development concerns: BAPO (Henk Obbink, Philips Research)

**New methods and processes**  
Many products are information-intensive. Rather than collecting the same information each time it is a better strategy to base new product development on building system families. However, so far,



Increase System-Family Engineering to speed-up development

mainstream software engineering technology has focused on the creation of one product at a time, and existing process models don't address system-family development adequately.

In order to reduce costs, improve quality and meet diverse client requirements, European industry needs to improve its competence in this area. Benefits of the system-family approach include:

- a reduction in product development costs while customer demands can be met more precisely, leading to increased market share,
- the competitive advantage of well-engineered system families can be used to enter new markets rapidly,
- system families are built on reusable components. This creates a market for component manufacturers and supports the creation of high-tech software small and medium-sized enterprises (SMEs),
- system families enable personnel costs to be reduced, or existing personnel may be used more efficiently across a wider range of tasks.

### Stimulating the system-family approach

The CAFÉ project introduced the business, architecture, process and organisation (BAPO) model in order to show that software development is influenced by concerns arising from a range of sources. These sources are grouped into four main categories:

- Business concerns – the way resulting products can generate profits.
- Architecture relates to the technology needed to build the system.
- Process concerns – the process responsibilities and dependencies relevant to software development.

## CAFÉ (ITEA 00004)

### Partners

- European Software Institute
- Fraunhofer IESE
- ICT-Norway
- INRIA
- Instituto di Elaborazione della Informazione
- Ivorum Software
- JKU Linz
- Market Maker
- Nokia
- Omega Generation
- Philips
- Robert Bosch
- Siemens
- Softeam
- Telvent
- Thales
- TU Wien
- Universidad Politécnica de Madrid
- University of Essen
- University of Helsinki

### Countries involved

- Austria
- Finland
- France
- Germany
- Italy
- The Netherlands
- Norway
- Spain

### Start of the project

July 2001

### End of the project

June 2003



## PROJECT RESULTS

- Organisational concerns – the environment in which the software is developed.

Changes in one area will affect the others and best-practice software development takes all these concerns into account. However, in many software development organisations these concerns aren't addressed in detail.

The CAFÉ project describes the organisational aspects relevant to ESAPS in an explicit way. In ESAPS, an initial system-family development process was created, along with platforms, components, methods, tools and processes for managing these assets. In CAFÉ the use of the system-family approach has been broadened by bringing neighbouring systems into the family, by maturing existing platforms and by providing investment when a system-family approach proves beneficial. CAFÉ has also filled in gaps not covered by the work of ESAPS. It provides a basis for further industrial research on, for example, testing methods, design for quality, and system validation.

CAFÉ prioritised the following technologies:

- product family adoption: when and how a system-family approach should be introduced and how best to integrate new with existing processes,
- a roadmap for product line adoption (including processes, techniques, and tools),
- support for integrating existing systems into system families to share knowledge and reduce future cost,
- support for development on interoperable heterogeneous platforms,

- support for dealing with varying quality requirements in a product family,
- integrated traceability, version management and variation support,
- support for testing and validation to reduce development time for family members.

### Mature product family engineering for the European industry

The results of the CAFÉ project have been published in a number of public deliverables that can be retrieved from the CAFÉ public website ([www.esi.es](http://www.esi.es) - under RTD projects search for CAFÉ). These deliverables cover the major topics in CAFÉ, such as System-Family Adoption; Asset Building and Usage; and Validation & Testing.

The project CAFÉ has brought first concepts for product family engineering to maturity so that they can be used to develop methods and procedures in real-world, concrete, projects. Services that make use of the project's results, which can be expected to be announced around 2005, will secure greater competitive power for many European sectors, including communications, air traffic control, healthcare, utilities control, supervision and management, financial services, and the automotive industry.

At the project's conclusion Philips Medical Systems and Nokia – two of the project's major partners – demonstrated how the concepts of CAFÉ were applied to their current product lines. These include medical systems and mobile phones and switching systems. The partners showed there had been an improvement to the competitive strength of both companies.

### Major project outcomes

#### Dissemination

- 113 papers (including conference presentations)
- 28 presentations/demos at events
- 20 articles
- The organisation of the PFE workshops
- 15 other dissemination activities

#### Exploitation

- 5 new products (2 for internal use)
- 4 new services for internal purposes
- 1 new system for internal use

#### Standardisation

- 5 contributions to 3 standardisation bodies (ESI, IEEE, OMG)

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Σ! 2023

October 2004