STRENGTHENING COMPETITIVENESS IN THE EUROPEAN RESEARCH AREA

European Commission

Information Society
Technologies

AITPL – IN A NUTSHELL

The strength of the European Economy is substantially based on agile enterprise networks, able to react to market demands in shortest time. They are still competing successfully on a world-wide scale with enterprises from low-wage countries. This success can be kept, only, if the networks establish and maintain smooth communications covering the complete life cycle of the product. Significant effort has been spent to synchronize the product development in such networks. However, the same exertion is indispensable to improve the manufacturing chain itself, providing means for a radical make-to-order strategy. This includes substantial new methods for product configuration, for supply network management, for the control of the supply network material capability as well as managing new model variants and variants going out of production.

While the challenge is to the network, the reaction to the challenge has to be performed by the companies as the only real actors. The keyword is context awareness, providing means to effectively manage decisions of different network partners. Different environments within one system should adapt to the roles of the human being addressing the network, and different (possibly conflicting) changes need to be detected and introduced into the workflow for problem solving. Today, Europe's attitude with respect to agility is massively higher than from distant low-cost / high volume providers. However, achieving the goals mentioned requires a new step forward in terms of the business culture. The projects in this cluster address these issues in order to maintain and even improve Europe's competitiveness.

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AITPL – FIELDS OF COOPERATION

BUSINESS PROCESS MODELING

The business process modeling (BPM) and analysis is usually carried out to streamline the business and serves as a fundamental base for a continuous observation and strengthening of improvement and competitiveness. Moreover, the BPM is a powerful scientific instrument to achieve research project goals. Hence, the European projects FLUID-WIN, E4, ILIPT and MAPPER found together in the Special Interest Group BPM. IT has been established as a common forum to discuss various aspects of modeling such as problems, best practices, research activities, and industrial applications. All projects benefit due to the mutual exchange of their results and experiences.

FLEXIBILITY OF PRODUCTION LINES

The SIG "Flexibility of Production Lines" addresses the wide ranging field of different types of manufacturing system flexibility and the technological and architectural approaches used to enhance these types of flexibility. It will discuss the problem of flexibility within manufacturing systems from different view points mentioned above with a focus on technologies and architectures (especially control architectures) and bordering conditions required to enable flexibility as well as effects caused by improved flexibility. Therefore, it will discuss best practice, research activities, and industrial applications and will provide a mean for assessment of project results related to manufacturing system flexibility.

PRE-NORMATIVE ACTIVITIES

The standardisation and pre-normative activities are focused on the identification of standards, commonalities and synergies across the AITPL projects and to promote standards at international level based on the AITPL projects research and experiences.

To this end, main research topics with clear identification of the standards being used or developed, the lack of standards in the research area as well as the enhancement of existing standards are extensively addressed.

The main research topics identified include:

- Value chain modelling in the SMEs networking based on VCOR as well as SCOR;
- Flexible supply network for automobile industry based on Odette and OAGIS;
- Web services interoperability;
- Collaborative knowledge management;
- Definition of open tracking and tracing architecture based on uniqueness and use of URL;
- Evaluation of flexibility in a variety of industries and production systems.

CATER

Project summary

The CATER project is an FP6 EU project launched in September 2006 aiming at developing innovative ICT tools and methods for mass customization of vehicles as well as new approaches to automotive design principles.

CATER introduces systems and methodologies that go beyond the traditional approaches of automotive OEMs and in which design is driven by cross-cultural and emotional aspects of customer needs, enabled through the integration of innovative ideas from diverse expertise of both Europe and Asia. CATER also advocates networked business in the automotive field, aiming at a better integration of stakeholders (from OEMs to customers) within the supply chain, to support product planners and designers; while the customers can design their own vehicle via a VR interface in a 3D Web environment.

CATER includes in its partnership 14 major European and Asian organisations; from vehicle manufacturers, OEMs to research centres and universities.

Outcome

To reach its objectives, CATER will develop several tools:

- A semantic notation system,
- A novel engineering methodology, called citarasa, involving elicitation of customer expertise and feeling in vehicle purchase
- Virtual Reality interfaces, including a Do-it-Yourself Design system for vehicle design
- A retrieval "module" (MArk)

E4

Project summary

The E4 project, established in January 2006 with twelve European partners from both industry and academia, aims to support suppliers of a manufacturing network under pressure of international market competition. The E4 Platform will provide a "virtual environment" where all participants of a project (Clients, Project Manager, Technicians and Suppliers) could:

- Access in a sure way to the system (registered users)
- Use all information available in respect to the roles
- Synchronize his own job with respect to a shared work plan
- Monitor the whole project in terms of Time, Costs and Quality using Key Performance Indicators.

Outcome

E4 want to implement an effective, integrated and easy to understand platform which will combine the following functions in just one platform:

- o Collaborative Project Management
- o Collaborative Customer Relationship Management
- o Collaborative Quality Management
- o Collaborative Product Structure Management
- o Collaborative Document Management
- o Collaborative Knowledge Management

In order to **"Making better products in less time"**

FLUID-WIN

Project Summary

The FLUID-WIN project aims to provide new efficient mechanisms for the interaction of service providers with manufacturing networks. The key innovation is to bind service providers to a complete B2B network, instead of interfacing them with the single network members, thus leading to the novel approach of business-to-network or B2(B2B) interaction. Key results are:

- The novel B2(B2B) business process model, build on field studies from manufacturing networks, logistic service providers and financial service providers.
- The prototypical implementation of a Web-based platform designed for application service (ASP) mode that implements the B2(B2B) method.
- A real-life evaluation, attaching service providers to different B2B networks.

Outcome

The research will lead to the following major results:

- Publication of the new B2(B2B) approach with a guideline targeted to the different roles of network partners.
- Provision of a Web platform that is open to manufacturing B2B networks as well as logistic and financial service providers outside the consortium.
- Collection of the detected shortcomings in used standards and reference models.

MAPPER

Project Summary

The MAPPER project develops enabling technologies for fast and flexible manufacturing in dynamic networked organisations. MAPPER provides methodology, infrastructure and reusable services for participative engineering in networked manufacturing enterprises, demonstrating practical benefits and scientific values in three industrial pilots realized by: an automotive manufacturer, automotive components supplier, and a design house (SME) of electronic virtual components.

Outcome

The main S&T results include:

- *Reconfigurable visual enterprise models* of products, processes and other enterprise aspects. Models described in business domain terminologies enable the cultivation of a web of shared understanding among stakeholders, and management of complex and dynamic enterprises.

- *Participative engineering methodologies*, enabling joint product and process design, interdisciplinary and inter-organisational collaboration throughout multiple product life-cycles.

- *Customisable work environments* for different stakeholders, roles and tasks. The platform will enable solution providers and users to jointly customise and configure such environments.

- *Secure collaboration platform*, enabling enterprises to access each other's engineering tools and product data in a collaborative, yet secure manner.

NET WMS

NET-WMS

Project Summary

The Net-WMS project aims at proposing interactive optimisation tools and prototype software that will form the basis for a new generation of **Warehouse Management Systems** networked services. Net-WMS will handle networked communication and co-operation processes through a variety of technologies:

- the integration of decision-making technologies,
- generic 2D/3D and higher-dimensional placement constraint solvers,
- visualisation and interaction with the solvers in virtual reality,
- packing models and knowledge modelling with business rules.

Outcome

The project scientific outcome will be relevant to the whole domain of combinatorial optimisation. It will have direct technological impact on Supply Chain Management at both the WMS and TMS (Transportation Management Software) levels, especially in the areas of packing, vehicle loading, space management, planning & scheduling, inventory control and packed item visualisation. In terms of commercial results, Net-WMS will produce:

- a packing modeller based on optimisation techniques and interactions in virtual reality,
- a palletising tool using optimisation techniques,
- a dispatcher including the virtualisation of a truckload

PABADIS'PROMISE

Project Summary

The PABADIS'PROMISE project expands established distributed control by incorporating not only models of resources and products but also distributed execution and reconfiguration of equipment. Thereby, the project follows the new paradigm "The Order is the Application" which stipulates a correspondingly innovative control and networking architecture across all levels of plant and manufacturing hierarchy exploiting upcoming architectural patterns like service oriented, agent oriented, and function block oriented architectures.

Outcome

The main impact of the project results is expected for single piece production as given in industries such as automotive, aircraft, machining tool, electronics and furniture. By the proposed architecture it will be possible to reach the following benefits:

- Ease of reconfiguration of assembly, production, and transport systems over their lifecycle in a plug-and-participate or manually controlled way
- Dynamic (re-) configuration of control and manufacturing equipment on production demand
- Higher value of built-in equipment flexibility by linking it to over-all plant flexibility needs
- Alteration of customer demand (product parameters) until their ultimate possible point
- Cross company wide co-operation over the whole supply chain.

SMART

Project Summary

The SMART project aims to support intelligent business networking and consumer services based on effective and efficient information/knowledge sharing and collaboration across supply chain partners, capitalizing on the fact that products are uniquely identified with the use of RFID technology. The project employs a distributed service-oriented architecture in order to support real time information sharing, decision making and collaboration among supply chain partners, as well as information services to educated customers.

Outcome

The project's overall objectives and expected outcome include:

- Innovative in-store consumer services and new supply-chain collaboration scenarios.
- Scalable, reliable and secure infrastructure supporting information sharing, collaboration and electronic services.
- New decision-support algorithms and software tools supporting store operations and supply chain processes.
- Collaborative services repository to enable open and dynamic integration in a global environment.
- Assessment from a business and marketing perspective of the impact that the developed services will have on increasing consumer value and building consumer loyalty.

SPIDER-WIN

Project Summary

The goal of SPIDER-WIN is to achieve efficient and simple exchange of order-related information among SMEs. SPIDER-WIN allows an accurate and fast feedback among the customer and any level of suppliers, and thus becomes a key element to providing supply networks with detailed information almost in real time, in order to properly identify delivery problems in advance. Key results are:

- The SPIDER-WIN business process model, build on field studies from different supply networks which models the supply network interactions.

- A novel Interlink Model that provides the means for a precise and efficient description of the product-specific supply network characteristics, allowing for interoperability within a network of independent companies being part of several different networks.

- A Web-based Prototype that implements the business processes and the interlink model, evaluated for three supply networks from different branches.

Outcome

The implementation of the SPIDER-WIN approach leads to the following major results:

- Improvement in customer service
- Lead time reduction
- Improvement in delivery dates
- Control simplification
- Paper use reduction (in compliance with ISO 14001)

TRASER

Project Summary

TraSer develops true Open tracking and tracing. TraSer based services are distributed and not dependent on centralized co-ordination. Using the unique ID@URI concept, TraSer compliant equipment sends tracking data automatically to the right locations without prior configuration. TraSer software and services will be completely "open source".

Outcome

- An Open-source software platform for product and product-data track and trace, allowing for:
    - Low initial systems investment,
    - Applicability with legacy and low-end standard systems,
    - Lean implementation and maintenance, to minimise the requirements for IT specialist staff,
    - SME Access to tracking infrastructure and RFID readers of Logistics Service Providers, also for small and incidental shippers.
- Implementations in various industry sectors
- Descriptions of specific business scenarios and models of potential benefits for small and medium sized companies
- Advancing theory on product-centric service innovation, the evolution paths for product-centric information architectures and applications.

X-CHANGE

Project Summary

The X-Change project, established in September 2005 with seven European partners from both industry and academia, aims to develop a flexible measurement tool capable of responding to the ever-changing business environment.

The key innovations of the X-Change project are:

- The development of several innovative, near real-time flexibility measurement methods.
- As well as the integration of the results of the flexibility measures into existing change management processes.

Outcome

The successful development and deployment of the X-Change results tend to meet the following key performance indicators:

- Reduction of the time from occurrence of a change necessity to fulfillment of the requirements by 20-30%
- Reduction of the adaptation cost by 25-35%
- Reduction of the number of inquiries by 10-20%
- Reduction of the opportunity cost by 10-20%
- Reduction of the investments for extra tools and machines by 5-10%
- Increase of the number of re-used production equipment by 20-30%