



Information Society
Technologies



SMEs Network Processes Harmonization and Collaborative Environment Development

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Globalized Competitive Environment

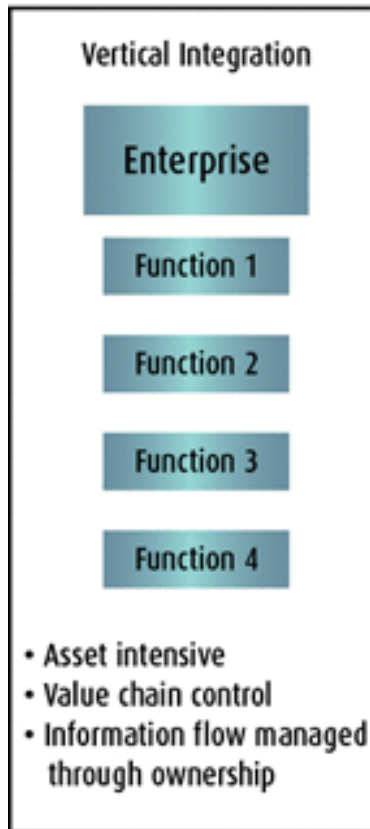
- Globalisation nowadays is linked to the enterprise challenge of managing changes and innovation in an increasingly competitive world.
- To survive and prosper, companies must reduce operating costs, increase automation and control, and prepare to scale the number of business relationships they can support.
 - An enterprise's competitiveness today is to a large extent determined by its ability to seamlessly interoperate with others.

Growing need for adopting innovative approaches to business organization

- The challenge is greater for SMEs, due to:
 - Limited R&D budgets (if compared to the R&D budget of large enterprises);
 - Limited capability for efficient interaction with business partners - traditional communication and collaboration tools (face-to-face meetings, telephone conversations, fax and e-mail messages, paper documents exchange).
- Therefore, there is a ***growing need to adopt innovative approaches to business organization.***

Traditional Enterprises

Traditional Approach



➤ Structured as ***vertical silos***

➤ ***Inward-oriented*** business processes

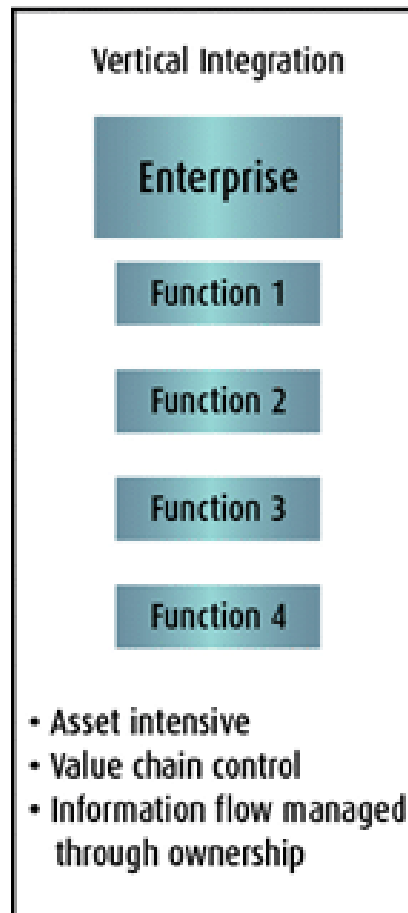
⇒ ***Drawbacks*** of the traditional approach:

✓ Extremely ***capital-intensive***

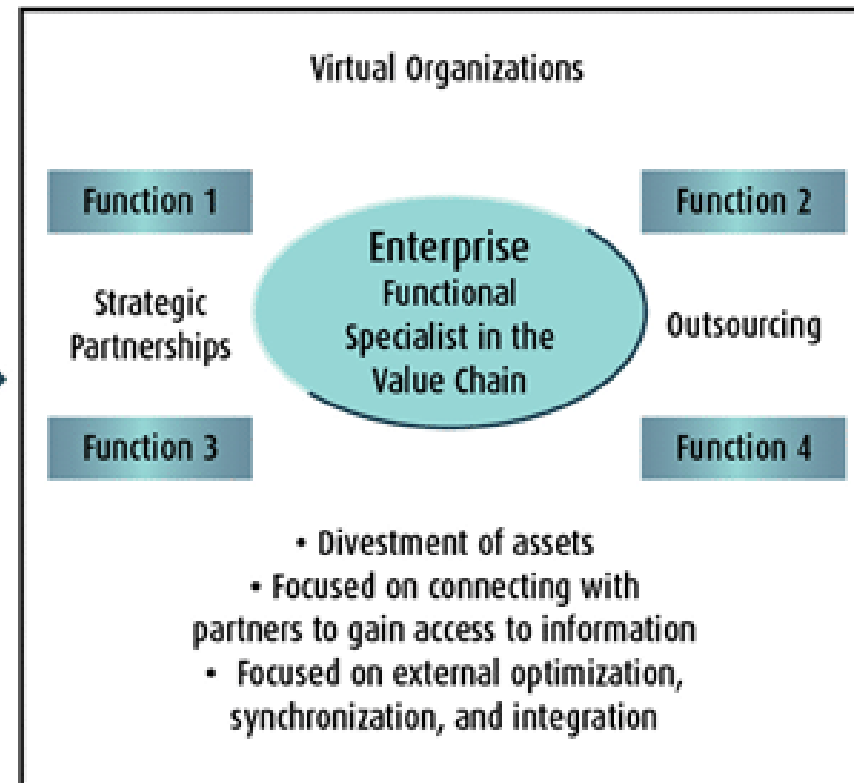
✓ This model forces organisations ***to focus efforts on business functions that are not their core competencies***

Shift from Traditional to Virtual Organisation

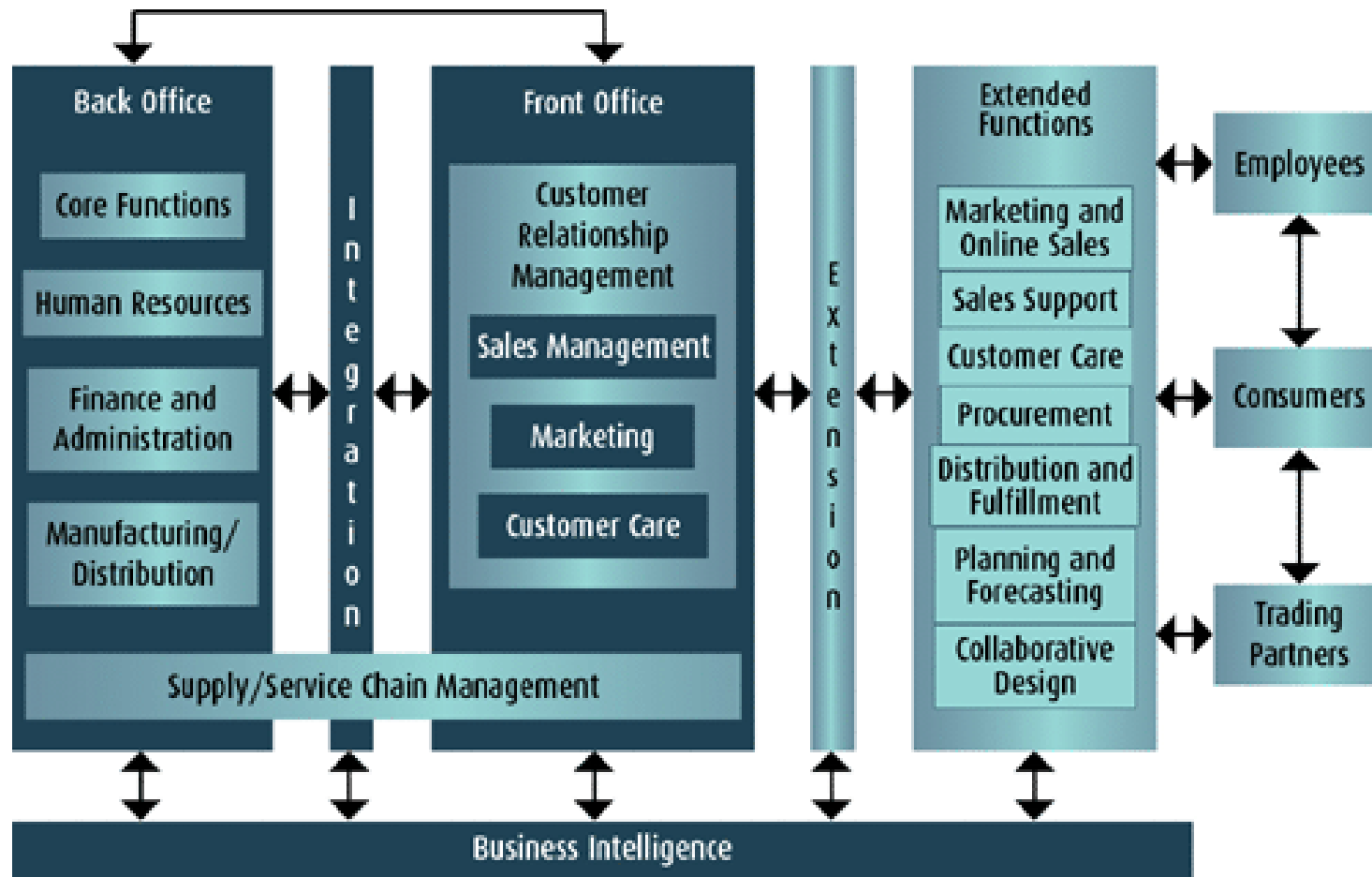
Traditional Approach



The New Approach



The Extended Enterprise Business Model



An extended enterprise – the phenomenon where an organisation extends outside its traditional boundaries



Characteristic Features of the Extended Enterprise

- Increased dynamics
- Complicated network communications
- Shared objectives, goals and expectations by all partners in the extended enterprise
- Common value chain members - still separate entities with their own interests
- Strictly followed Intellectual Property Rules

Manufacturing Networks

- Design and manufacturing of assembled products - usually carried out by a network of enterprises:
 - ✓ Subsystems at the higher tiers
 - ✓ Simpler components at the lower tiers (SMEs)
- Activities at the lower tiers:
 - ✓ Short – a few months at most
 - ✓ Frequent design changes
- Suppliers – under constant pressures for continuous innovation and technological adaptation due to intensification of competition in the European internal market.
- Suppliers - compete on cost, quality and response time; transparency and reliability are key components of process quality.

Existing Collaboration Problems

- SMEs rely upon a great variety of tools – different CAD/CAM systems, ERP systems, project management software, which are not integrated, difficult to use and often ineffective.
- The OEMs often require the SMEs (suppliers) in their networks to use specific tools, leading to higher expenses of suppliers for:
 - ✓ Buying new software
 - ✓ Integration with existing systems
 - ✓ Training employees

Collaborative Environment Development

- Lack of collaborative networks among SMEs in EC region and Eastern Europe.
- Unavailable suitable software solutions that could support manufacturing collaborative networks, and especially SMEs.
- **E4 - Extended Enterprise Management in Enlarged Europe** - funded by the European Commission within FP6:
 - ✓ **Main goal** - to develop innovative integrated collaborative environment specifically tailored to the needs of the suppliers operating in a business network, involving companies from all over Europe.



Need for harmonization and Standardization of Business Processes in Collaborative Networks (1/4)

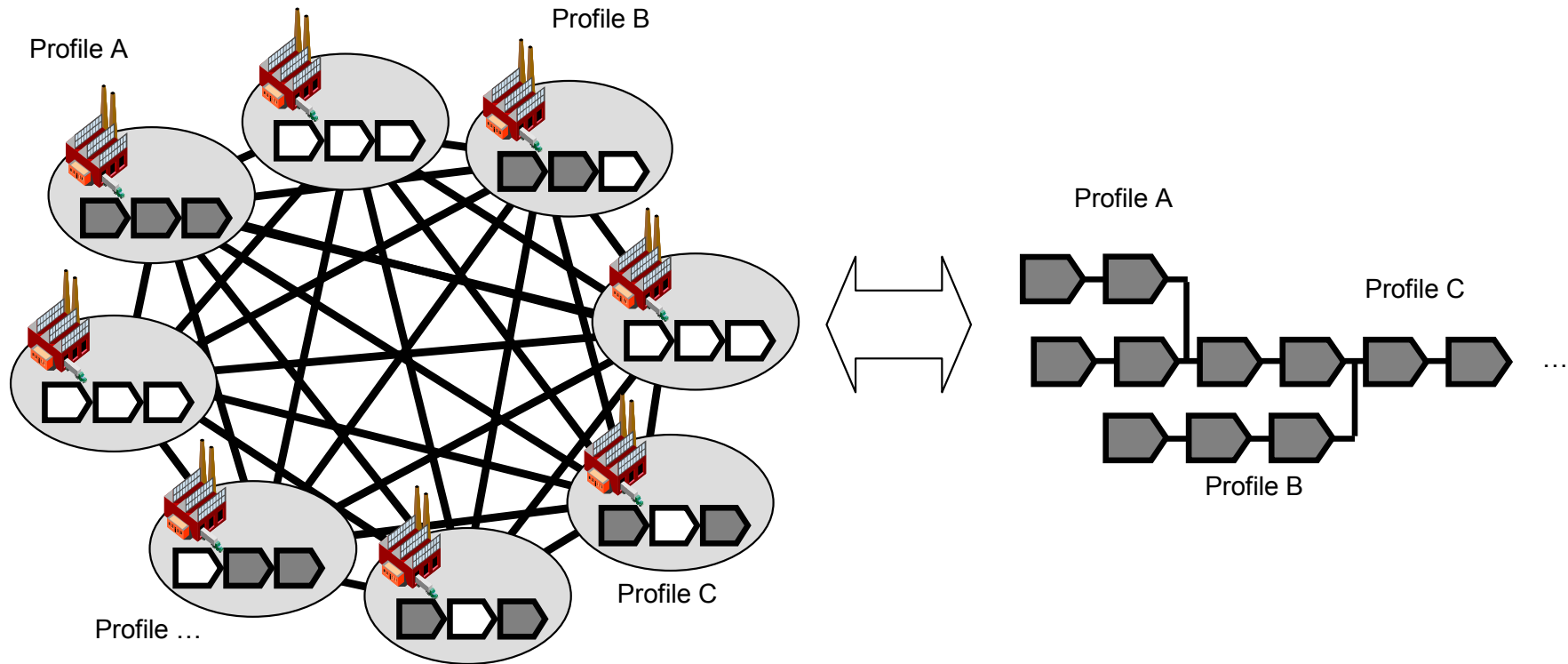
- The performed analysis revealed that a critical prerequisite for a successful collaborative environment development appeared to be the introduction of a model for harmonization and standardisation of the business processes and activities of the involved companies.
 - The complexity and heterogeneity of contemporary collaborative business networks is constantly increasing.
 - However, there is still a lack of common standards and terminologies to support and improve the collaboration between the participating partners.



Need for harmonization and Standardization of Business Processes in Collaborative Networks (2/4)

- A lot of research efforts have been made for providing a structured and comprehensive presentation of business relations and processes within a network.
- Recently proposed approaches consider business networks as based on processes, each of them being a sequence of partners' activities.
- Since every process with its inputs and outputs contributes to the network's added value, each process is considered a part of a value chain process within a network.

Process View of a Network



- The presentation of a network from a process perspective significantly decreases the network complexity due to the elimination of intra-company processes that are not shared with network partners.

Need for harmonization and Standardization of Business Processes in Collaborative Networks (3/4)

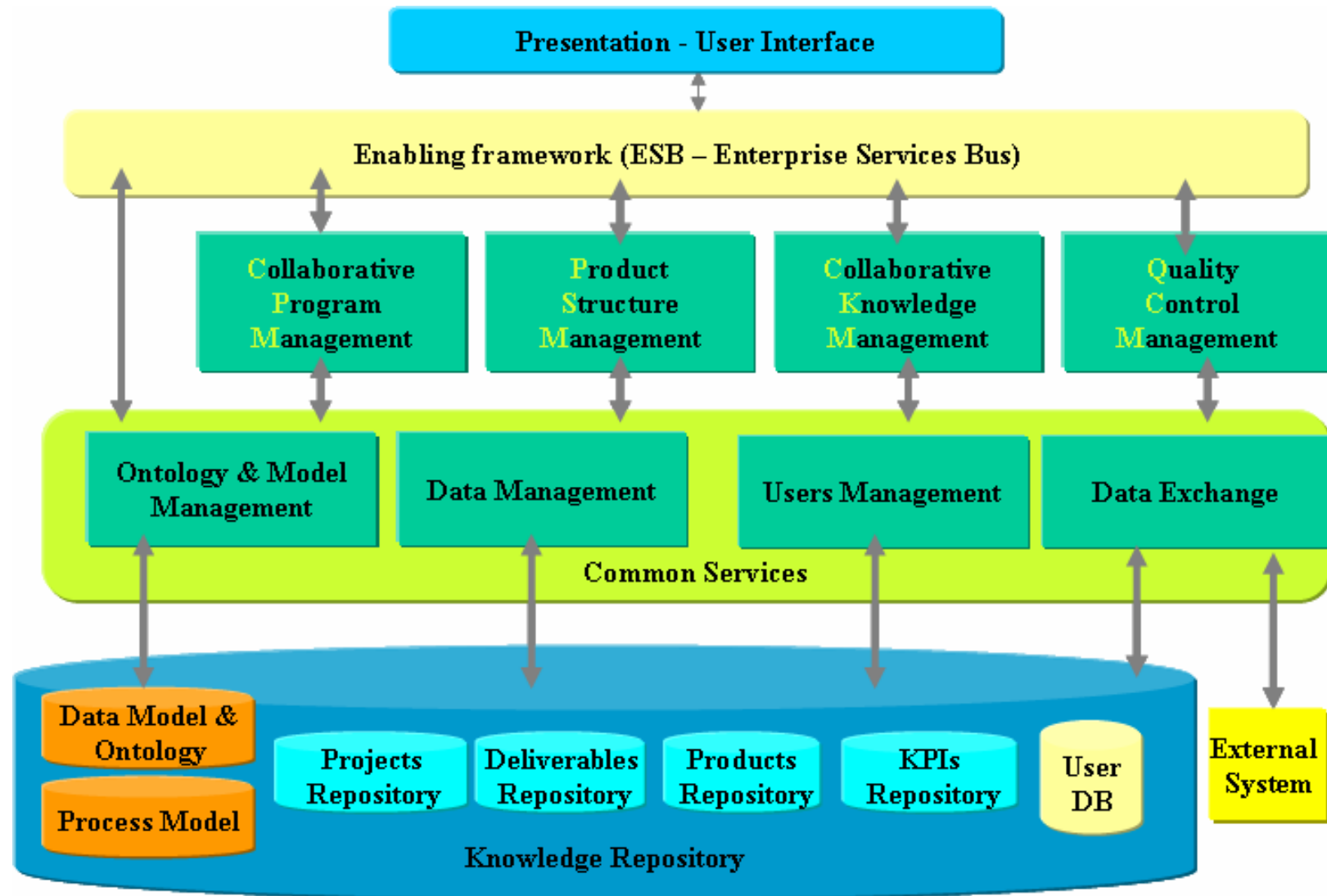
- This approach is used for the E4 collaborative platform development:
 - In order to decrease the complexity and heterogeneity of contemporary business networks, they are described by only those activities, going on between business partners.
- The Value Chain Operations Reference (VCOR) Model is used for ensuring a common terminology and standard process descriptions, and for understanding the activities that make up the value chain.



Need for harmonization and Standardization of Business Processes in Collaborative Networks (4/4)

- When building its profile and providing data about its products, each company describes only those activities, related to its business partners.
- These activities are then mapped against the standard micro-processes of the VCOR model and values are provided for the parameters (Key Performance Indicators – KPIs), corresponding to each micro-process.
- Based on this model, the main functionalities that the developed collaborative environment should provide, are identified.

E4 Platform Logical Architecture



Basic Elements of the Logical Architecture

- **Data Layer** – Knowledge repository (incl. data from Projects, Deliverables, Products, KPIs and any other source of knowledge such as documents, ideas, emails, media, exchanged by the platform users)
- **Common Services** – containing all the services that can provide reusable functions - data management, data exchange, users management, ontology and model management
- **Enabling Framework** - providing a set of infrastructure capabilities, implemented by middleware technology, that enable the integration and the choreography of services in the SOA
- **Vertical Modules** – providing the platform functionalities
- **User Interface** - providing an access point to all platform functionalities

Vertical Application Modules

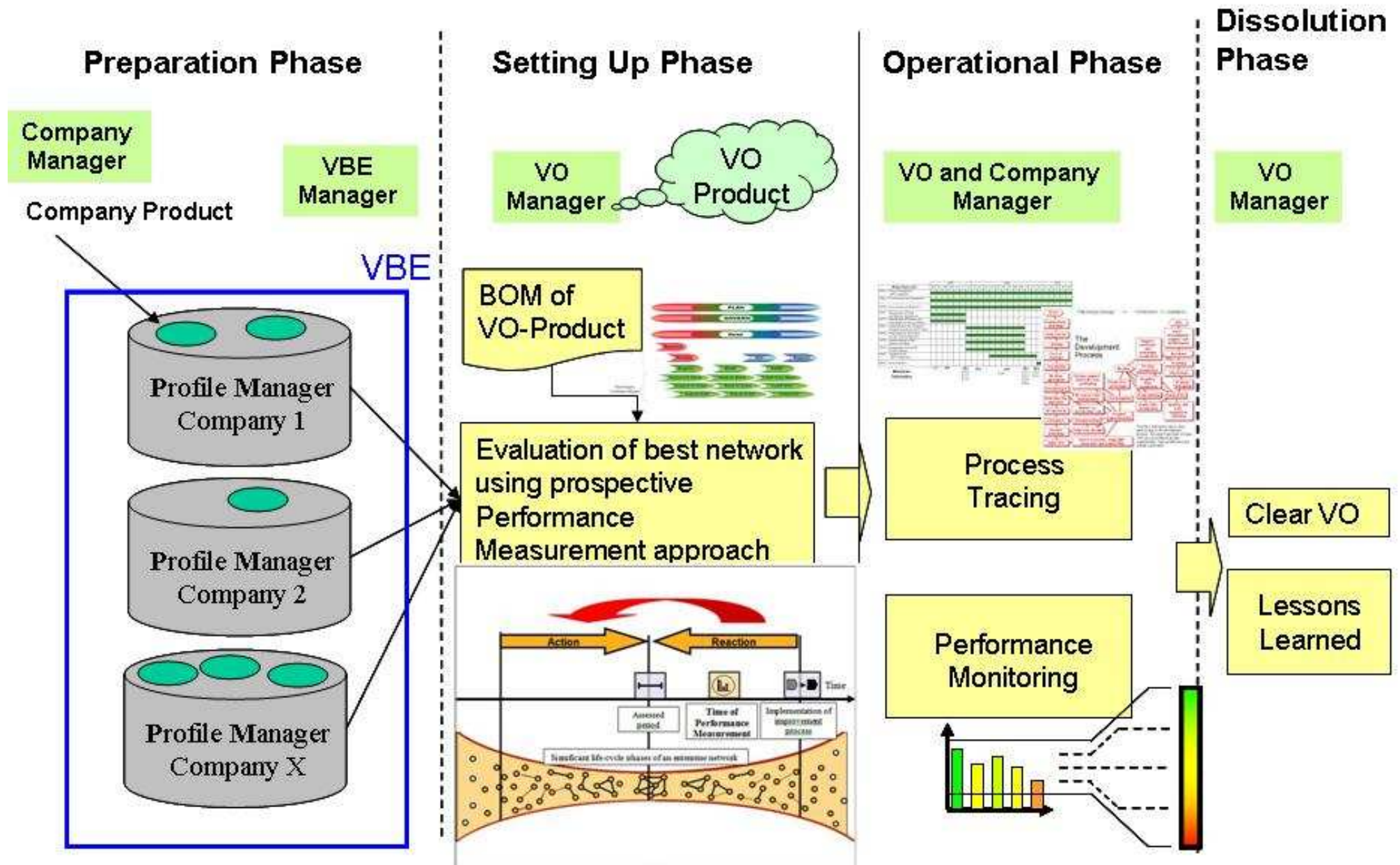
- ***Collaborative Program Management (CPM) Module*** - manages the planning and monitoring of development activities;
- ***Product Structure Management (PSM) Module*** - manages the structure of the product under development and all related information;
- ***Collaborative Knowledge Management (CKM) Module*** - provides knowledge re-use and learning from past experiences;
- ***Quality Control Management (QCM) Module*** - keeps records and provides reports of all planning and execution activities traced by the platform.

E4 Platform Innovative Features

- Contributes to the improvement of the collaborative business processes mapping facilitated by a process perspective view on networks using a value chain reference model.
- The software solution is realized by implementing key emerging technologies:
 - ✓ **Service-oriented architecture** based on Web services – better platform adaptability, easy reflection of business changes, increased modularity, re-use and interoperability.
 - ✓ A **common ontology** is developed - representing in a common and formal way internal knowledge, to add semantics to Web services and to enable data exchange with local or Original Equipment Manufacturer (OEM) systems and retrieval of previous knowledge.

Collaborative Business Networks Life-cycle

- The provided functionalities cover all the activities performed within the life-cycle phases of a collaborative business network:
 - **Preparation Phase:** configuration of the software, entering the data about suppliers and their products;
 - **Set up Phase:** covering all the steps necessary to get the project started, from identifying a new business opportunity to the confirmation from the network partners;
 - **Operation Phase:** project implementation for the product development;
 - **Dissolution Phase:** after sales services, tracked as subprojects under the original project that resulted from the delivery of the product.



Conclusions

- The innovative aspect of the suggested approach refers to the improvement of the collaborative business processes mapping, facilitated by a process perspective view on networks using a value chain reference model.
- However, the harmonization and standardization of activities and processes in collaborative business networks is not an easy task.
- The experience with the three end-users participating in the project revealed that mapping suppliers' activities against the micro-processes of the VCOR model and the selecting the KPIs for the used micro-processes is a difficult and time-taking procedure.

Future Research Aspects

- Consultancy services are usually used in such situations and it is considered that the consultants do know very well the software they provide and so they would assist at that stage.
- Nevertheless, future research activities could be directed at easing the processes standardization, making it more user-friendly and understandable for end-users. A guide and a special tool could be developed to assist in the mapping process.
- The collaborative environment concept could be further extended by using a more sophisticated exploitation model – the software to be hosted and maintained on a server by an independent provider.



Thank you for your kind attention!

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