



SAP RESEARCH

SYSTEMATIC THOUGHT LEADERSHIP FOR INNOVATIVE BUSINESS

EuroMOT 2006

**Second European Conference on
Management of Technology**

**10th to 12th September 2006
Birmingham, United Kingdom**

**Technology Push vs. Market Pull
Software Engineering Companies:
Corporate Research Units as Pull Facilitators**

**Barbara Flügge, Till Janner and Christoph Schroth, SAP
AG /RESEARCH Lab, St Gallen**

THE BEST-RUN BUSINESSES RUN SAP



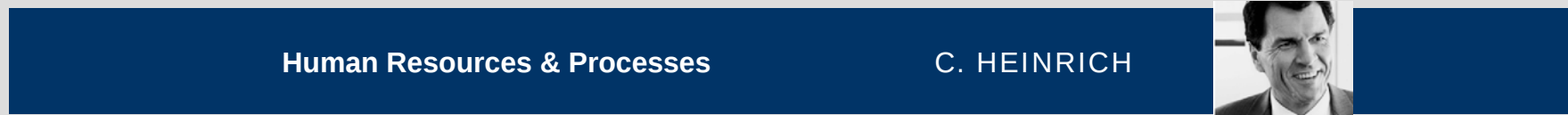
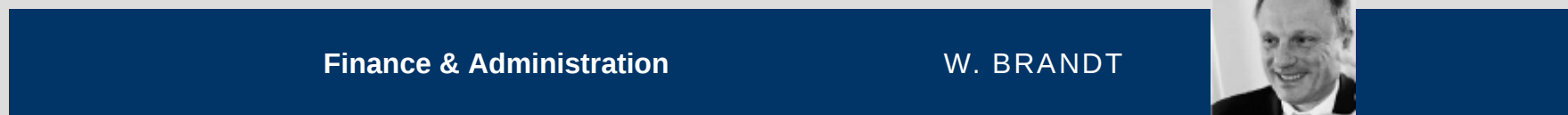


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Systematic Thought Leadership for Innovative Business

SAP's Organizational Structure

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SAP INSPIRE

- Seeks for entrepreneurial talent within SAP
- Identifies growth opportunities which are in line with SAP's overall vision and strategy

Near term focus
(~18 month)

Innovation through Entrepreneurship!

SAP RESEARCH Labs

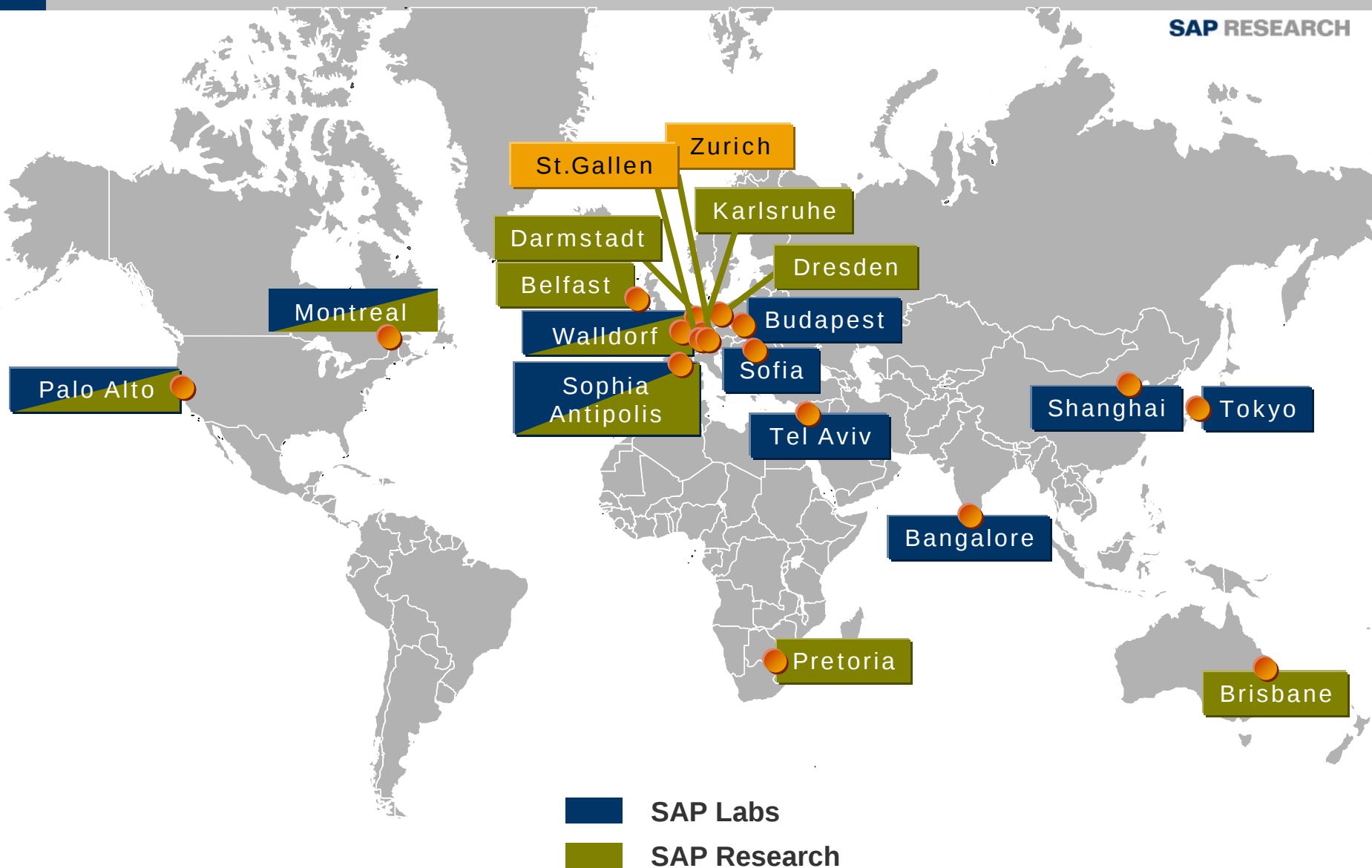
- Observes IT trends
- Determines business value of new technologies
- Introduces new technology & concepts for future solutions

Long term focus
(~3-5 years)

The Innovative Force behind Tomorrow's Technology!

The Future Research- & Development Network of SAP

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New research location

- **Common research center University St. Gallen & ETH Zurich**
- **Topics: Future Technologies, Applications & Business Strategies around**
 - ◆ Internet of things (RFID, Sensor Networks, ...)
 - ◆ Enterprise Services Architecture

Why HSG/ETH Zurich?

- **Combination of technology and business expertise**
- **Research excellence of institutions**
- **Long standing research relationship with SAP**

Execution Proposal

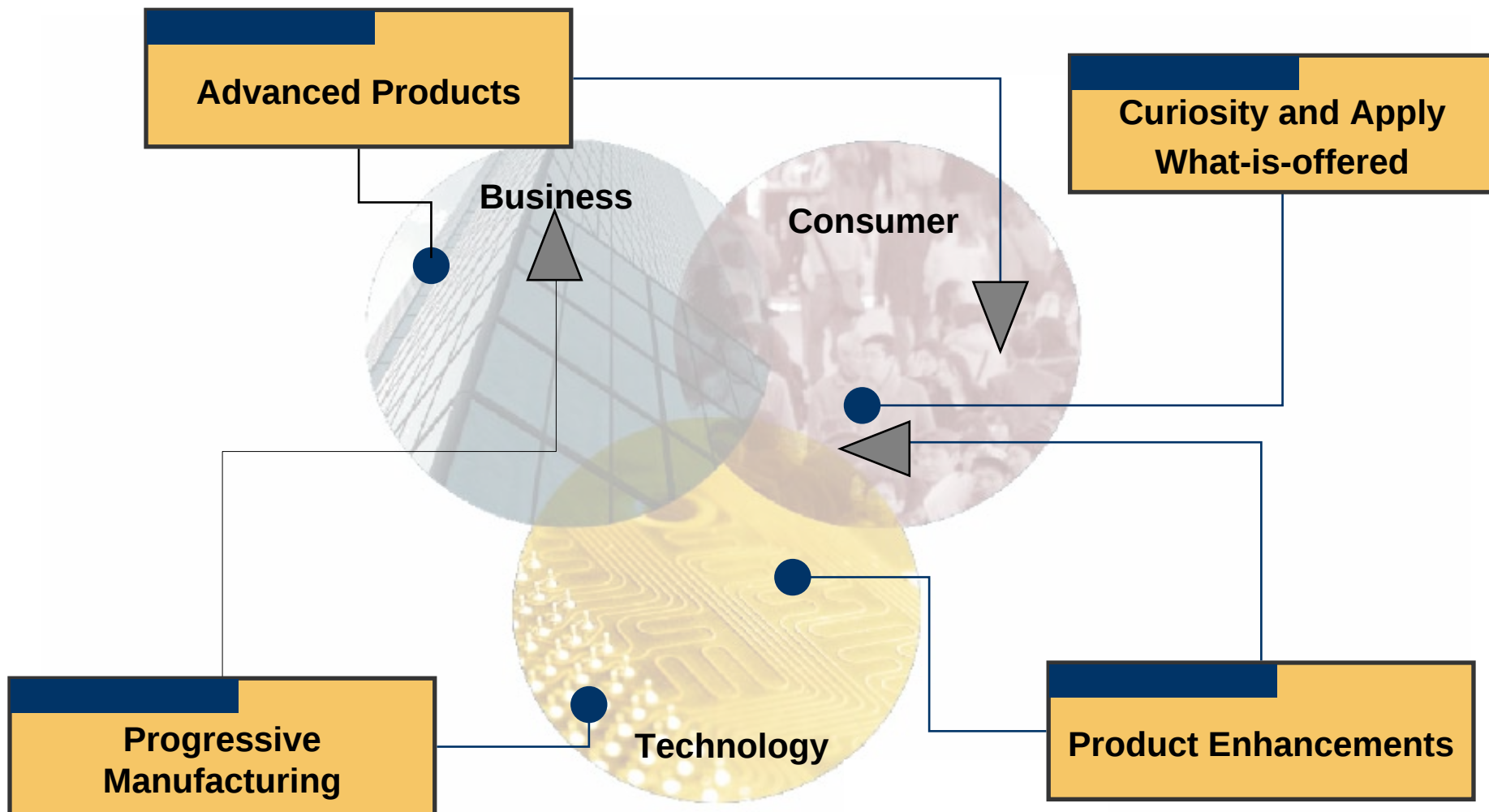
- **Public funded**
- **SAP full-time researchers + SAP Management**
- **Co-funding (50/50) of PhDs**

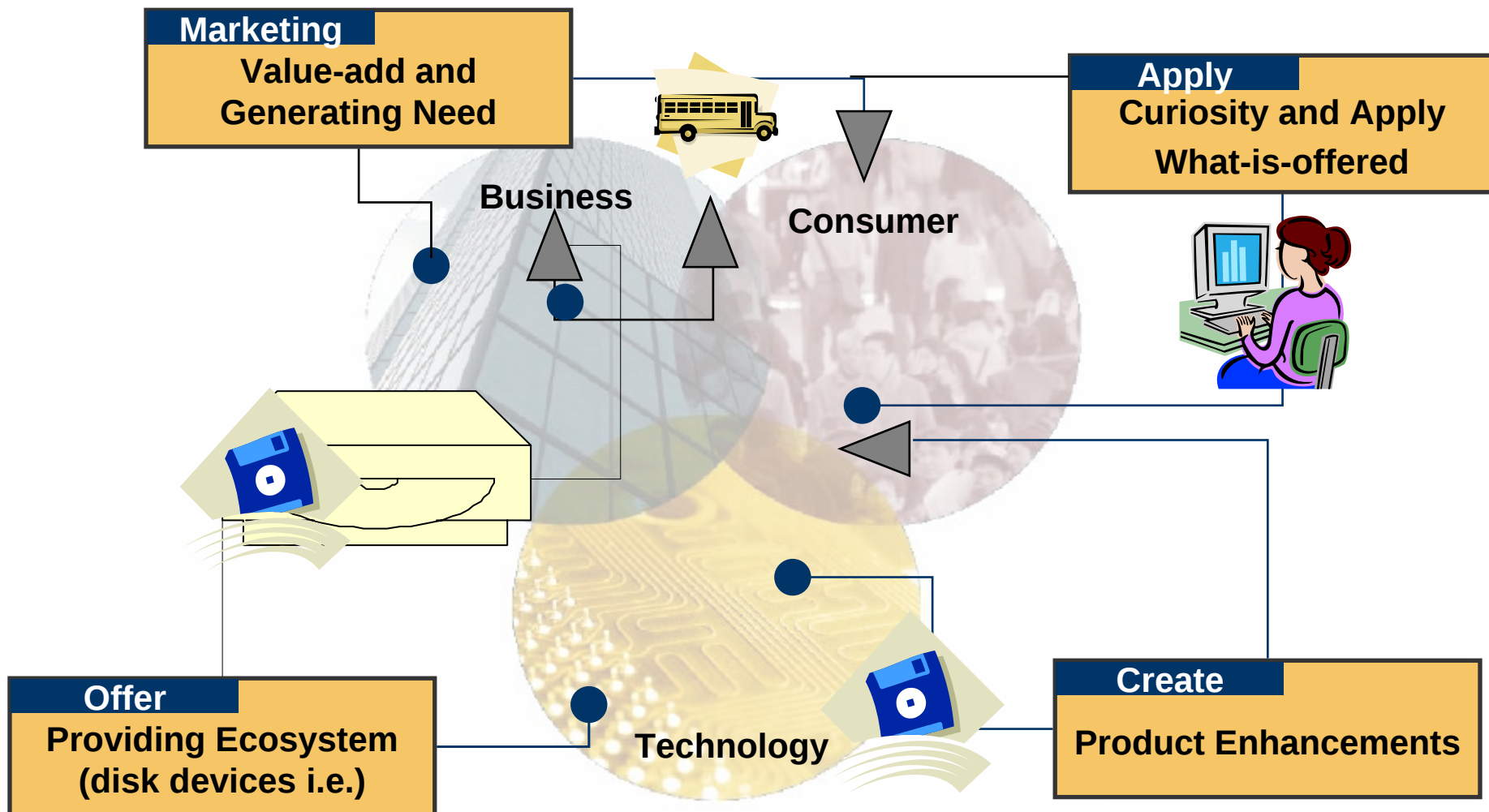


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Technology Push and Marketing Pull In the Traditional Context





- **Envisioning the product***
 - **Invent technology itself**
 - **Create how-to-manufacture scenario**
 - **Define feature driven products**
 - **Create appropriate manufacturing facilities**
- ⇒ **Stage of product offering and to-be-standards**



Technology

* Stands for Tangible or Intangible Product

- Envisioning what the customer wants
- Create awareness
- Create „demand for“
- Define appropriate pricing strategy by direct product placement

⇒ Seeking „customer acceptance“



- **Reviewing price strategy**
- **Reviewing distribution strategy**
- **Searching for common denominators in customer base**
- **Defining ways of involving customers like market studies, interviews, beta sites**
- **Decision making progress upon product content starts**

⇒ **Stage of best practices driven product definition**



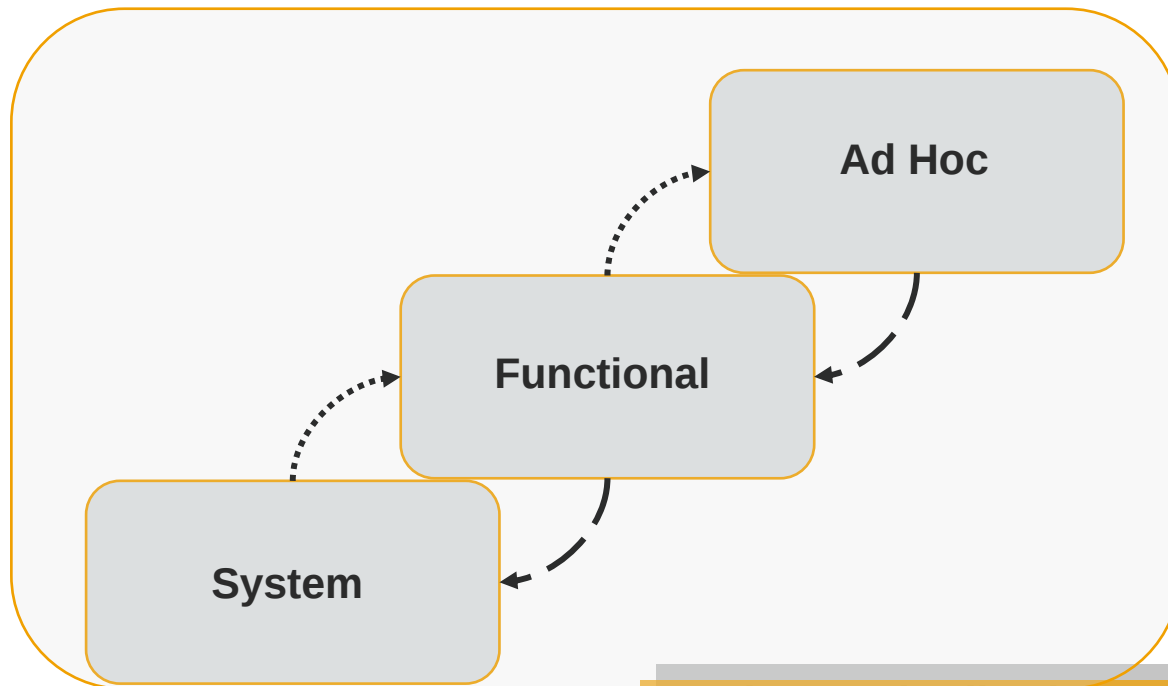
Technology

- Seeking customer knowledge
- Applying customer knowledge
- Reaching for larger customer basis
- Listening to the others

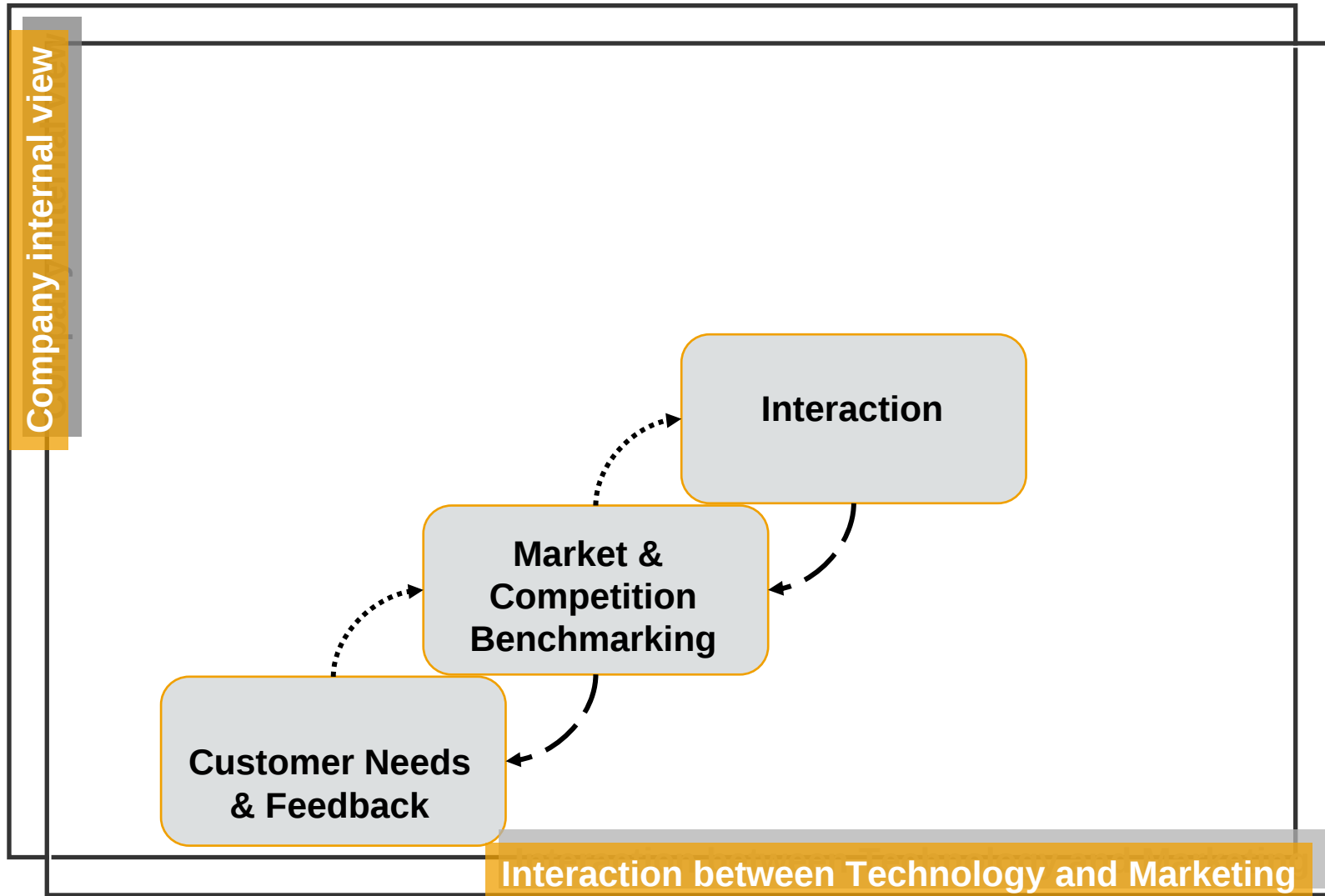
Consumer

⇒ **Active Exchange between Product Development and Marketing**

Customer Need & Value



Early Standardization Approaches in IT



Technology Push

- Invent new technology
- Guess suitable applications (Medical? Automotive? Toys? Military? Food? Health/beauty?)
- Contact people in each industry and try to explore feasibility / need for each potential application scenario
- Figure market size, demand, payback for each feasible path
- As an “outsider”, data is not easily available

Market Pull

- Identify and verify a market need (e.g. estimate market size, demand, ROI)
- Find a solution that relieves the potential customers from their “pain”
- Solve design issues
- Work out manufacturing issues (cost and reliability)
- Profit by increased sales margin

!

- **Product Development get stuck as the interaction with the ecosystem is not effective and sufficient**
- **The ecosystem itself is not growing**
- **Often requires multi-disciplinary view where you may not be an expert in all markets**
- **Market screening may be costly – typically the customer base is driving enhancements and further development needs as external partner**
- **There may not be any application left to be invented**

The technology push approach may be successful and may even be inevitable

Technology often emerges before any potential application field (e.g., Laser, Transistor, Electron Tube)

Disruptive technologies often need a technical push

- Lack of skills within a stable market to add knowledge about new technologies
- Existing businesses are defended (Innovators Dilemma, e.g. telegraph company $\rightleftharpoons$ telephone technology)

There have been tech push successes

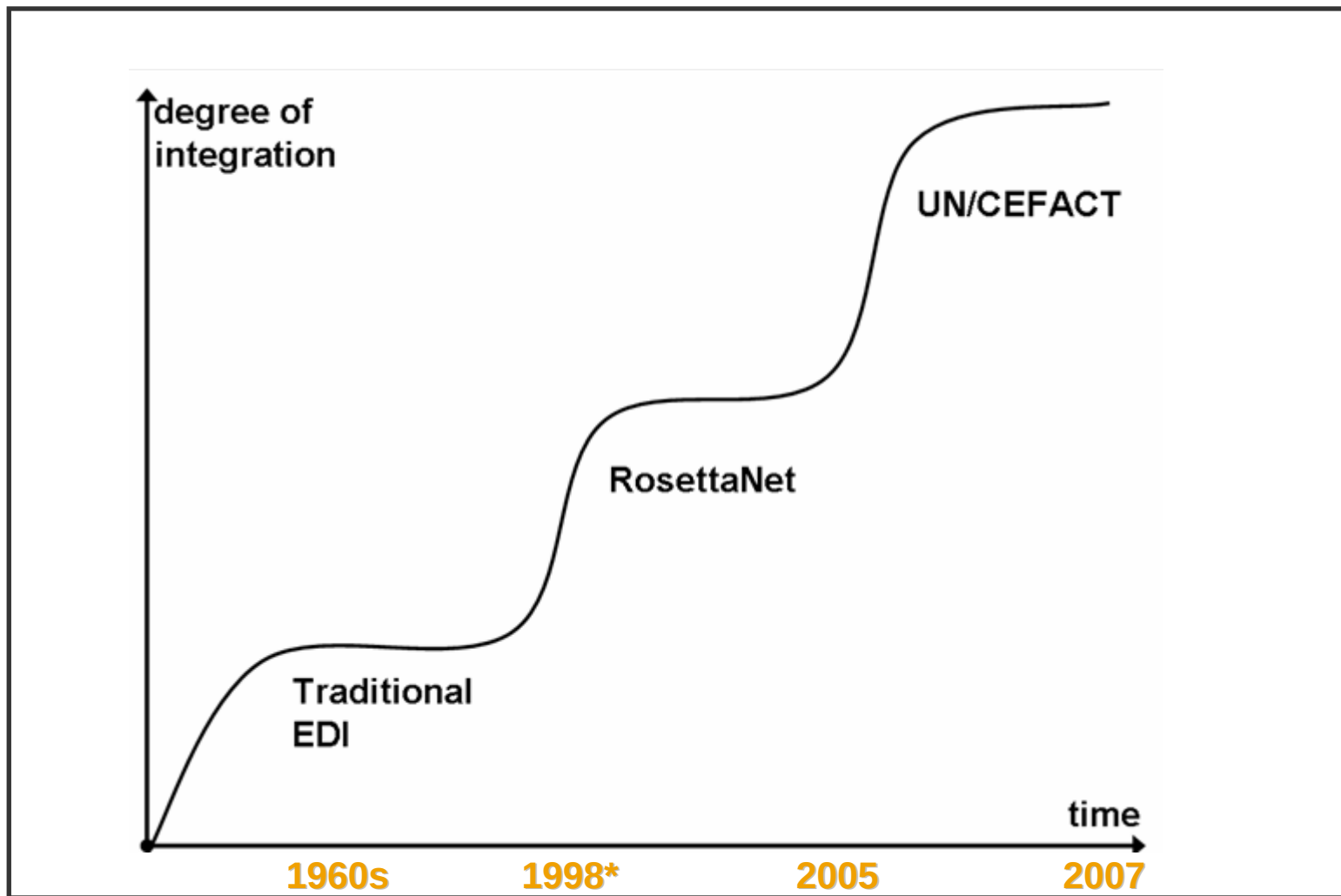
- e.g., AT&T, Wright Aircraft, Apple Computer
- XML standard and push into market



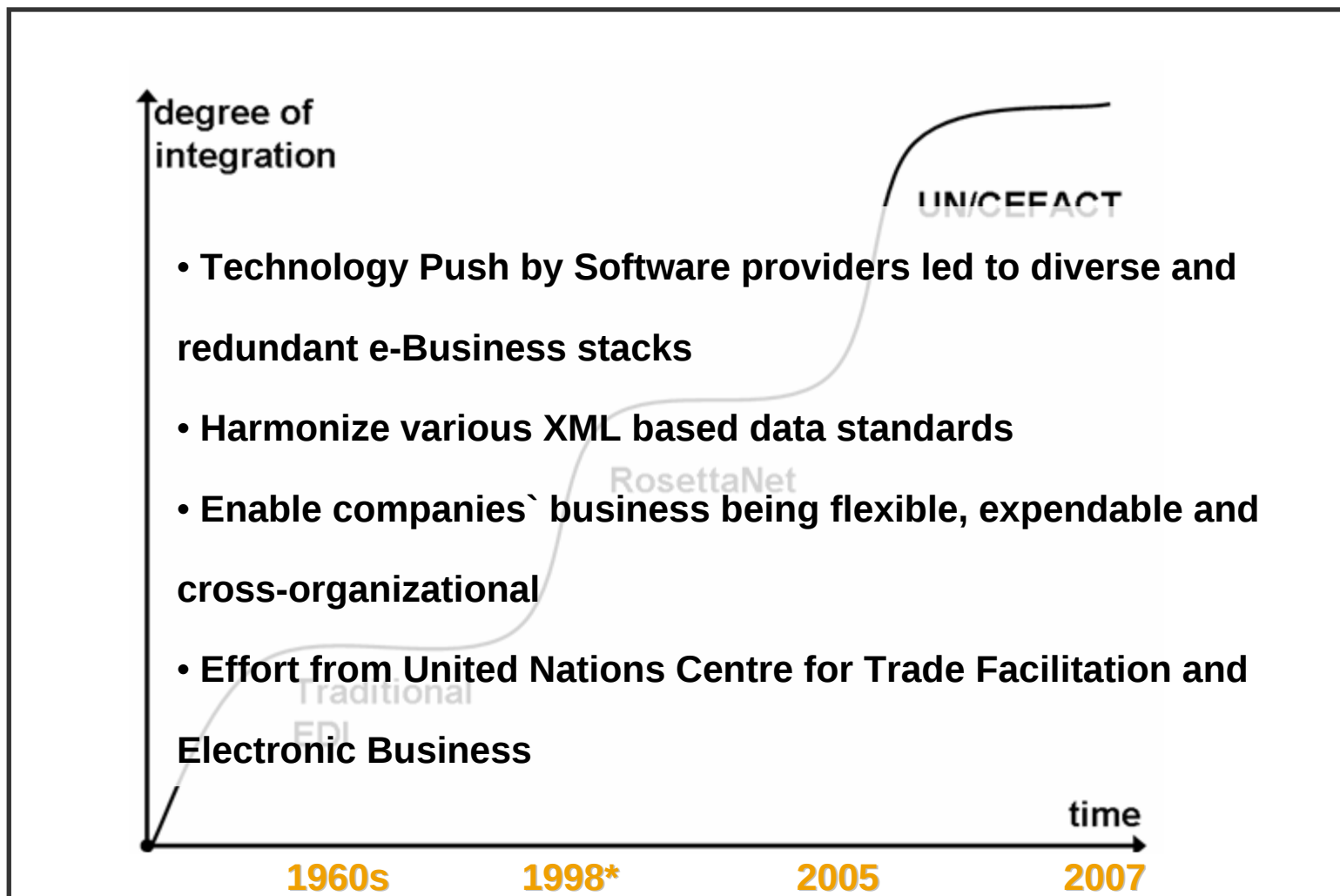
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The UN/CEFACT e-Business stack – an overview



* Release of XML



* Release of XML

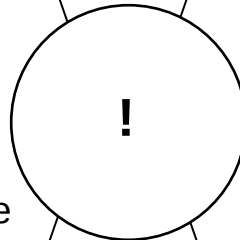
UN/CEFACT e-Business compared to EDI and RosettaNet

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	UN/ EDIFACT	RosettaNet	UN/ CEFACT
Semantics	Proprietary EDIFACT syntax	Rosetta Net Dictionaries (Business & Technical)	Core Component Library CCL
Modeling		UML classes and sequences	Unified Modeling Methodology UMM
Process specification		Partner Interface Processes PIPs	BCSS
Business data specification		RosettaNet/ PIP specific XML, XML Schema	CCTS CDM BMA SBDH CDT Bus. Terms ...
Syntax binding			UN/CEFACT NDR UBL BPSS BPEL ...
Infrastructure	No specific infrastructure/ protocols defined	RosettaNet Implementation Framework RNIF Multiple Messaging Service MMS	ebXML Reg & Rep Messaging Specifications UN/CEFACT Registry Specification Genesis Arch. ITAIDE Arch.

CCL

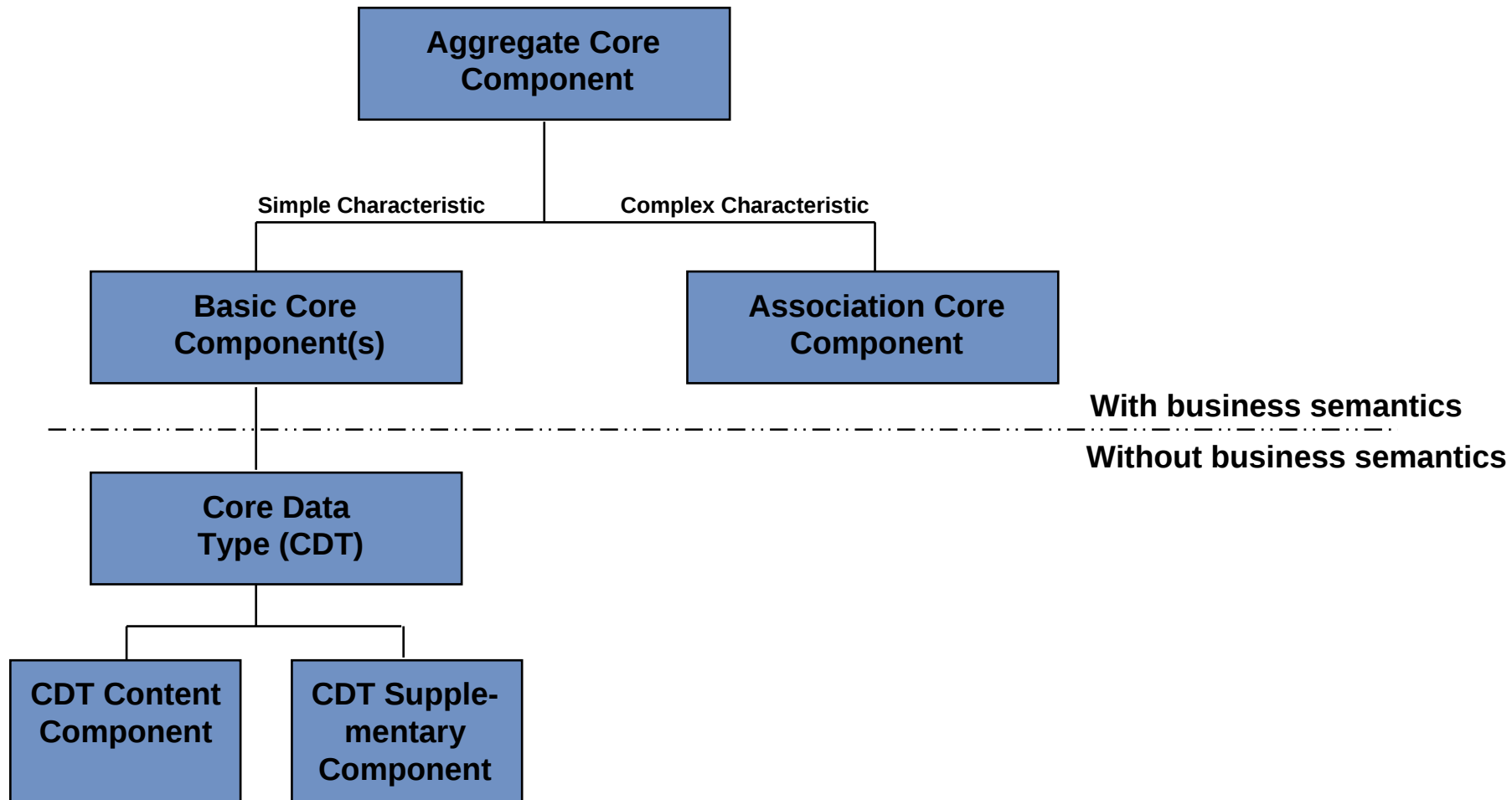
- **Set of Core Components** that work as basic building blocks for assembling higher level business documents
- **Major benefits:** Increase of reuse of data elements during modeling and improved enterprise interoperability due to common basis for business data description
- **In February 2006**, the ICG* of the UN/CEFACT announced “the formal release of the first UN/CEFACT Core Component Library. It has been produced in compliance with existing procedures and it is considered satisfactory for implementation”



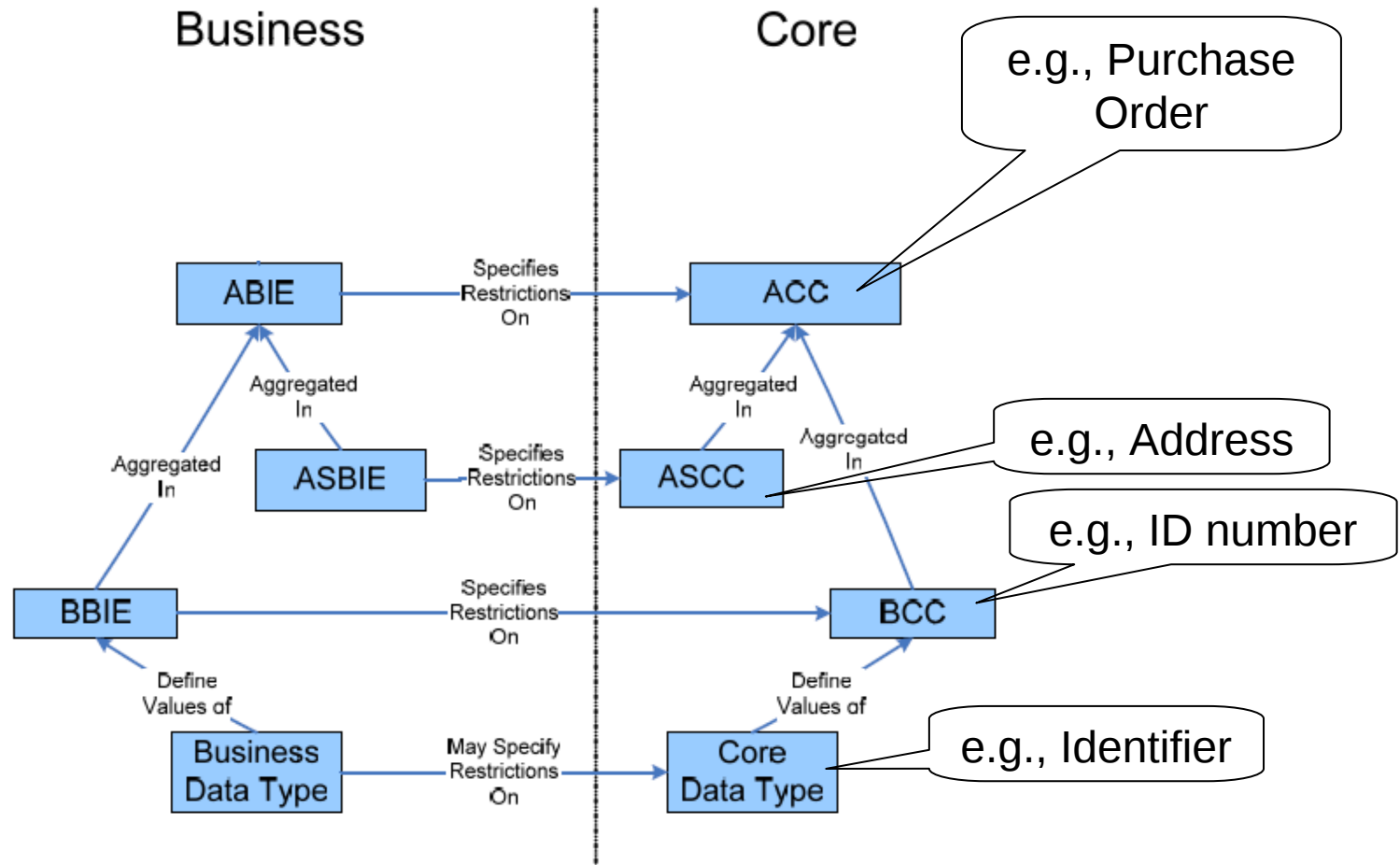
CCTS

- Determines the **usage of the core components contained in the CCL**: “Defines meta models and rules necessary for describing the structure and contents of conceptual and physical/logical data models, process models, and information exchange models”
- “The **artefacts** created as a result of employing this specification should be **maintained** in a universally freely accessible Core Component Library (**CCL**)”
- Version 2.2 published in **March 2006**, ready for implementation

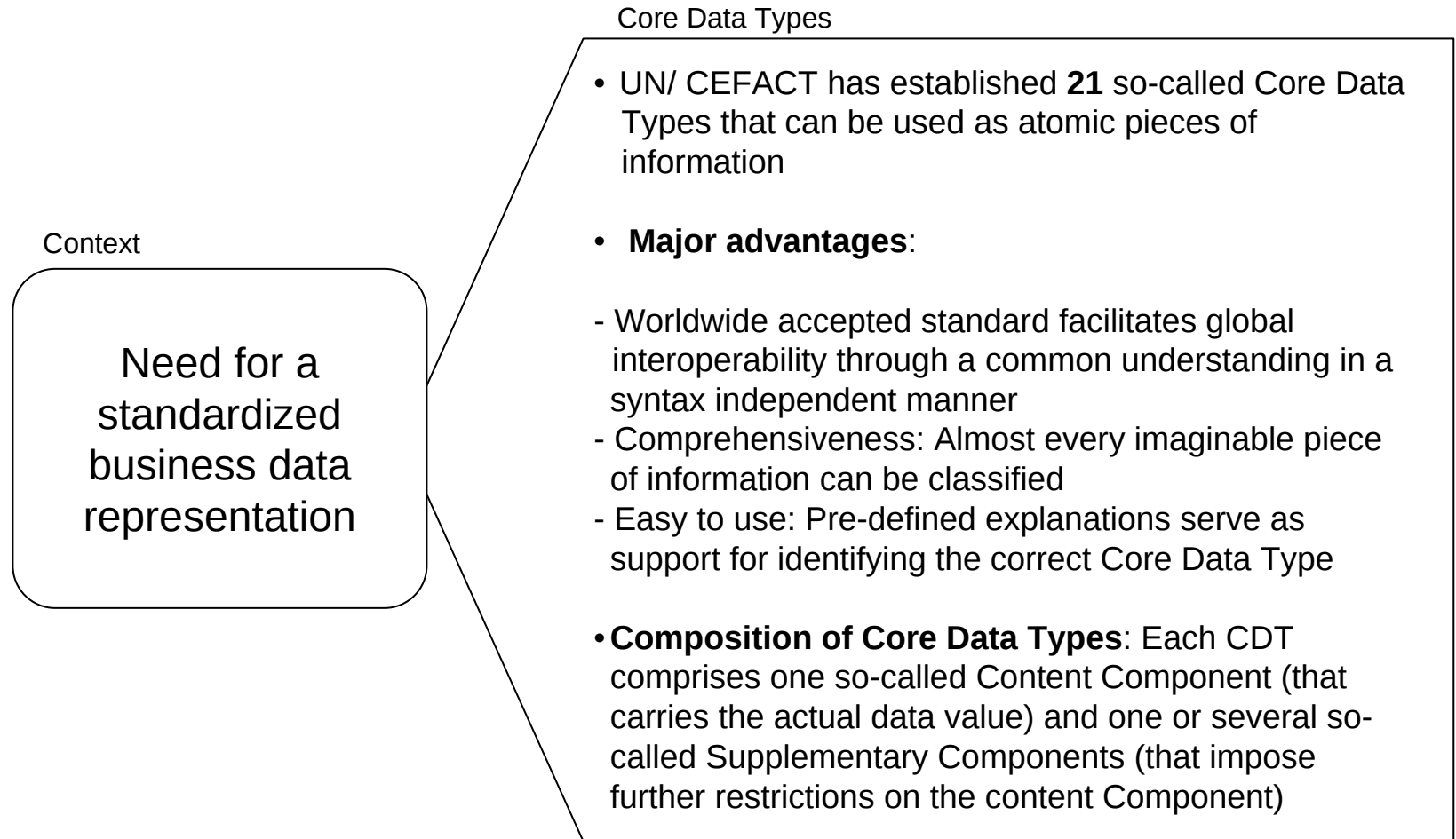
* Information Content Management Group



Generic and context-specific business data



Core Data Types as the minimum pieces of information



BCSS used to make UML UMM compliant

- BCSS used to impose certain restrictions on UML modeling such that resulting models comply with the UMM standard
- Fostering of enterprise interoperability through common basis

1

BOV- centric modeling methodology for B2B scenarios

- Technology and syntax independency
- Enables users to leverage diverse implementation frameworks
- Abstracts scenarios and facilitates complexity hiding

2

UML as basis for the notation

- Use of the diverse forms of UML charts for capturing business logic (activity charts, sequence diagrams)
- Definition of a set of stereotypes, tagged values and constraints defined to customize UML meta model
- Allows for easy export (e.g., XMI)

4

Facilitation of reuse through template- and repository orientation

- Provision of basic process building blocks that can be used to assemble overall processes
- Starting process modeling activities from scratch thus becomes superfluous
- Incorporation of the CCTS methods to model business data

3



CDM

The Context Driven Methodology (CDM) will represent a novel and unique possibility to adapt generic business data core components to the current users' contexts. In this way, only the data parts that are of high relevance for the users are pre-selected for data modeling purposes

BMA

The Business Message Assembly (BMA) specification is regarded as an important approach for assembling higher level business information for complete, electronic messages. By defining one standard for the composition of business messages, enterprise interoperability is facilitated

SBDH

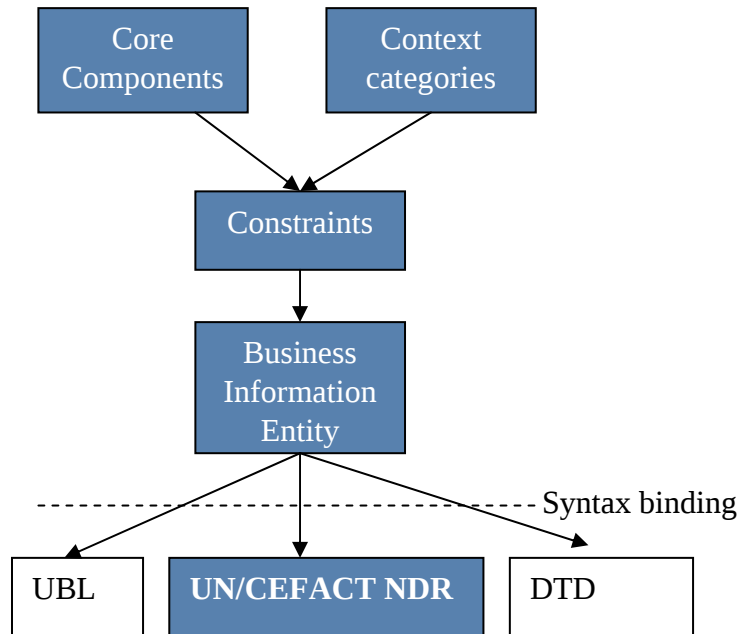
The Standard Business Document Header (SBDH) specification is a further composite of the UN/CEFACT e-Business stack and supports the determination of application based logical routing requirements of business information

CDT

The Core Data Type (CDT) standard defines the smallest pieces of information in a business data model with relevant characteristics. In this way, UN/CEFACT has created an unambiguous basis of atomic business information parts that are used to assemble all higher level parts up to a complete business document

Business Terms

The so-called Business Terms are used to translate Core Components into all the different industry-specific terminology domains



- UN/CEFACT mainly concentrates on BOV-layer specifications, but also offers a syntactical representation of its basic data building blocks
- XML Naming and Design Rules Technical Specification describes and specifies the rules and guidelines that will be applied by UN/CEFACT when developing XML schema
- The UN/CEFACT NDR build upon the W3C XML Schema recommendation

Motivation

- One technical recommendation for the implementation of a globally uniform registry that **defines the roles of and the functionality provided for** both users and standardization bodies and **allows for the unified deployment** of all advantageous features of the UN/CEFACT standardization body (e.g. Context data)

Scope

- Specification of criteria for implementation of the UN/CEFACT *Registry*
- Registry to serve as a global registry/repository of reference data for e-business
- Defines three main procedures: submission, retrieval and administration of business data

Relation to other standards

- Registry complies with the ebXML registry specifications ([ebRS], [ebRIM])
- The specification also builds upon the ebXML specification. It can be considered as an application allowing and simplifying the standardization process and the publication of business specifications
- Registry supports the libraries defined by specifications such as the [CCTS]



FSV: Functional service view



BOV: Business Operational View

Name	Explanation	Current version	Maturity
CC Library ¹	Core Component Library- first set of generic and CCTS based business information; contains the aggregated core components	V 06A	
CCTS ²	Technical syntax-independent model, conventions, and methodology for semantically based modeling of reusable business information	V 2.2	
CDM ³	Methodology for assigning context to business information using a number of context drivers	V 1.0	
BMA ⁴	Methodology for assembling higher level business information for Electronic messages	V 1.0	
SBDH ⁵	Determines application based logical routing requirements of business information	V 1.3	
CDT ⁶	Smallest and generic piece of information in a business data model with relevant characteristics	V 2.2	
UMM ⁷	Business Collaboration Schema Specification: UML based representation of CCTS based conventions and artifacts	V 1.0	
BCSS ⁸	Business Collaboration Schema Specification: UML based representation of CCTS based conventions and artifacts	V 1.0	
NDR ⁹	Rules for XML Schema and XML based instance representation of CCTS based conventions and artifacts	V 2.0	
Schema for CDT ¹⁰	Smallest and generic piece of business information represented in XML schema	V 2.0	
Reg./rep. Spec. ¹¹	Specification defining scope and functionality of registries and repositories	V 1.0	

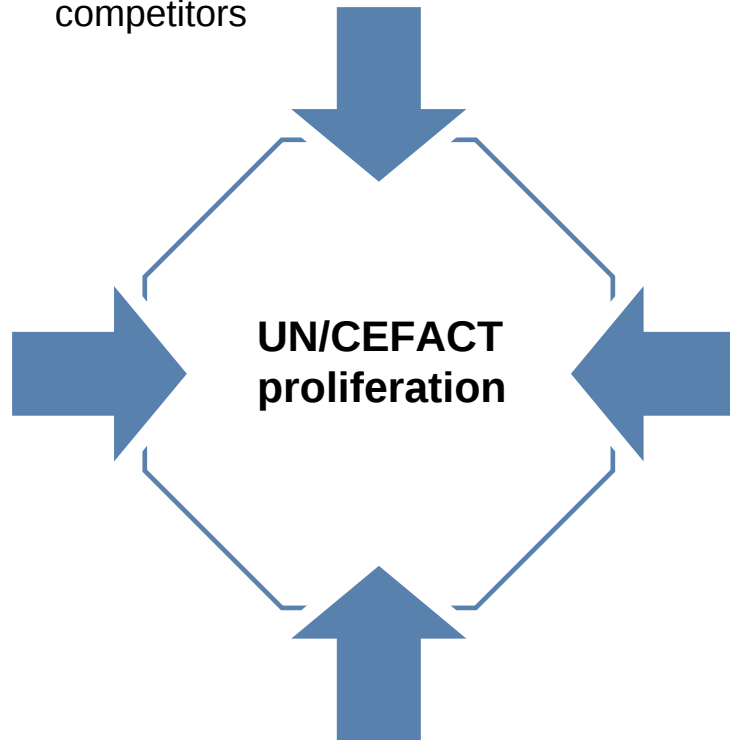
- 1 **Core Component Library (V06A)**- first set of generic and CCTS based business information available
- 2 The **Core Component Technical Specification Version 2.2** defines meta models and rules necessary for describing the structure and contents of conceptual and physical/logical data models, process models, and information exchange models
- 3 Project proposal existing
- 4 Project proposal existing
- 5 SBDH: **V1.3** readily available– Technical Specification by UN/CEFACT TMG CCWG
- 6 **V2.2 –Annex B of CCTS – Draft version**, Core Data Types still subject to refinement and extension
- 7 UN/CEFACT's Modeling Methodology (UMM): Version 1.0 for implementation verification completed
- 8 BCSS: UML Profile for Core Components based on CCTS 2.01: Version 1.0 existing
- 9 UN/CEFACT XML NDR for CCTS (XML Naming and Design Rules): According to G. Stuhec, theses NDR are **more mature than its competitors** UBL NDR and DON NDR
- 10 **V2.0** – Technical Specification by UN/CEFACT
- 11 A **Second Working Draft of the UN/CEFACT Registry Implementation Requirements Specification 1.0** is existing: The draft document contains information as guidance for establishing the UN/CEFACT Registry based on the OASIS ebXML registry specifications

Private standardization bodies:

- Other standardization bodies (e.g., the RosettaNet consortium) are considered as competitors

Industry:

- Majority of worldwide Fortune 2000 companies use UN/EDIFACT-based business data exchange and are reluctant to switch to new technologies
- A migration path from EDI to UN/CEFACT must be provided to the various companies
- Industry associations (e.g., BITKOM) facilitate the deployment of UN/CEFACT standards



**UN/CEFACT
proliferation**

Large Software Vendors:

- SAP, for example, leverages CCTS-based business data repositories (e.g. Global Data Types) and thus plays a pulling and supporting role

Governmental bodies:

- Recognized the urgent need for harmonized e-Business frameworks especially in the field of e-Government
- Bodies such as KBSt or KoopA ADV have established e-Business standards recommendation frameworks (e.g., SAGA) on their own



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I like to thank my colleagues, Till Janner and Christoph Schroth, for their contribution to this section.

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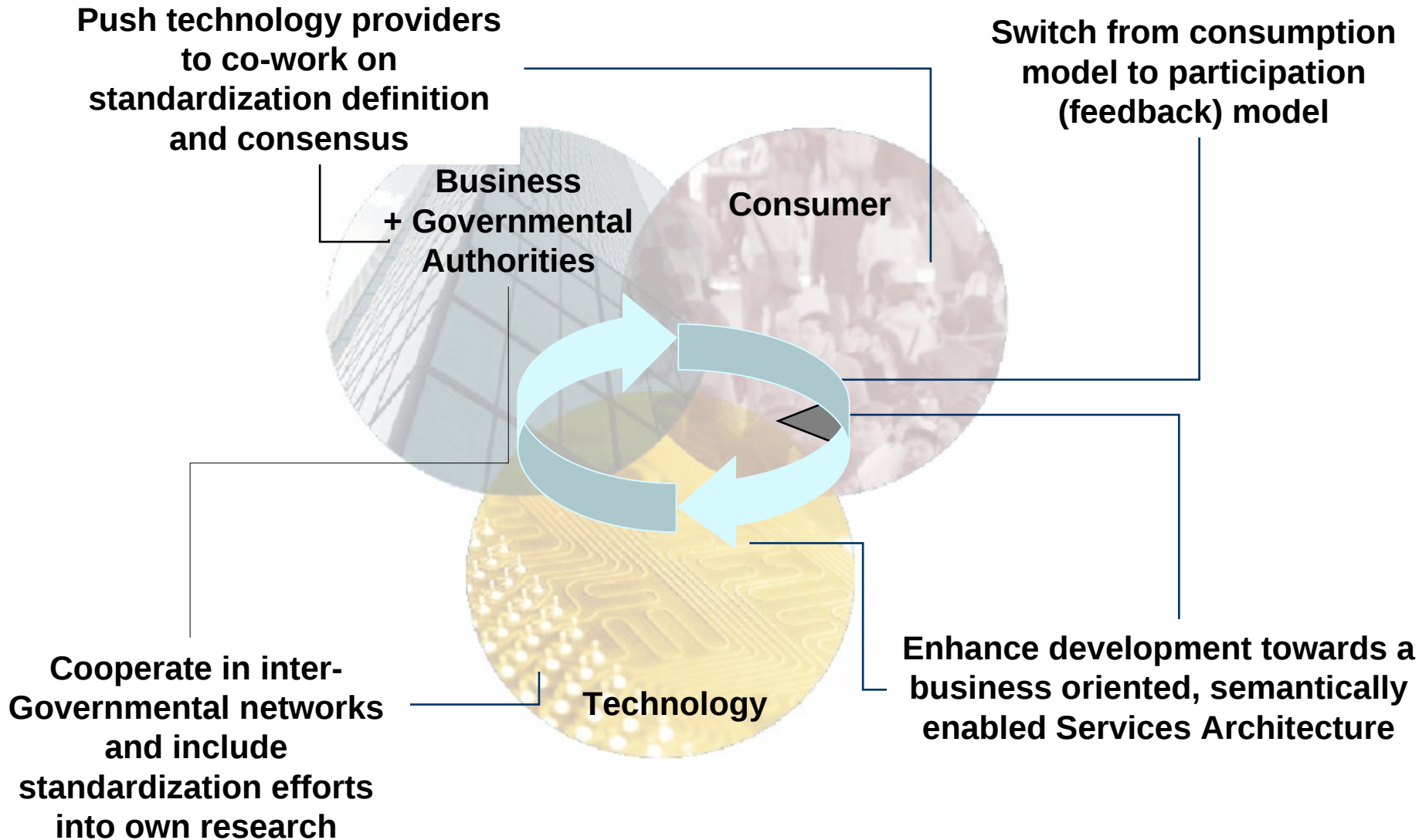




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Conclusion



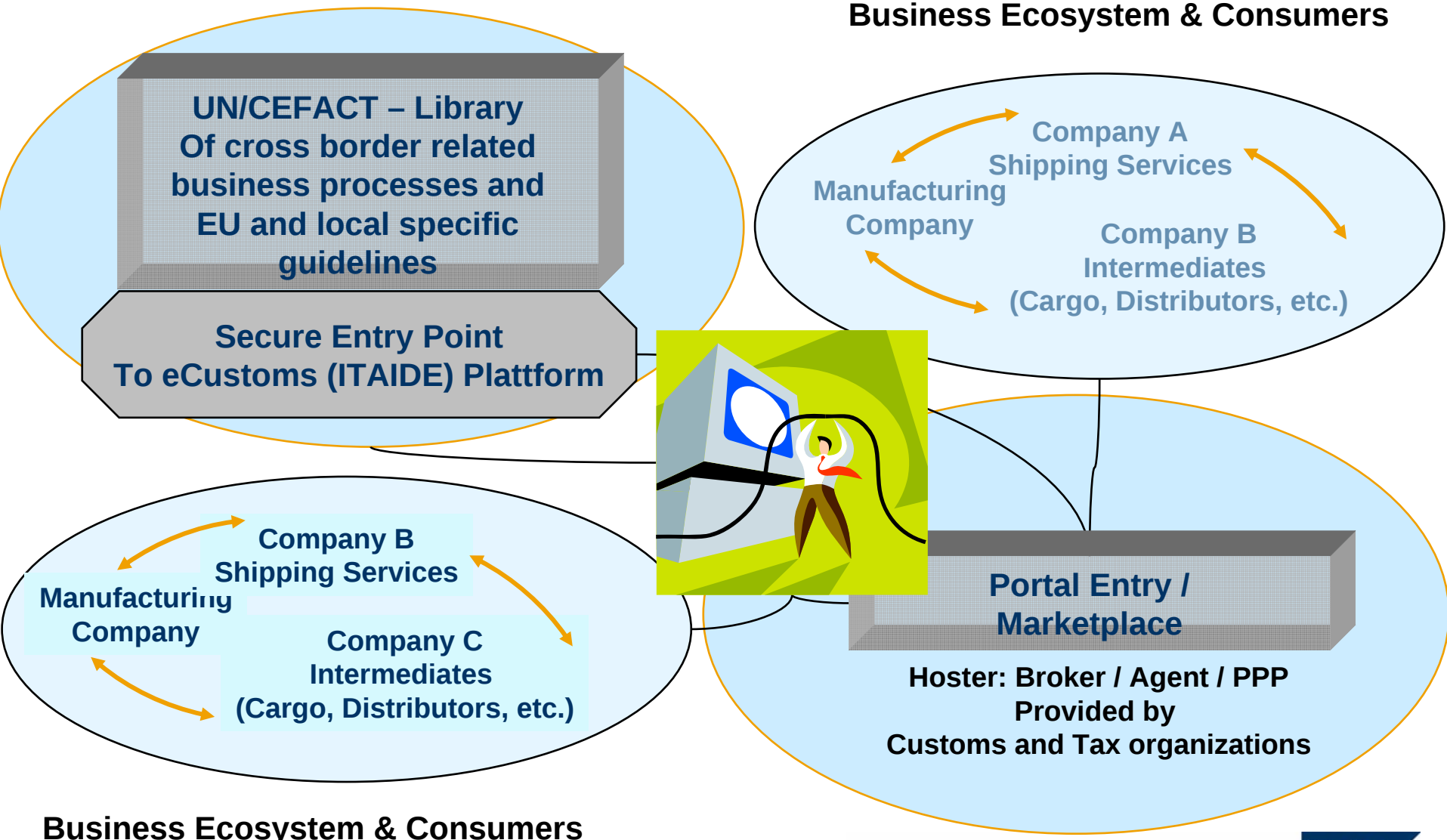
The technology push approach may be successful and may even be inevitable

The characterization of standardization activities reached a stage

where the how to and choreography of objectives, software design approaches and transfer mechanism

- from internal development to external awareness,
- from external initiatives to become internal influencers

are determined by the capabilities of IT companies to enable the cross-organizational business and concentrating on interoperable applications.



Identification of market needs

- Research Units have expertise in different industry categories and are close to emerging market needs
- Strong link to partners in both academic and industry ecosystems on a worldwide basis
- Heterogeneous “knowledge pool” (creative people with different backgrounds and innovation potential) helps to extend the company’s horizon and to understand technologies

Support of solution design

- Experience in ramping up prototype solutions
- Interdisciplinary teams that can cope with unconventional design issues
- Cross-organizational projects can be used to discover shortcomings in the field and to improve solution

Dissemination facilitation

- Conventional advertising of novel technology not useful
- Scientific publications as well as patents, however, gain awareness in a promising markets
- If the product solves a real problem, market pull can thus be facilitated



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Thank you for your attention.

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- [1] K. L. Kraemer, J. L. Perry, *The Federal Push to Bring Computer Applications to Local Governments*, in *Public Administrations Review*, Vol. 39, No. 3. (May – Jun., 1979), pp. 260-270
- [2] R. W. Zand, *The Effectiveness of External Information Channels*, in *Facilitating innovation within Software Development Groups*, in *MIS Quarterly*, Vol. 7, No. 2. (Jun., 1983), pp. 43-58
- [3] R. W. Zmud, *An Examination of `Push-Pull` Theory Applied to Process Innovation in Knowledge Work*, in *Management Science*, Vol. 30, No. 6. (Jun., 1984), pp. 727-738
- [4] E. Gerstner, J. D. Hess, *A Theory of Channel Price Promotions*, in *The American Economic Review*, Vol. 81, No. 4. (Sep., 1991), pp. 872-886
- [5] T. Janner, A. Schmidt, Ch. Schroth, G. Stuhec, *From EDI to UN/CEFACT: An Evolutionary Path Towards a Next Generation e-Business Framework*, submitted for International Conference on e-Business 2006 / Bangkok

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