

# Business Analytics als Treiber für das Corporate Semantic Web



Presentation

Dr. Christoph Tempich

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# Corporate Semantic Web

Presenter

## Dr. Christoph Tempich

I am a management consultant in the CP Information Technology. at Detecon International.

### Sectors

- Telecommunication, Automotive.

### Functions

- Enterprise Information Management.
- Technology markets and innovation.

### Experience

- Consulting at Detecon International and Bearingpoint (KPMG).
- More than 10 years Semantic Web research.
- Workshops and more than 40 publications.
- Two Innovation Awards for Semantic Web applications.



# Wer Großes bewegen will, muss Größe haben – Unsere Organisation

Detecon ist eine der erfolgreichsten, weltweit führenden Management- und Technologieberatungen für Kunden, deren wirtschaftlicher Erfolg stark technologisch geprägt ist. Unsere weltweite Präsenz sichert unseren Kunden den internationalen Erfolg.

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Detecon International GmbH

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165 Mio. Euro  
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## Gesellschafter:

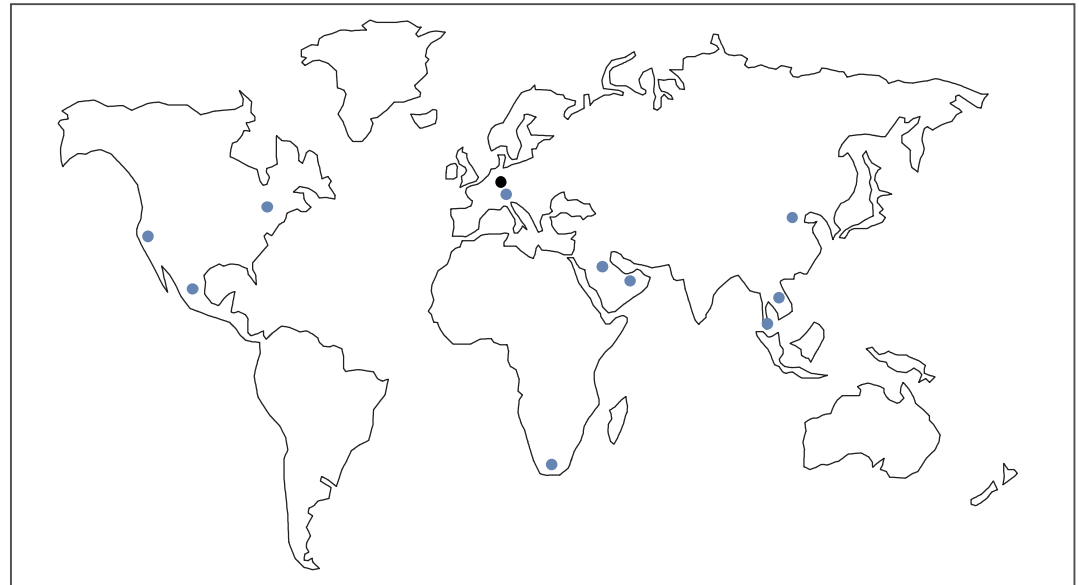
T-Systems Enterprise Services GmbH

## Standorte Deutschland:

Bonn (Hauptsitz), Dresden, Eschborn, München

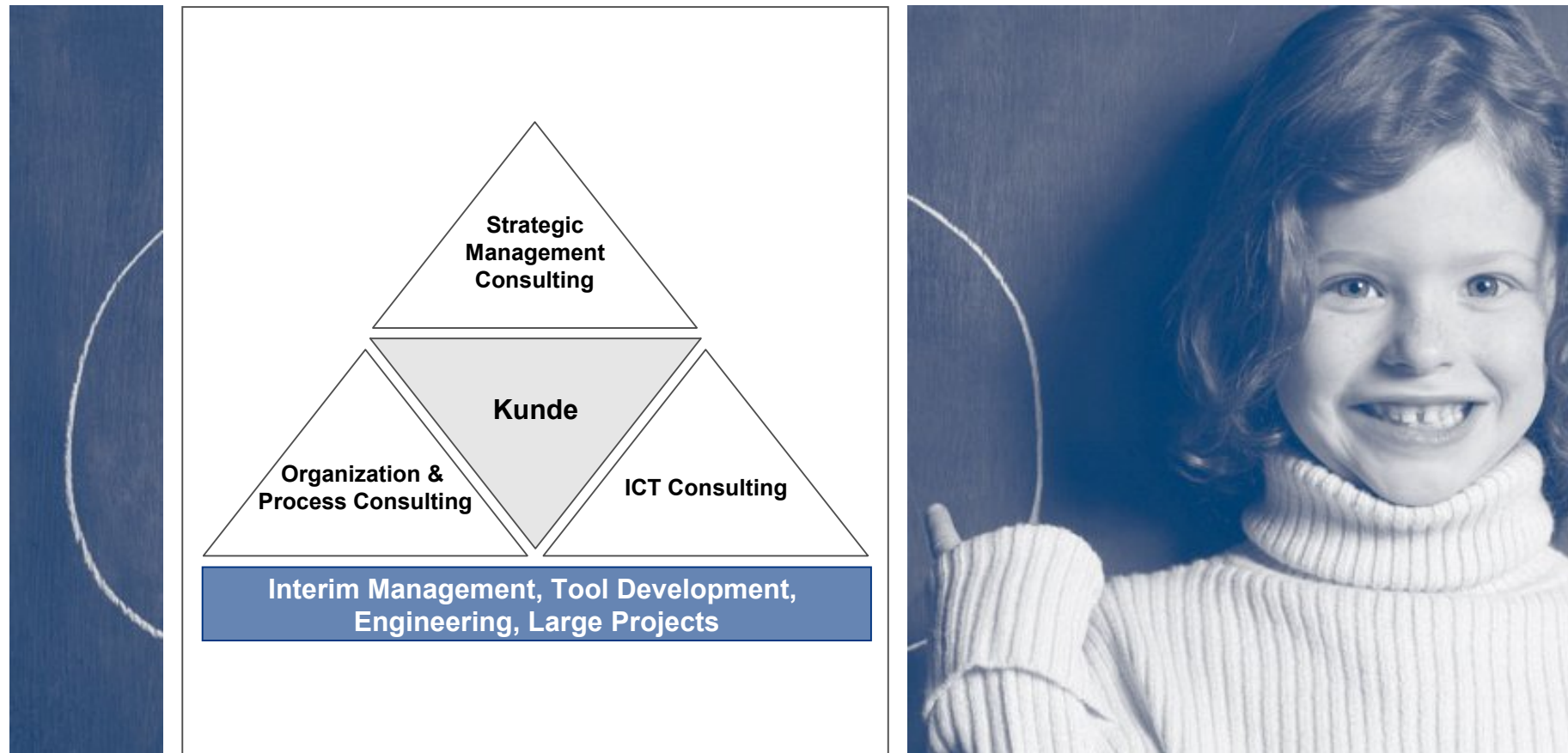
## Standorte international:

Abu Dhabi, Bangkok, Johannesburg,  
Mexico City, Peking, Reston, Riad,  
San Mateo, Singapur, Zürich



# Performance auf der ganzen Linie – Unsere strategische Ausrichtung

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- Travel & Transport
- Utilities

## Public Sector

- Entwicklungsbanken
- Öffentliche Verwaltung
- Regulierungsbehörden



# Corporate Semantic Web

## Management Summary

**In this talk I will argue that Semantic Web technologies are a core enabler for an holistic Enterprise Information Management which is required to support decision making.**

- Capital markets require from decision makers that they base their conclusions on facts rather than pure intuition.
- As the available information is growing exponentially, decision makers need new approaches to master this information and to extract the decision relevant parts.
- In order to achieve this goal companies have to identify, integrate and analyze the available information.
- Semantic Web standards provide enabling technologies to integrate external, internal, structured and unstructured information.
- Companies should thus consider Semantic Web technologies appropriately in their Enterprise Information Management strategy.



# Content

- 1. Motivation**
- 2. Enterprise Information Management**
- 3. The Semantic Web and Analytics**
- 4. What should Enterprises do now?**
- 5. Open Research Questions**
- 6. Conclusion**



# Content

**1.**

## **Motivation**

Vision

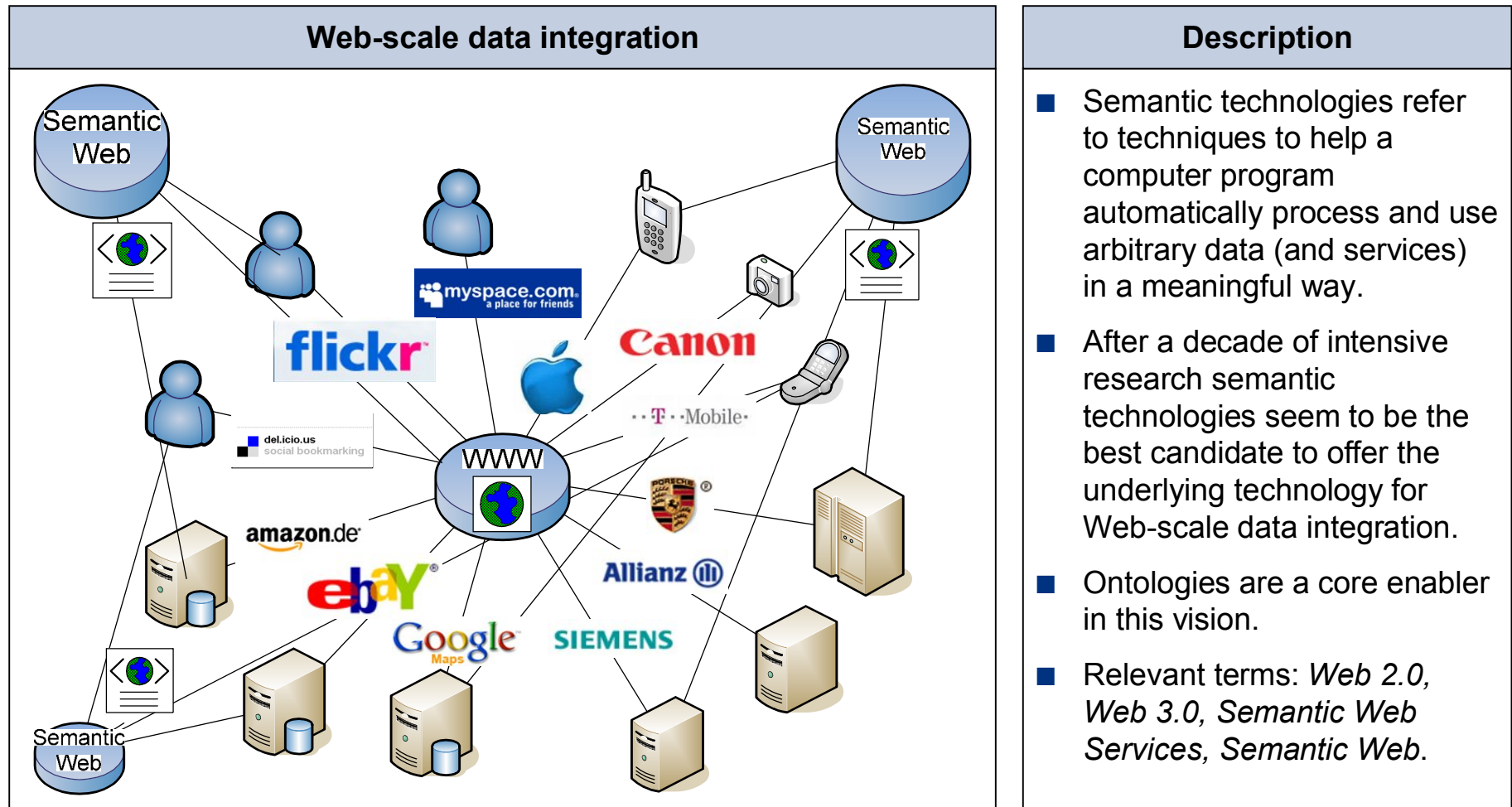
Customer Challenges and Benefits



# Motivation

## Vision

Seamless data integration across different data sources on the Web is a great challenge. It also promises huge business opportunities and cost savings.



# Motivation

Customer Challenges and Benefits

**Enterprise Information Management copes the rapidly growing amounts of information relevant to an enterprise business.**

Challenges	Benefits
<ul style="list-style-type: none"><li>■ The amount of available and potentially relevant information is growing exponentially.</li><li>■ The time for decision making is decreasing continuously.</li><li>■ Decision making is based on multiple highly heterogeneous, distributed and rapidly changing information sources.</li><li>■ The explosion of information is facilitated by technical developments such as RFID , email, Web, Internet.</li><li>■ Enterprises need an intelligent information infrastructure which delivers the right information at the right place in the right time.</li><li>■ Data Governance is required for clear responsibilities.</li></ul>	<ul style="list-style-type: none"><li>■ A flexible information infrastructure which allows to manage the growing amount of information.</li><li>■ Flexible integration with business processes to account for changing business requirements.</li><li>■ Up-to-date information for accurate decision making.</li><li>■ Fulfillment of regulatory requirements.</li><li>■ Timely and informed interaction with customers responding to their needs.</li><li>■ Identification of information leakage, customer demands and cost drivers.</li></ul>



# Content

## **2.** Enterprise Information Management

Definition

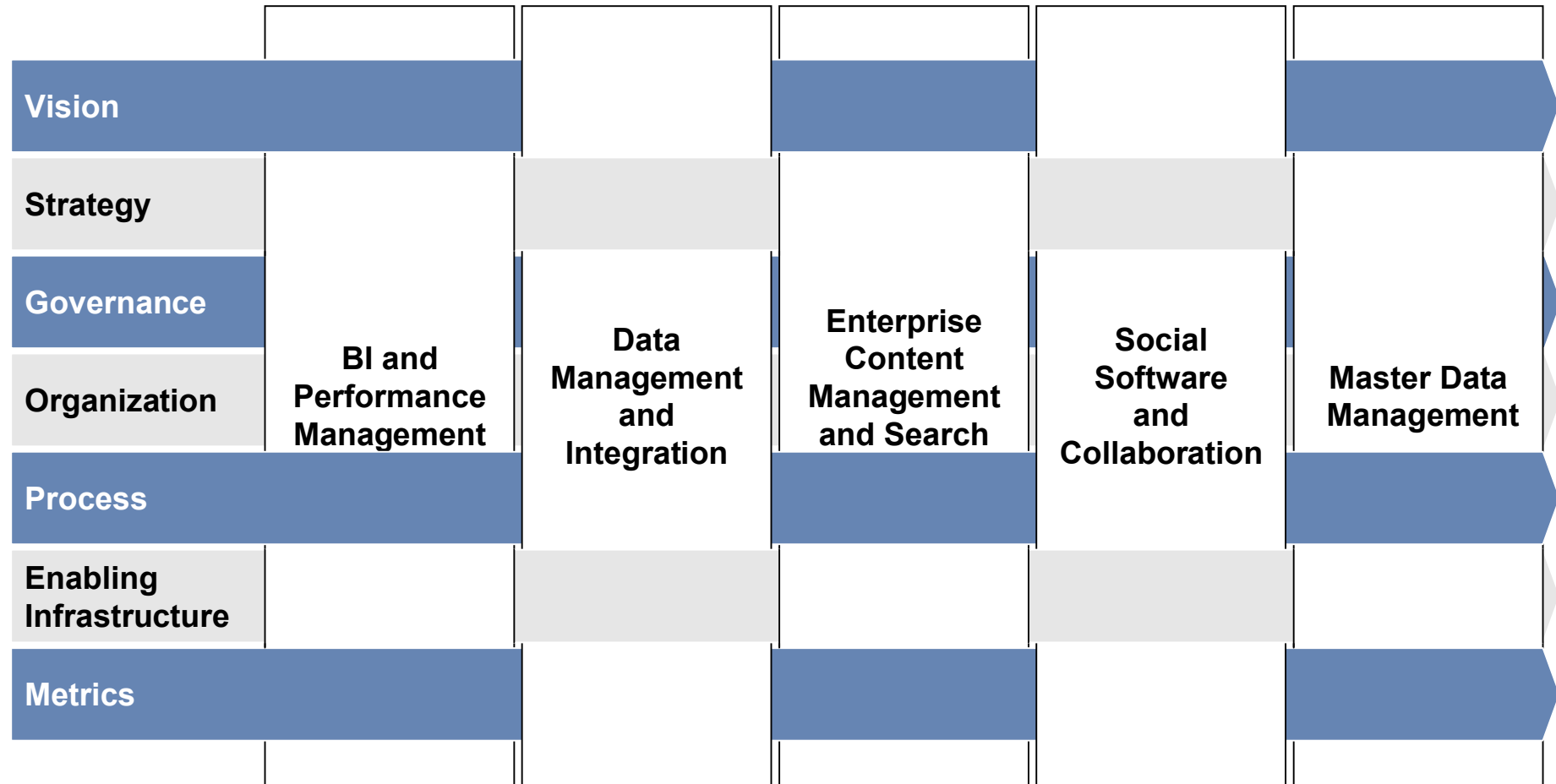
Market Growth

Information Value Chain

# Enterprise Information Management

## Definition

Enterprise Information Management takes an holistic view on decision relevant information available within an enterprise.

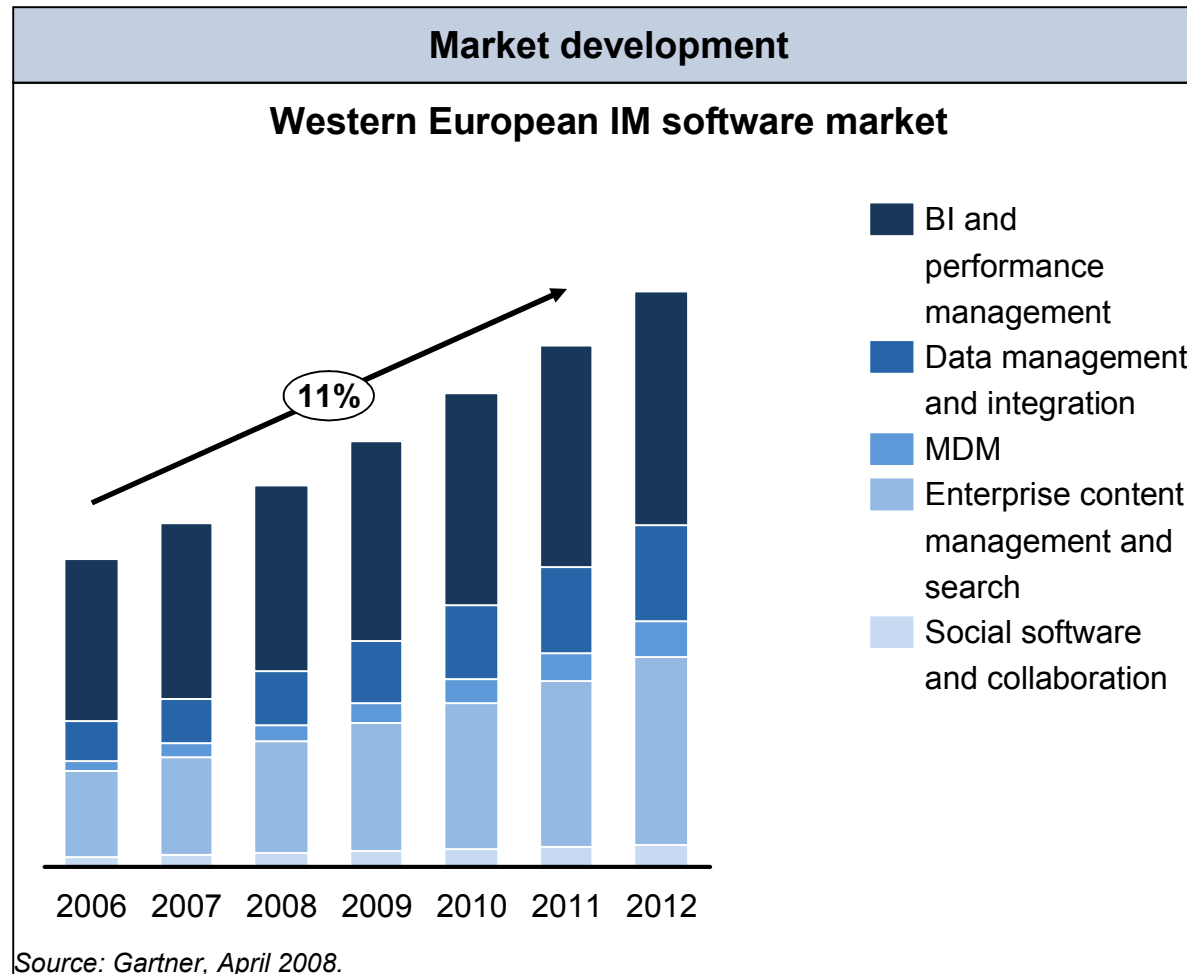


Source: Gartner 2007, EIM conference 2008, Detecon Research 2008.

# Enterprise Information Management.

## Market Growth

Information Management software and services are the fastest growing segment in the software market because they leverage information in core business applications.



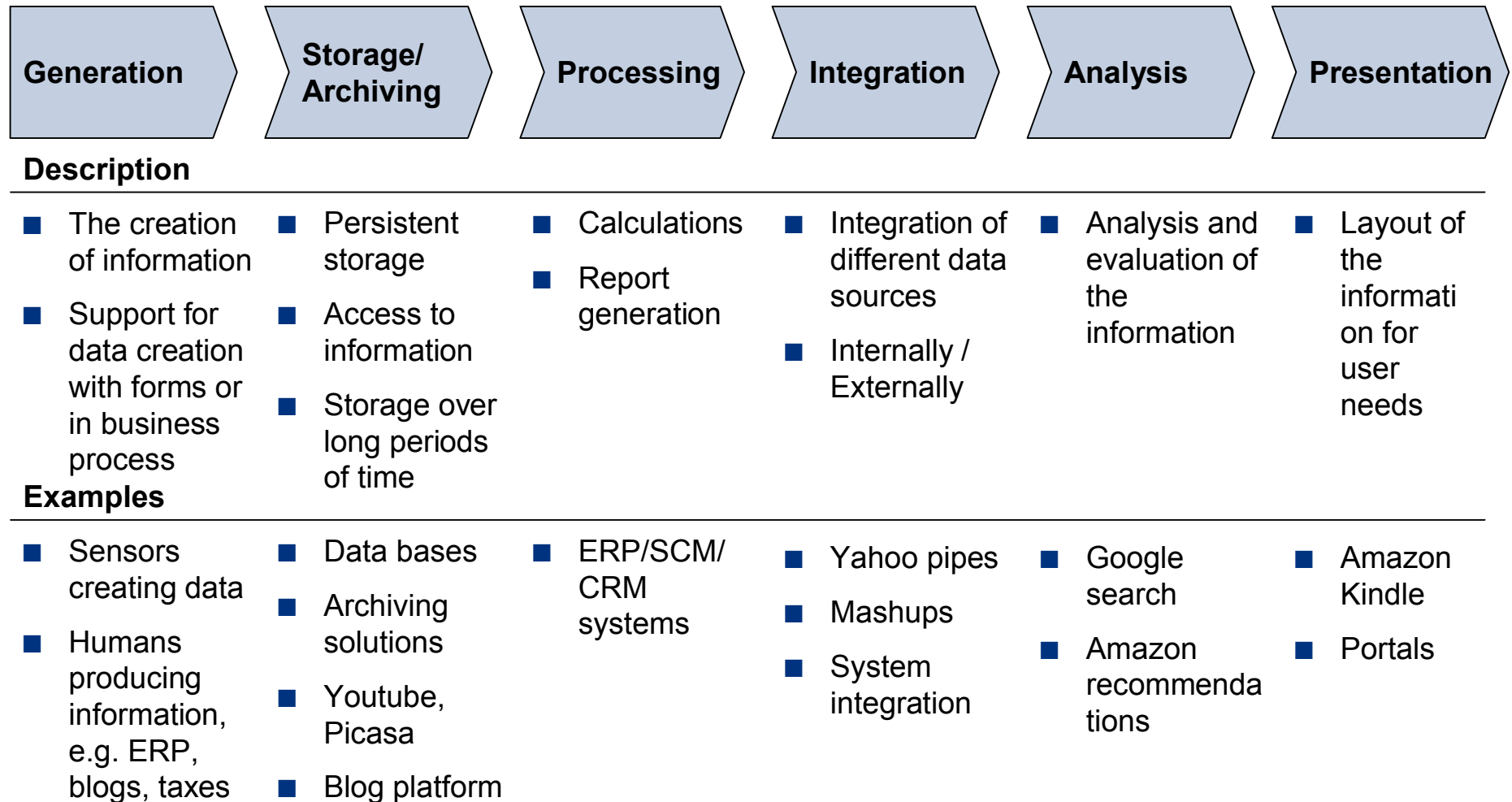
**Assessment**

- Data integration is a core enabler for all other IM initiatives.
- BI and Performance Management are the major topics for IM.
- Competing on analytics has become a key issue, as innovation leaders use analytics as a means to profit growth.
- More important than the technical solutions for IM are vision, strategy, policy, process and organizational issues.

# Enterprise Information Management.

## Information Value Chain

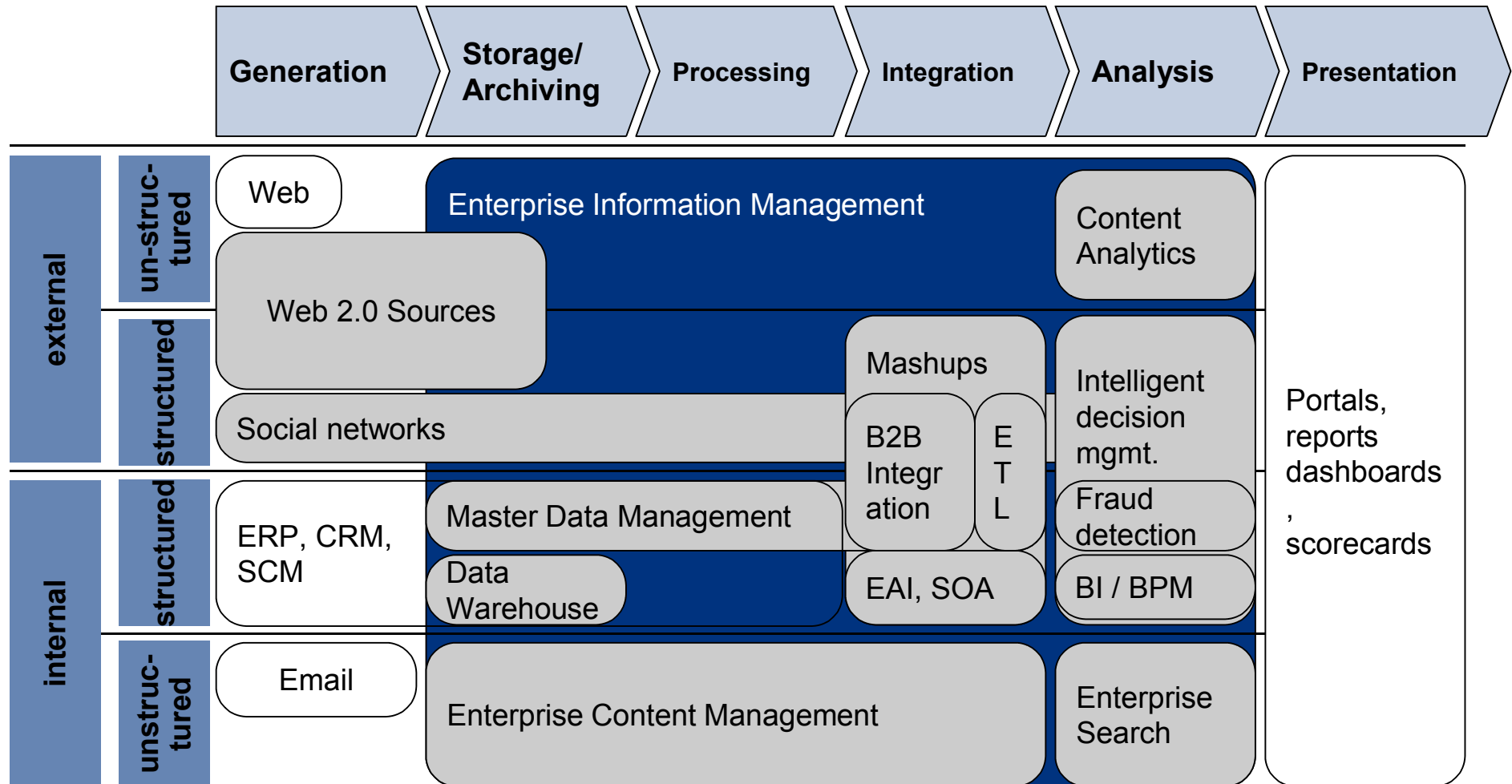
The information value chain is a simple yet powerful method to analyze information-based business models, applications and value propositions.



# Enterprise Information Management.

Information Value Chain

Positioning of the Enterprise Information Management in the overall software application market.





# Content

## **3. The Semantic Web and Analytics**

Ontologies in the Information Value Chain

Ontologies in Enterprise Information Management

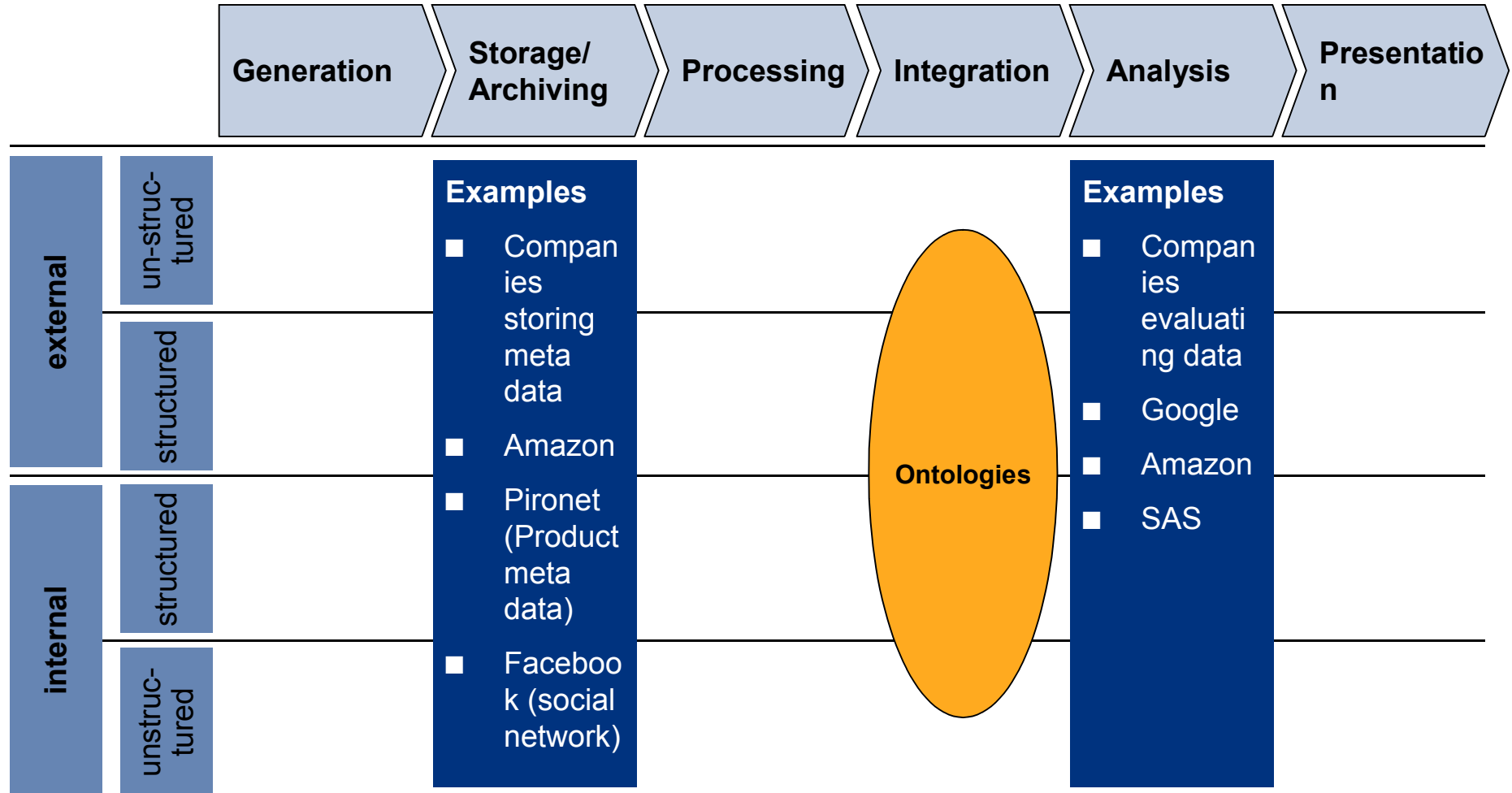
Examples



# The Semantic Web and Analytics

## Ontologies in the Information Value Chain

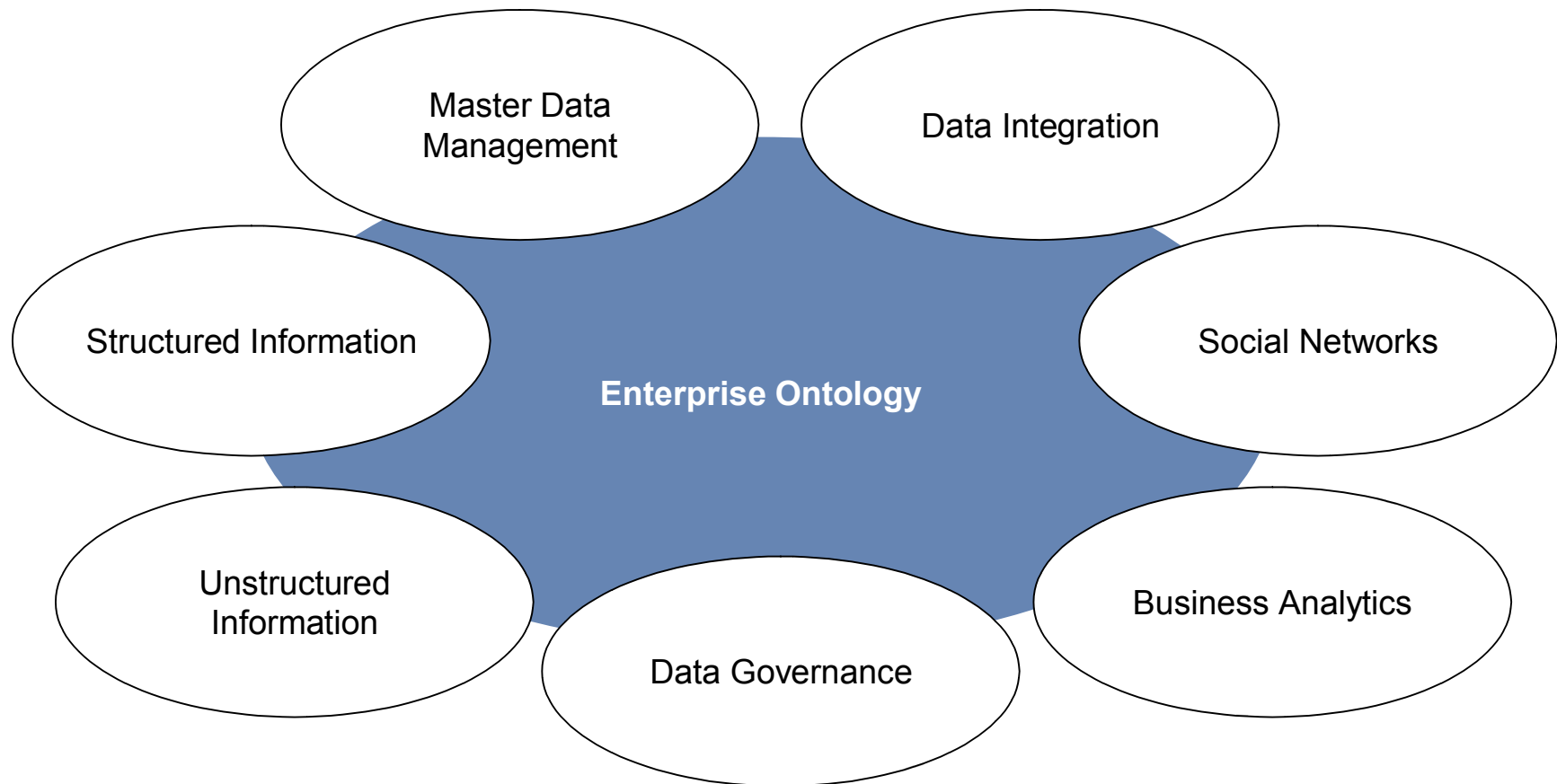
Ontologies do not generate value themselves, but enable the generation of value in subsequent stages.



# The Semantic Web and Analytics

Ontologies and Enterprise Information Management

**Ontologies are at the core of Enterprise Information Management.**



# The Semantic Web and Analytics

Example: Master Data Management

The combination of Wiki and Semantic Web technology is extremely powerful, as they combine accessibility, communication support and structured information.

**Semantic Media Wiki facilitates access**

Seite Diskussion Quelltext betrachten Versionen/Autoren

## MM01

Die SAP-Transaktion MM01 legt einen Materialstammsatz an.

Die Transaktion **MM01** wird in den Prozessen PROD, SD, MD-SCM und MM verwendet.

Vor der Neuanlage eines Materialstammsatzes sind folgende Punkte zu beachten:

- Es ist zu prüfen, ob bereits ein Material mit gleichen Eigenschaften (Prüfung von technischen Merkmalen) vorhanden ist.
- Vollständige Kontaktdaten (Anschrift, Kommunikationsdaten, Bankverbindung) des Lieferanten müssen vorhanden sein.

Bei Fragen kontaktieren Sie bitte die jeweiligen Datenowner Kai Hüner (Rohmaterial), Boris Otto (Handelsware) und Hubert Österle (Fertigerzeugnis).

**Fakten zu MM01** RDF-Feed

Guideline	Es ist zu prüfen, ob bereits ein Material mit gleichen Eigenschaften (Prüfung von technischen Merkmalen) vorhanden ist. +  und Vollständige Kontaktdaten (Anschrift, Kommunikationsdaten, Bankverbindung) des Lieferanten müssen vorhanden sein. +
Kurzbeschreibung	Die SAP-Transaktion MM01 legt einen Materialstammsatz an. +
Legt an	Materialstammsatz +
Prozess	PROD + , SD + , MD-SCM +  und MM +

Kategorie: SAP-Transaktion

**Advantages**

- Master Data Management is a state of the art approach to increase data quality in an enterprise context
- Master Data is used across many applications and establishes a single source of truth
- Semantic annotations of Master Data facilitate the communication between different stakeholders
- Semantics give context to the objects defined as master data

Source: Hüner, K. et. al.: Information Management & Consulting, 2008.



# The Semantic Web and Analytics

Example: Uptake

**Ontologies facilitate the selection of appropriate travel facilities as they enable the integration of different data sources under a common and abstracted vocabulary.**

**Integration of travel information**

Source: <http://www.uptake.com/>

**Advantages**

- Uptake integrates data from different travel portals to facilitate travel planning
- Ontologies are used to define a shared view on the travel domain
- Uptake integrates by means of the ontology, hotel offerings, user ratings, and other sources
- They categorize hotels according to a common vocabulary which enables rich queries to the large database.

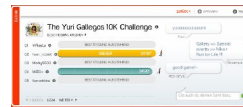
# The Semantic Web and Analytics

Example: Nike

**Die Kundenbindung wird durch Anreicherung der physischen Produkte mit einer werthaltigen Informationskomponente wesentlich gestärkt.**

## Nikeplus – „Die neue Art des Laufens“

- Teilen der eigenen Laufstrecke durch Eintragen auf Landkarte
- Suche nach Laufpartnern, die die gleiche bzw. eine ähnliche Laufstrecke haben
- Ausrichtung und Teilnahme an virtuellen Wettbewerben (z.B. wer verbraucht als 1. mehr als 2000 Kalorien)
- Erstellung von Trainingsplänen
- Trainingskontrolle durch Chip im Schuh und Datenübertragung an Apple iPod
- Teilen der eigenen Musikfavoriten (inkl. Powersong)
- Direkte Verbindung zu Apple iTunes (für den Kauf von Musikstücken)
- Vernetzung der Nutzer durch Community



## Vorteile

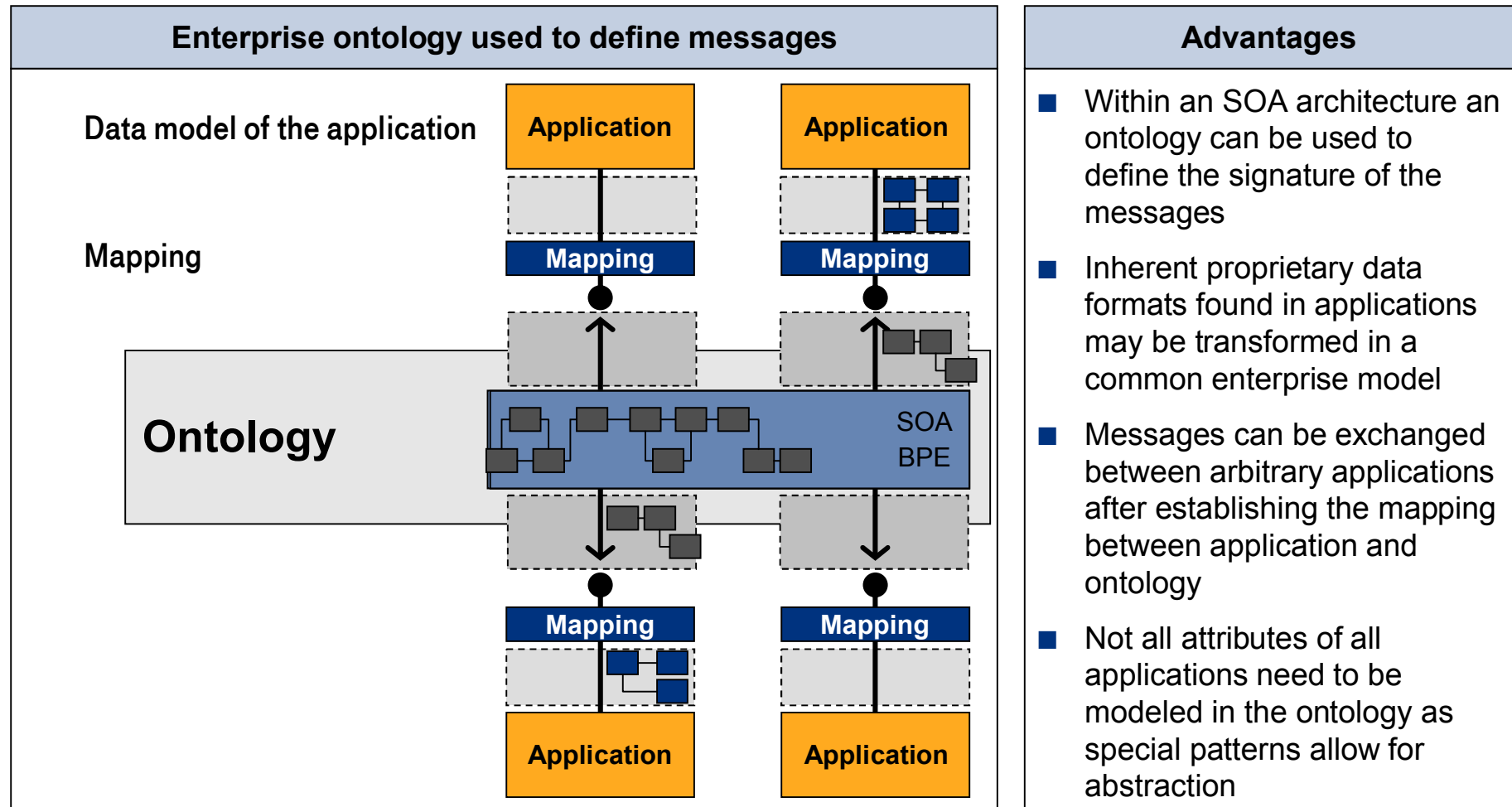
- Physische Produkte gewinnen an Wert durch Anreicherung mit Daten
- Cross-Marketing/Selling (Apple iPod & iTunes und Nike Sportschuhe)
- Erweiterte Kundendaten (neben Name, Alter auch Laufverhalten, Standort und Musikgeschmack)
- Nutzerbindung mit Community (Durch steigende Nutzerzahl erhöht sich Attraktivität: viele Strecken, Wettbewerbe etc.)
- Lock-In Effekt (Nutzer benötigen Apple iPod und Nike Sportschuhe)

Quelle: Nike Unternehmensdarstellung ([www.nikeplus.com](http://www.nikeplus.com))

# The Semantic Web and Analytics

Example: SOA Project

In a service oriented architecture an ontology represents the common denominator for all data which is exchanged between applications.





# The Semantic Web and Analytics

Example: Technology Management

**Ontologies are at the core of Enterprise Information Management.**

Technology management	Advantages
<ul style="list-style-type: none"><li>■ Representation of<ul style="list-style-type: none"><li>● technology,</li><li>● products,</li><li>● product versions,</li><li>● and standards with an ontology</li></ul></li><li>■ Clarification of interdependencies</li><li>■ Communication of standards across the company</li><li>■ Integration with current technologies and evaluation against the standards</li></ul>	<ul style="list-style-type: none"><li>■ Technology Management aims at the standardization of technologies used within a company</li><li>■ Ontologies facilitate the clear definition of the terms used within the technology management domain</li><li>■ In combination with an Semantic MediaWiki the technology standards can easily be communicated</li><li>■ The existing infrastructure can be evaluated against the technology standards</li></ul>





# Content

## **4.** What should Enterprises do now?

Process

Portfolio

# What should Enterprises do now?

## Process

**Enterprises should develop a light weight enterprise ontology covering the most important information items in order to evaluate the business potential of information.**

Process				Summary
<b>Information Architecture Alignment</b>	<b>Information Governance</b>	<b>Information Architecture</b>	<b>Viewpoint implementation</b>	
<b>Scope of Work</b>				
<ul style="list-style-type: none"> <li>■ Data base line description</li> <li>■ Alignment with IT strategy and KPI definition</li> <li>■ Identification of information value contribution potential</li> </ul>	<ul style="list-style-type: none"> <li>■ Definition of rules, architecture viewpoints and tools</li> <li>■ Control, lead &amp; ownership management definition for information</li> </ul>	<ul style="list-style-type: none"> <li>■ Definition of ontology domains</li> <li>■ Definition of Target Information Architecture (ontology)</li> <li>■ Alignment with business processes</li> </ul>	<ul style="list-style-type: none"> <li>■ Stakeholder needs analysis</li> <li>■ Definition of selected viewpoints on Target Information Architecture</li> </ul>	<ul style="list-style-type: none"> <li>■ The requirements on data quality are increasing both from the customer side and the internal side for decision making</li> <li>■ The granularity of data required / available for delivery of customer services is growing strongly</li> <li>■ A coordinated information management is required both for efficient customer-oriented processes and for additional value creation (profiling, cross selling)</li> <li>■ Information management provides a governance framework to implement an information architecture considering the business requirements and stakeholder viewpoints to ensure the alignment with business strategy.</li> </ul>
<b>Key Deliverables</b>				
<ul style="list-style-type: none"> <li>■ As-is analysis of information-architecture</li> <li>■ Information architecture strategy</li> </ul>	<ul style="list-style-type: none"> <li>■ Information governance defining management processes and information quality criteria</li> </ul>	<ul style="list-style-type: none"> <li>■ Ontology</li> <li>■ Aligned Target Information Architecture</li> </ul>	<ul style="list-style-type: none"> <li>■ Data model dissemination, interoperability, lifecycle, security, management view</li> </ul>	

# What should Enterprises do now?

## Information Architecture Alignment

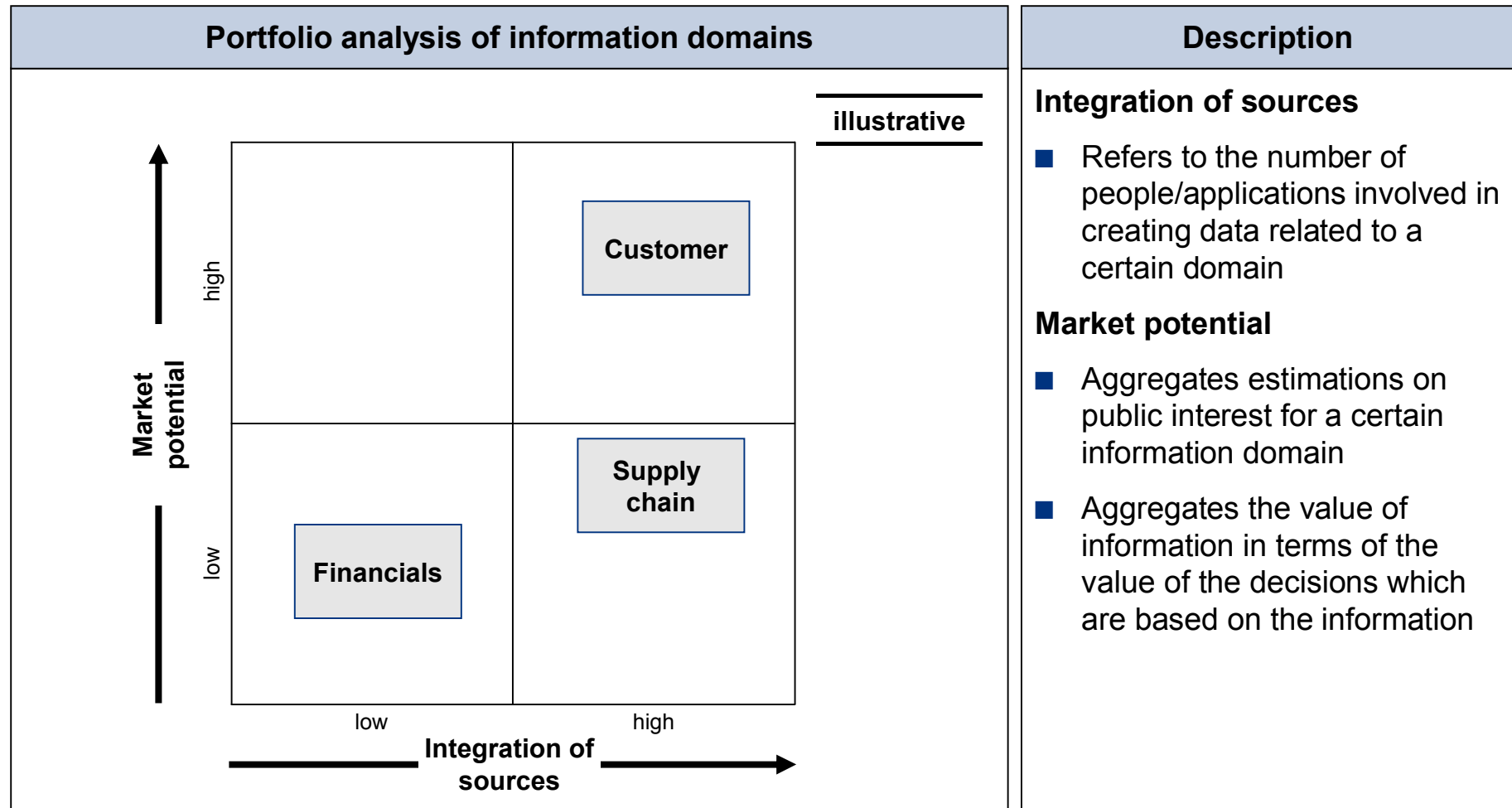
Enterprises benefit most from ontologies is cross functional areas, in which ontologies can facilitate communication and data integration.

	Customer	Product	Operations	Supply Chain
Customer	CRM	What product is the customer using? How does the usage pattern look like?	What hardware and software is delivered to the customer?	Who is deploying it to the customer?
Product	Which customer is buying this product?	Product Catalog	What resources are needed to deploy this product?	What HW/SW is required to deliver the product
Operations	Which customers can be supported by our operations?	Which products can be produced?	Inventory	What is needed (synergies) to support the global operations?
Supply Chain	How to improve the supply-chain to meet customer's needs?	How to improve global product rollout & sales by supply-chain activities?	(How to) Ensure efficient global operations?	Supply Chain Management

# What should Enterprises do now?

## Portfolio

A portfolio of information domains can indicate in which areas ontology development should focus.





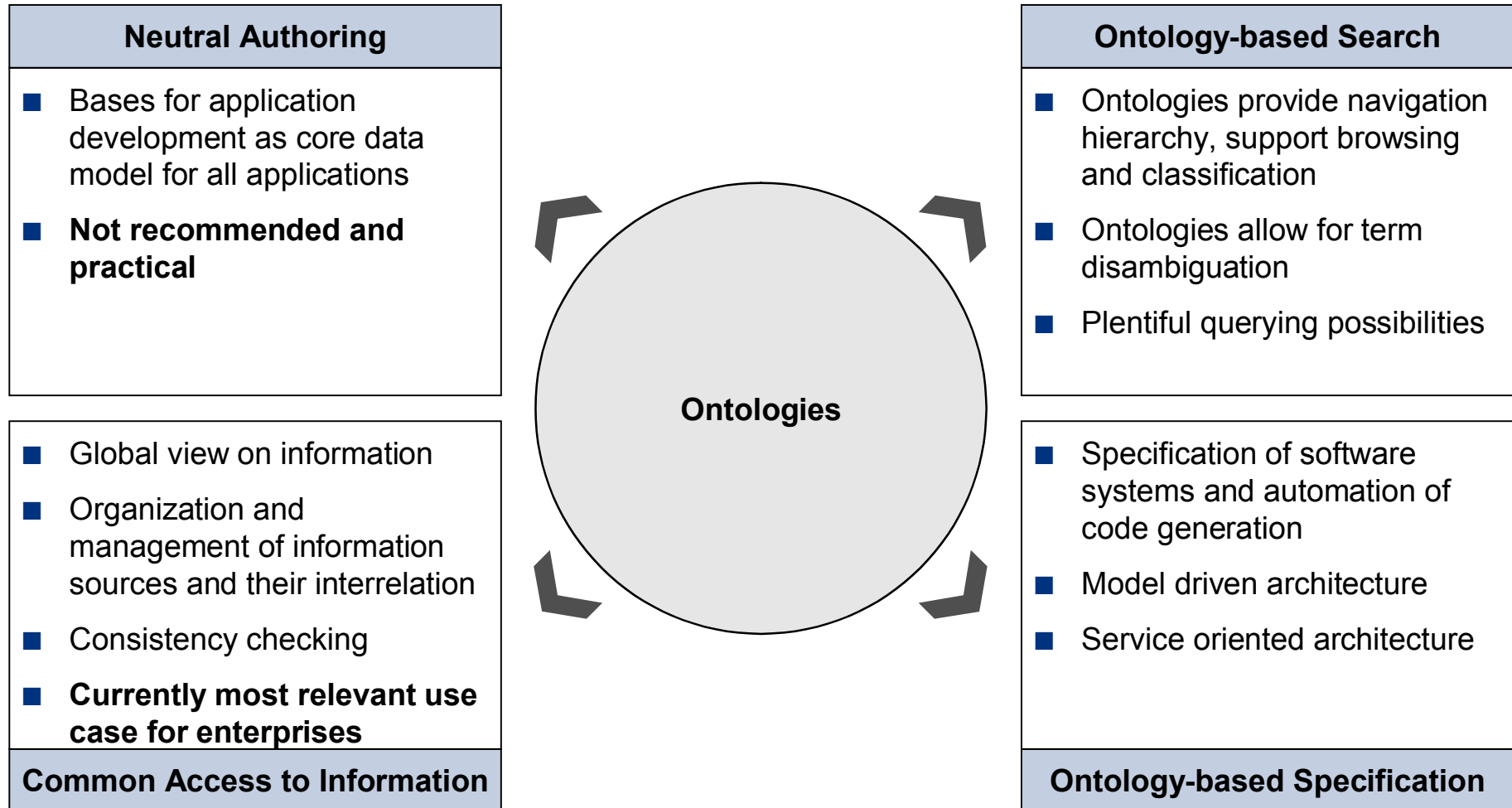
# Content

- 4.** **Open Research Questions**
  - Example Integration
  - Collection

# Open Research Questions

## Application Scenarios for Ontologies

**Ontologies not only are a means to enable interoperability between machines but also facilitate communication between people providing a shared representation of a domain .**



Source: Jasper & Uschold, 1999.

# Open Research Questions

## Application Scenarios for Ontologies: *Common Access to Information*

Building a semantic application is possible. However it still requires deep technology insight and best practices for system integration are still under development.



### Stakeholders\*

<ul style="list-style-type: none"> <li>■ Consultants (<i>few consultants available understanding the benefit</i>)</li> <li>■ Decision makers (<i>mainly technicians, few C-level awareness</i>)</li> </ul>	<ul style="list-style-type: none"> <li>■ System integrators (<i>only small players</i>)</li> <li>■ <b>Weakest part in the value chain</b></li> </ul>	<ul style="list-style-type: none"> <li>■ Technology consultants (<i>Few consultants, engineering environment available</i>)</li> <li>■ Staff (<i>requires knowledge transfer</i>)</li> </ul>	<ul style="list-style-type: none"> <li>■ Technology consultants (<i>Technology requires great technical skills</i>)</li> <li>■ Technology ready for structured data sources, not ready for unstructured sources</li> </ul>	<ul style="list-style-type: none"> <li>■ Technicians (<i>Scalable stores available, Good vendor support</i>)</li> <li>■ Integration with all kinds of data bases possible</li> </ul>	<ul style="list-style-type: none"> <li>■ System integrators (<i>user interfaces available, customization required, few people available</i>)</li> </ul>
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### Key Deliverables

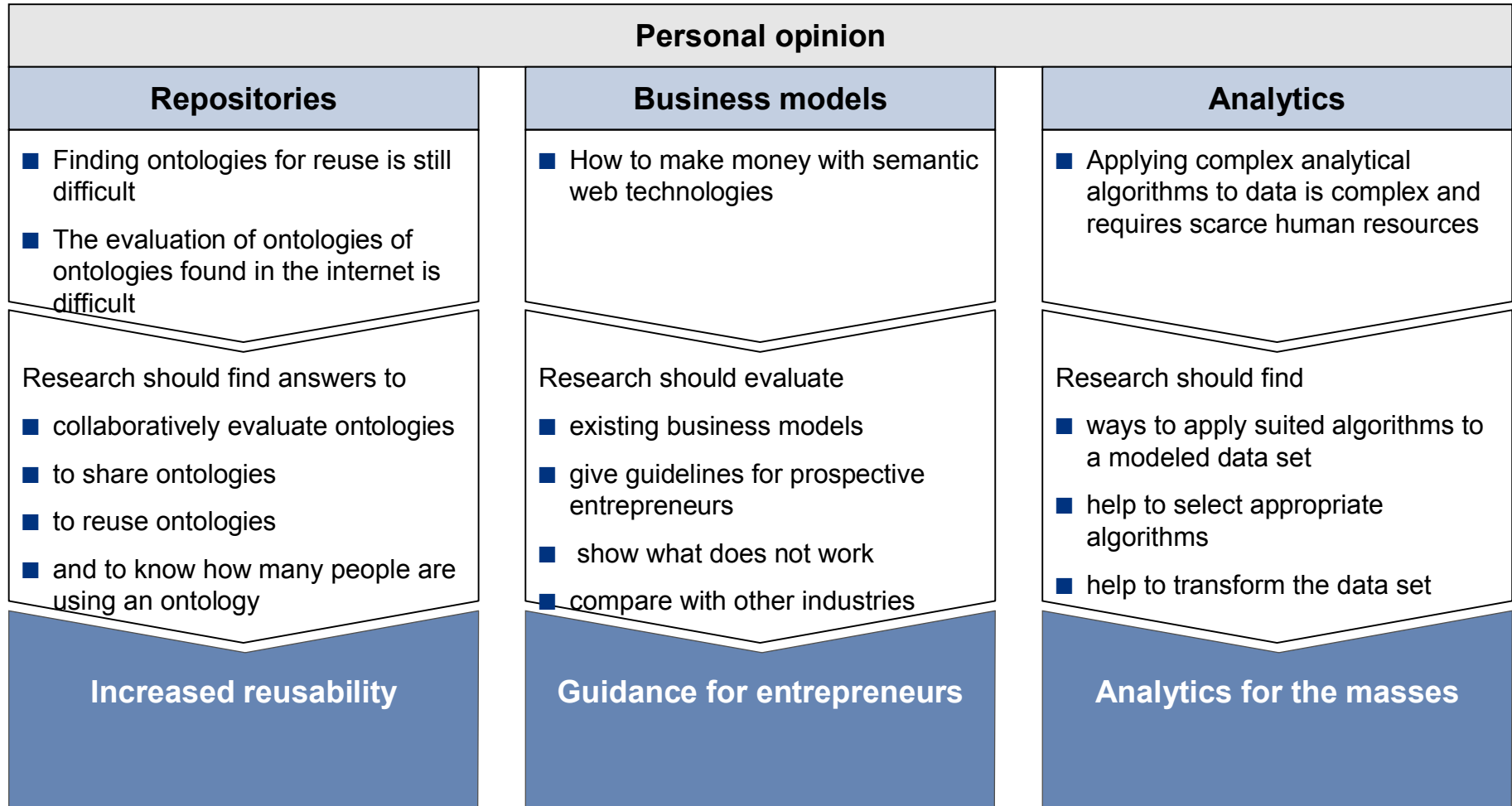
<ul style="list-style-type: none"> <li>■ Feasibility study</li> <li>■ Identification of data stores to be integrated</li> <li>■ Business case</li> <li>■ Rough application architecture</li> </ul>	<ul style="list-style-type: none"> <li>■ Detailed description of application</li> <li>■ Evaluation criteria</li> <li>■ Detailed description of data sources</li> <li>■ Application scenario</li> </ul>	<ul style="list-style-type: none"> <li>■ Ontology</li> <li>■ Sample queries</li> <li>■ Translation</li> <li>■ Logical model</li> <li>■ Documentation of ontology</li> <li>■ Maintainability of ontology</li> </ul>	<ul style="list-style-type: none"> <li>■ Mapping of data sources to ontology</li> <li>■ Enterprise ontology based SOA messages</li> </ul>	<ul style="list-style-type: none"> <li>■ Integration of triplestores with data sources by means of mappings</li> <li>■ Scalable storage solution</li> <li>■ Maintainability</li> </ul>	<ul style="list-style-type: none"> <li>■ User interface</li> <li>■ Process to support application</li> <li>■ SOA infrastructure</li> </ul>
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\*Who should do it (*current problems*)

# Open Research Questions

Collection

**Research in Corporate Semantic Web technologies should address ontology reuse, integration, and business model issues.**

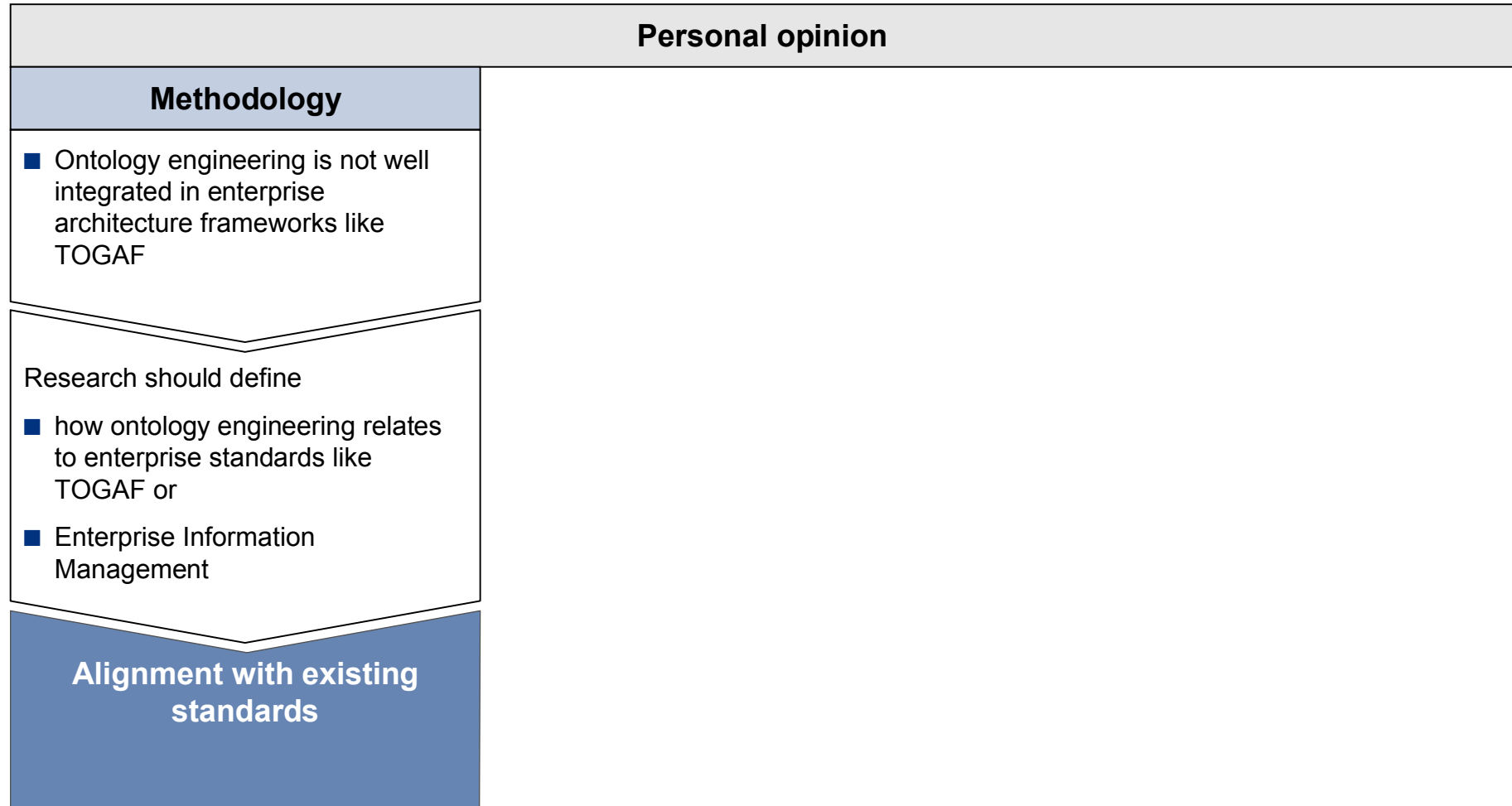




# Open Research Questions

Collection

In terms of methodology the integration of ontology engineering methodologies with enterprise methodologies like TOGAF is still weak.



# Conclusions

- 1 In a corporate context Semantic Web technologies are part of Enterprise Information Management
  - 2 Intrinsically ontologies do not provide a specific value to the business, but they are core enablers
  - 3 Ontologies facilitate the analysis of data and should therefore play a major role in an EIM strategy
  - 4 The application of ontologies in SOA and EAM projects is mature
  - 5 Enterprises should develop their own enterprise ontology to evaluate their information needs
  - 6 Ontologies have the highest benefit when they support cross functional information integration
- Corporate Semantic Web research should focus on:
- issues related to existing enterprise standards
  - integration with analytics
  - reusability



**Thank you.**

# Contact



**Dr. Christoph Tempich**  
Detecon International GmbH  
Industry/Competence Practice IT

Oberkasseler Str. 2  
53227 Bonn (Germany)  
Phone: +49 228 700-1942  
Fax: +49 228 700 – 2361  
Mobile: +49 (151) 12720065  
e-Mail: [Christoph.Tempich@detecon.com](mailto:Christoph.Tempich@detecon.com)