



## Information Systems 2

Lars Schmidt-Thieme

Information Systems and Machine Learning Lab (ISMLL)  
Institute for Business Economics and Information Systems  
& Institute for Computer Science  
University of Hildesheim  
<http://www.ismll.uni-hildesheim.de>

## **1. What are Information Systems?**

## **2. Course Outline**

## **3. Organizational stuff**

## **4. About ISMLL**

## J.C. Penney

The company J.C. Penney sells shirts through a network of local warehouses.

Formerly, it replenished sold items by stocking:

- Each warehouse stocks shirts for up to 3 months.
- Warehouses are supplied from regional storehouses that stock shirts for up to 6 months.



## J.C. Penney

Nowadays, replenishing works completely different:

- At checkout each transaction is reported electronically to TAL Apparel Ltd. in Hongkong.
- TAL produces a new shirt like the one just bought and ships it directly to the local warehouse.
- TAL's application system uses the demand on different shirts in the past to predict the number of shirts needed in each store.
- TAL assigns article numbers and bar codes for easy identification of different shirts.
- TAL offers information about which shirts have been sent, when, and where they are right now.

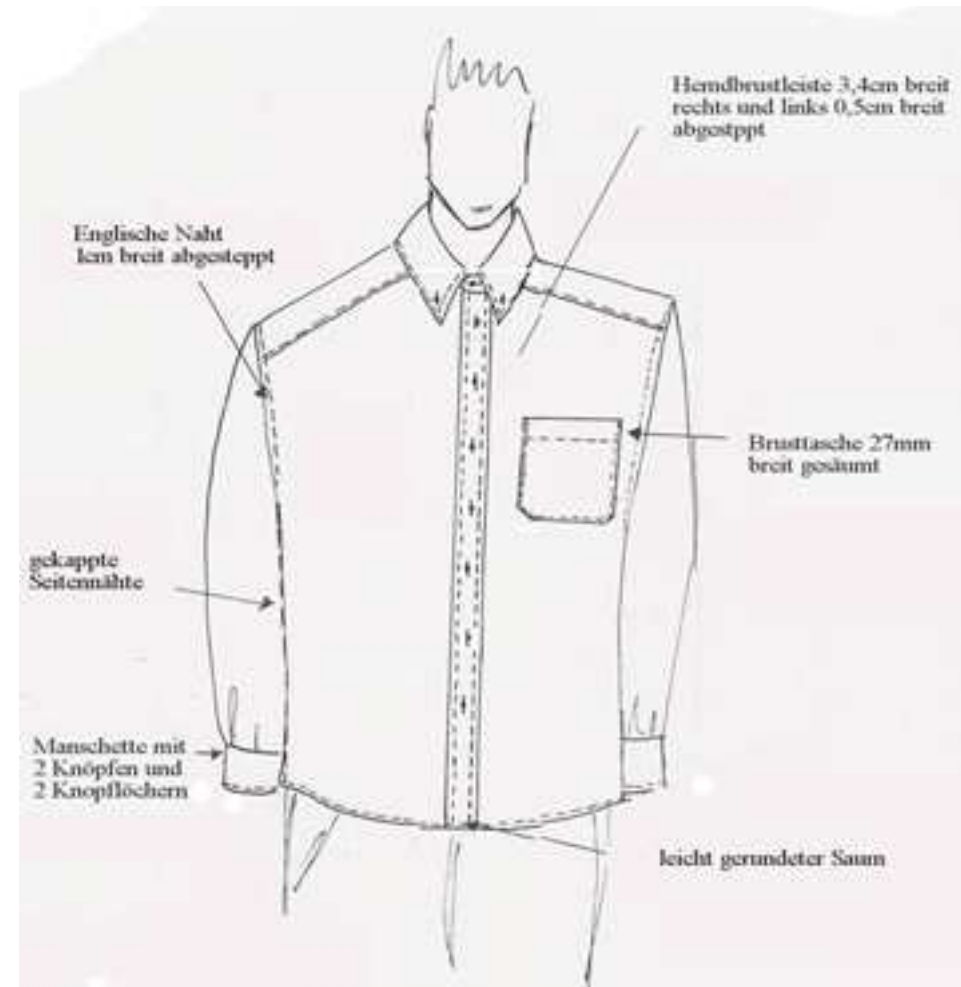


## J.C. Penney

The new method for replenishing has side effects, e.g., for development and testing of new shirts:

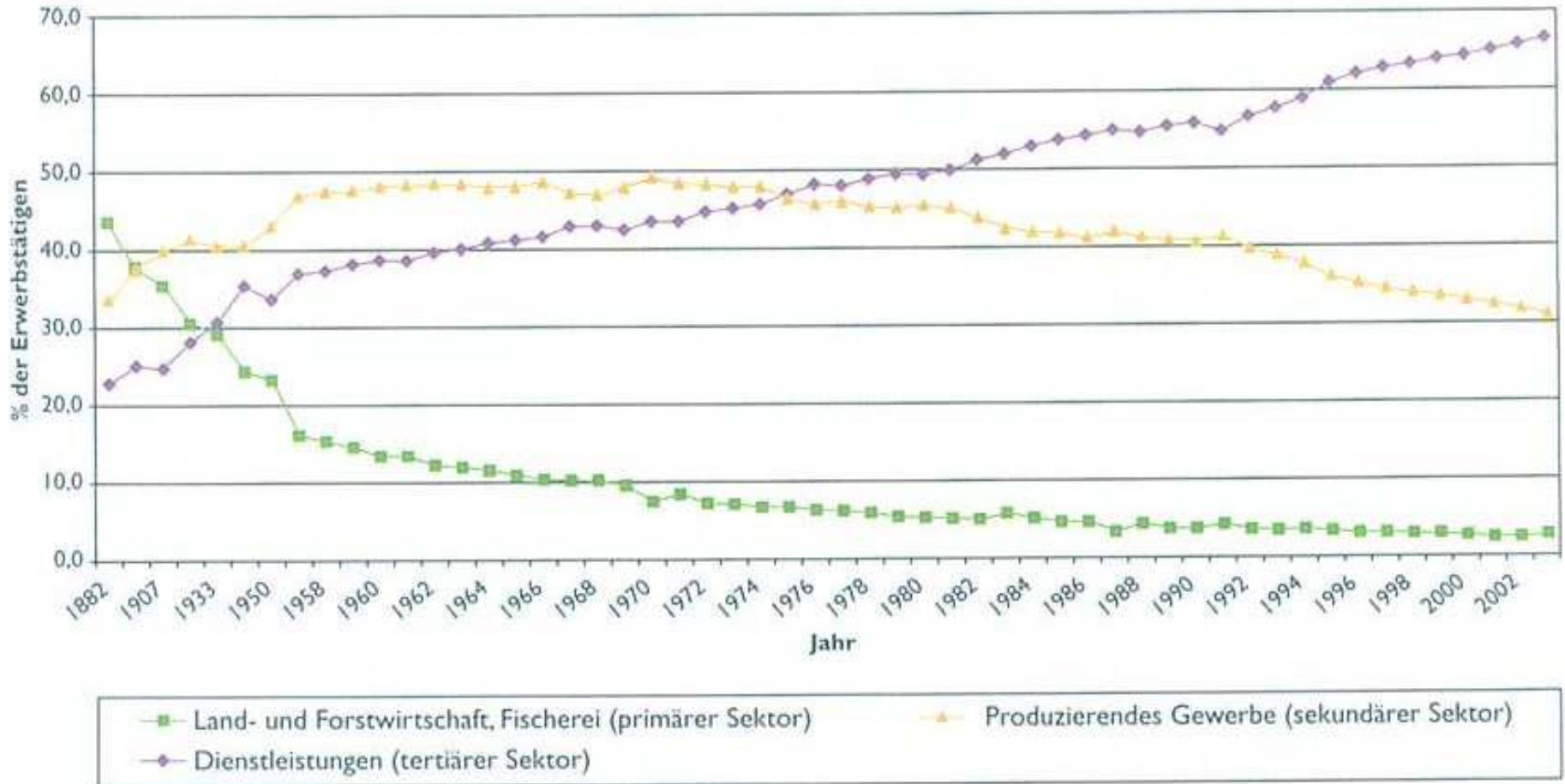
- TAL produces a lot of variants (colors, sizes, shapes, etc.) and sends them directly to the warehouses.
- Penney can base their choices for new shirts on sales figures of the test shirts.

[LLS06]



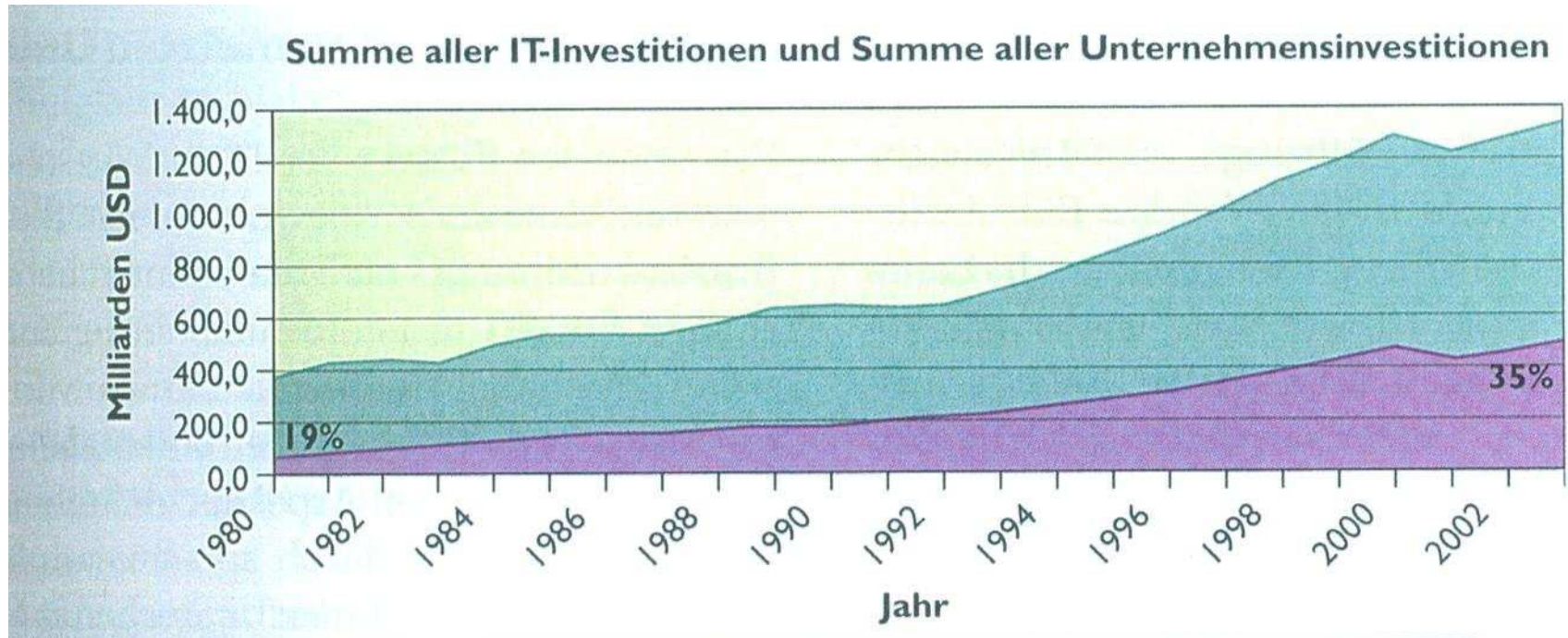
# Information Technology in Business (1/2)

Erwerbstätige nach Wirtschaftssektoren 1882 - 2003



[LLS06]

## Information Technology in Business (2/2)

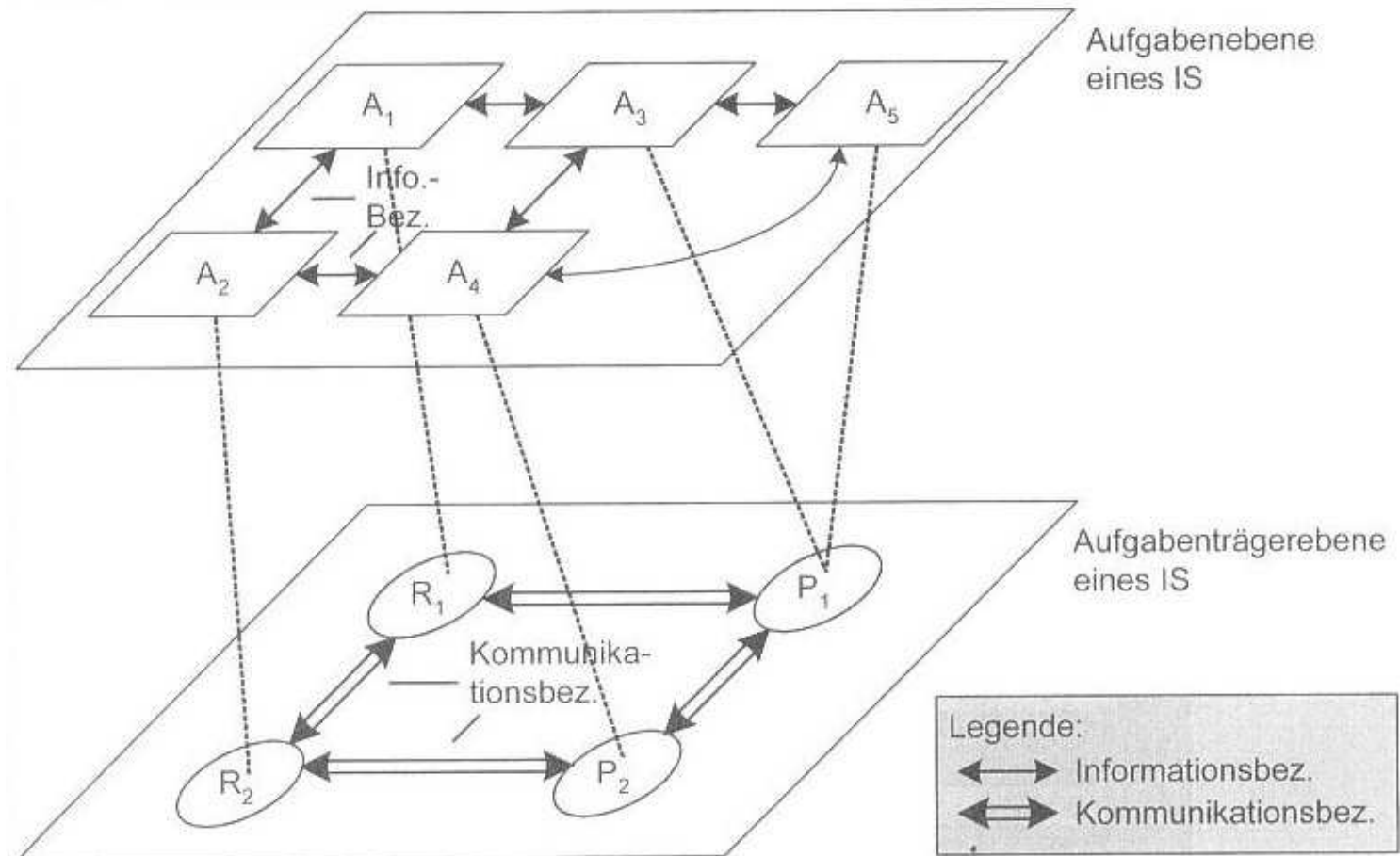


[LLS06]



# Information Systems

“Unter einem Informationssystem [wird] ein System verstanden, das Informationen verarbeitet, d.h., erfasst, überträgt, transformiert, speichert und bereitstellt”[FS06, p.



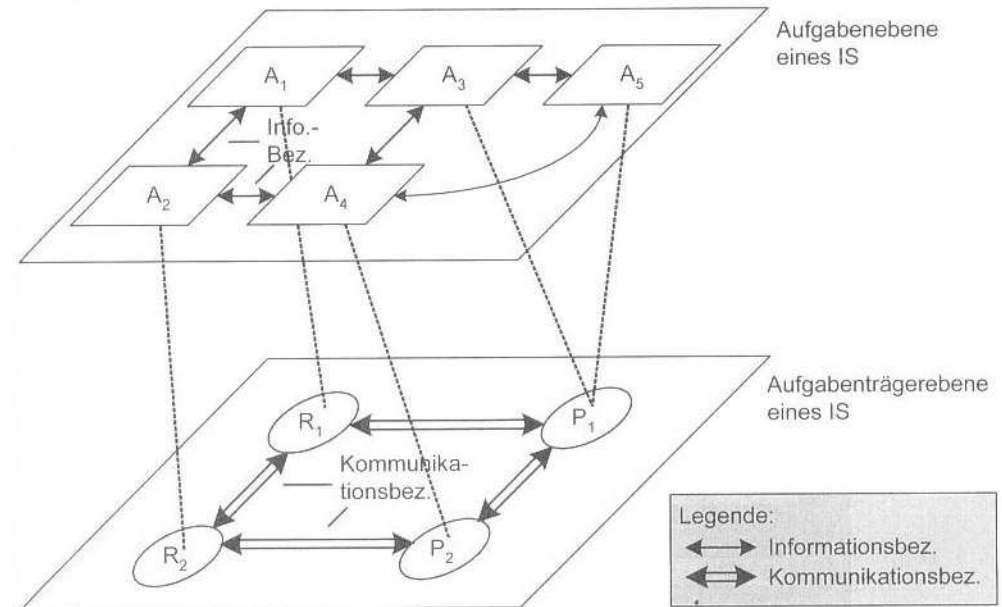
# Information Systems

“Unter einem Informationssystem [wird] ein System verstanden, das Informationen verarbeitet, d.h., erfasst, überträgt, transformiert, speichert und bereitstellt” [FS06, p. 1].

\*

“A computer is a machine which manipulates data according to a list of instructions” [English Wikipedia, “Computer”, 23.10.2007].

“Ein Computer, auch Rechner genannt, ist ein Apparat, der Informationen mit Hilfe einer programmierbaren Rechenvorschrift verarbeiten kann” [German Wikipedia, “Computer”, 23.10.2007].



[FS06]

## Application Systems vs. Information Systems

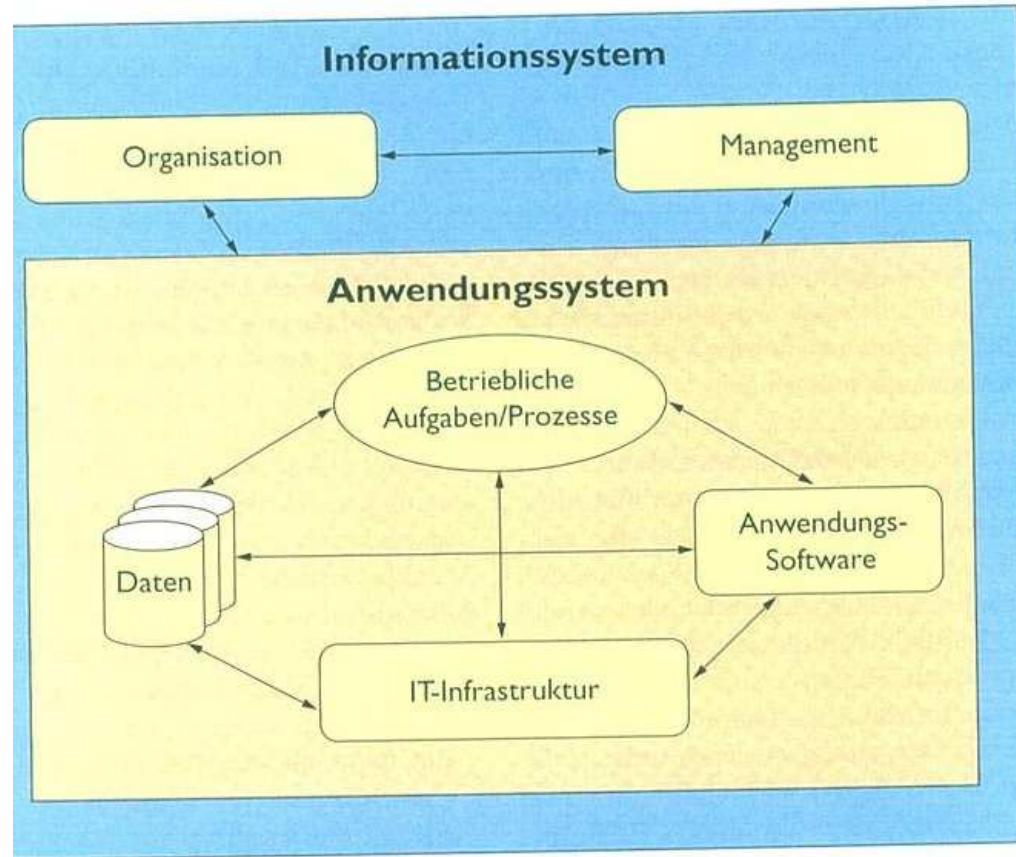
An **Application System** is a set of interoperating

- software programs,
- IT infrastructure and
- data

that supports a specific business domain.

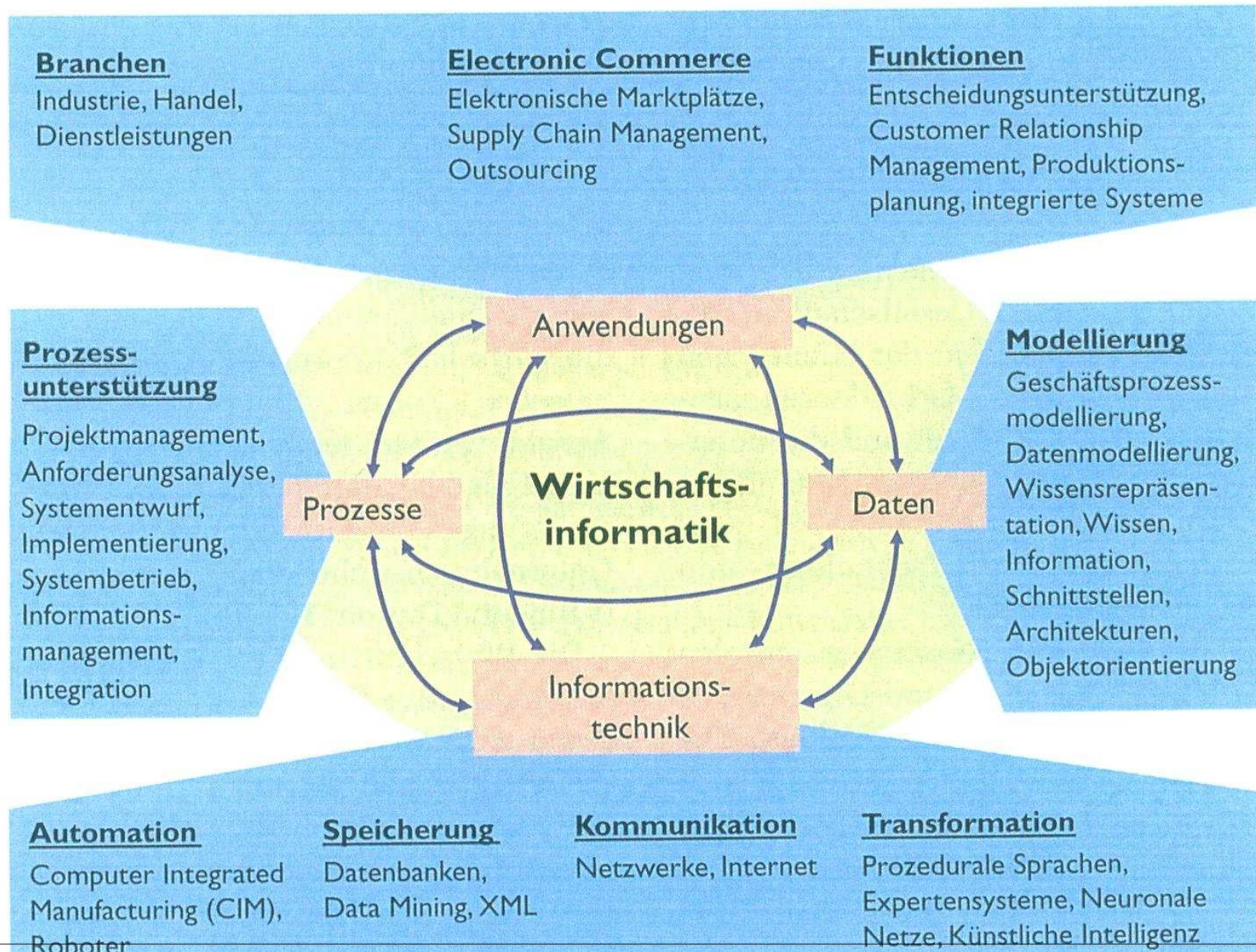
An **Information System** is an application system plus its business context, i.e., the organisation, people, etc. that use the system.

Application systems are **technical systems**, information systems **socio-technical systems**.



[LLS06]

## Aspects of Business Information Systems [LLS06]



## Software usually not considered to be Part of an Information System

### 1. **office software**

— but, companies started to collect all their documents in document warehouses and index them by knowledge bases.

### 2. **embedded software to operate a machine**

— but, in many scenarios machines generate some output that may be of further interest and thus should be managed by an information system.

### 3. **educational software**

— but, some modern educational software no longer is a monolithic isolated stand-alone piece of software, but connects learners and teachers through an online platform.

### 4. **entertainment software**

## Information Systems Program Contents — GI Recommendation [fl03]

- 1. Basics:**  
subdisciplines; relation to business management; law; behavioral sciences; computer industry.  
processes and functions; integration; electronic market places.
- 2. Information and Communication Technology:**  
computer architecture; hardware, software, middleware and development platforms; networks; communication.
- 3. Information Management:**  
information as agent of production; information supply; information networks; security; information system architectures.
- 4. Business Information Systems / E-Commerce & E-Business:**  
information systems oriented at economics sectors; information systems oriented at
- 5. Application System Development:**  
analysis, design, implementation, deployment; web-based systems; choice, customization and deployment of standard software; system integration.
- 6. Data and Knowledge:**  
data models and data bases; data warehouse; knowledge representation and engineering.
- 7. Disposition and Decision Support:**  
mathematical and statistical models and methods; operations research; artificial intelligence; methods of strategic management.

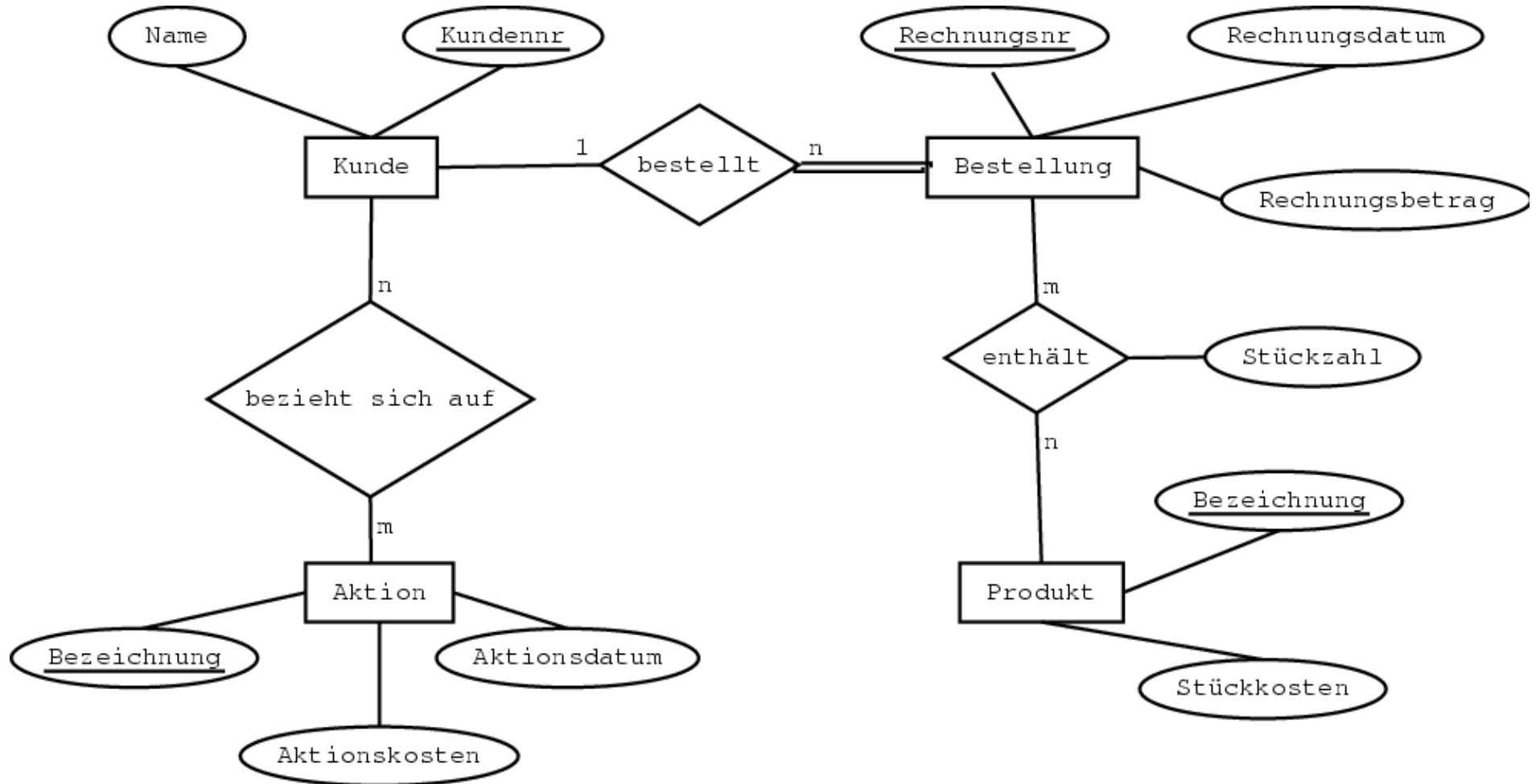
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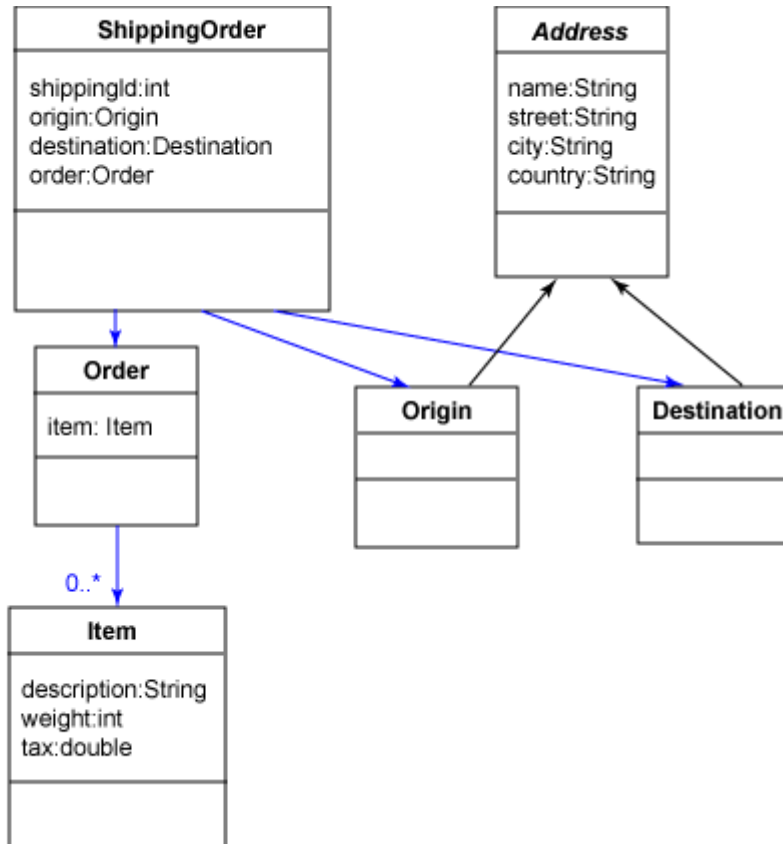
## **4. About ISMLL**

# Modelling Information Systems / Databases





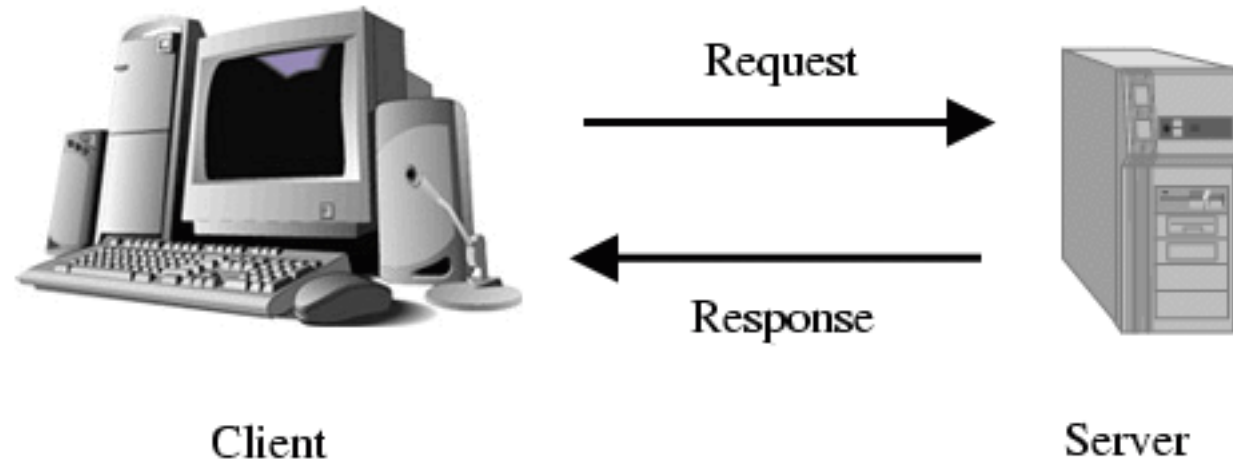
## Modelling Information Systems / Extended Markup Language XML



```

1 <?xml version="1.0" encoding="UTF-8"?>
2 <shippingOrder xmlns:xsi="http://www.w3.org/2001/XMLSchema"
3   xsi:noNamespaceSchemaLocation="C:\schemas\ShippingC
4   <shippingId>09887</shippingId>
5   <origin>
6     <name>Ayesha Malik</name>
7     <street>100 Wall Street</street>
8     <city>New York</city>
9     <country>USA</country>
10  </origin>
11  <destination>
12    <name>Mai Madar</name>
13    <street>Liivalaia 33</street>
14    <city>Tallinn</city>
15    <country>Estonia</country>
16  </destination>
17  <order>
18    <item>
19      <description>Ten Strawberry Jam bottles</description>
20      <weight>3.141</weight>
21      <tax>7.60</tax>
22    </item>
23  </order>
24 </shippingOrder>
  
```

## Distributed Information Systems / Remote Invocation



## Distributed Information Systems / Web Services

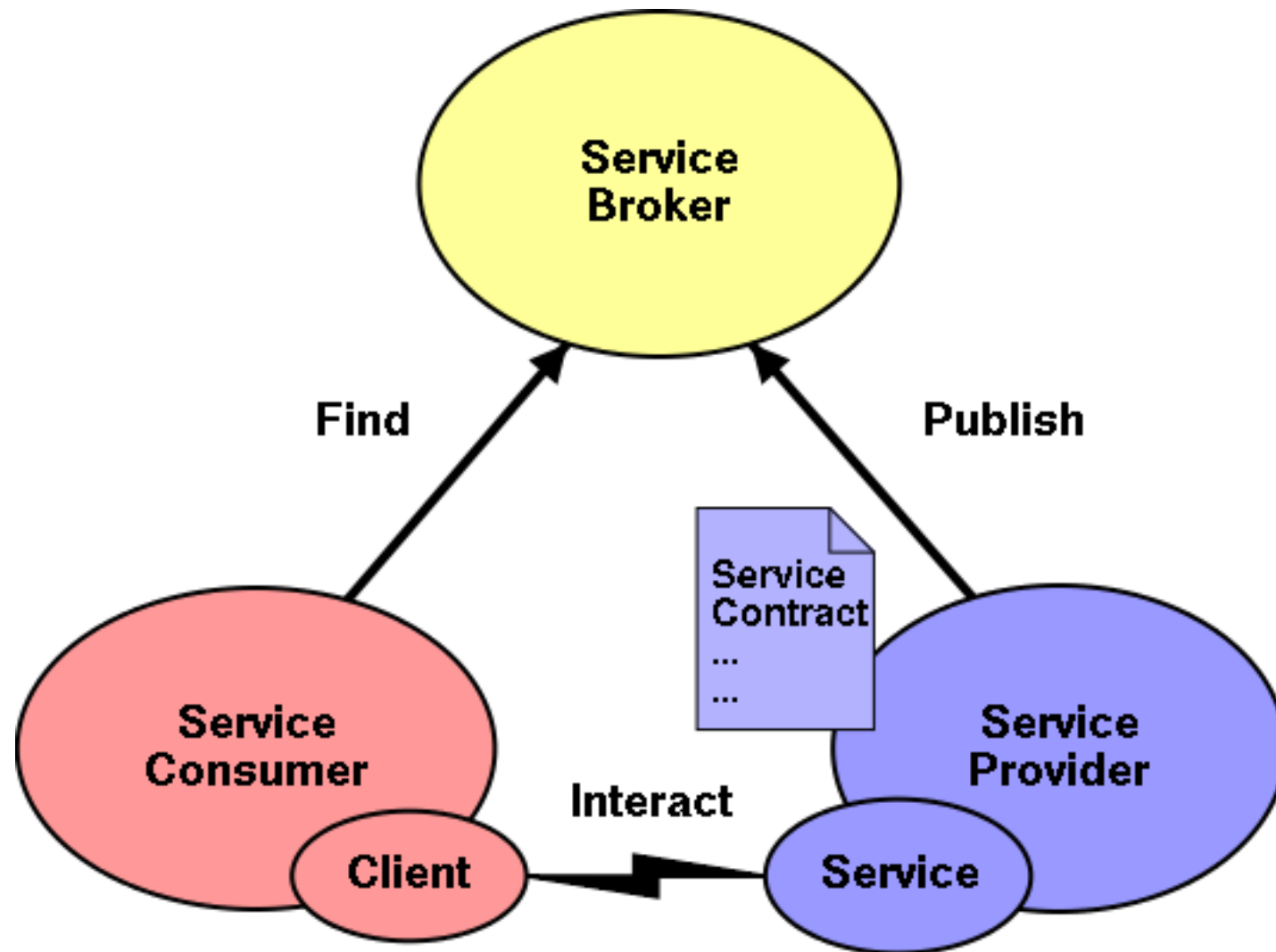


Figure 11: Service oriented architecture [Haa03].

## IT Management

- IT strategy
- IT organisation
- IT controlling

## Business Process Modelling / Process Modells

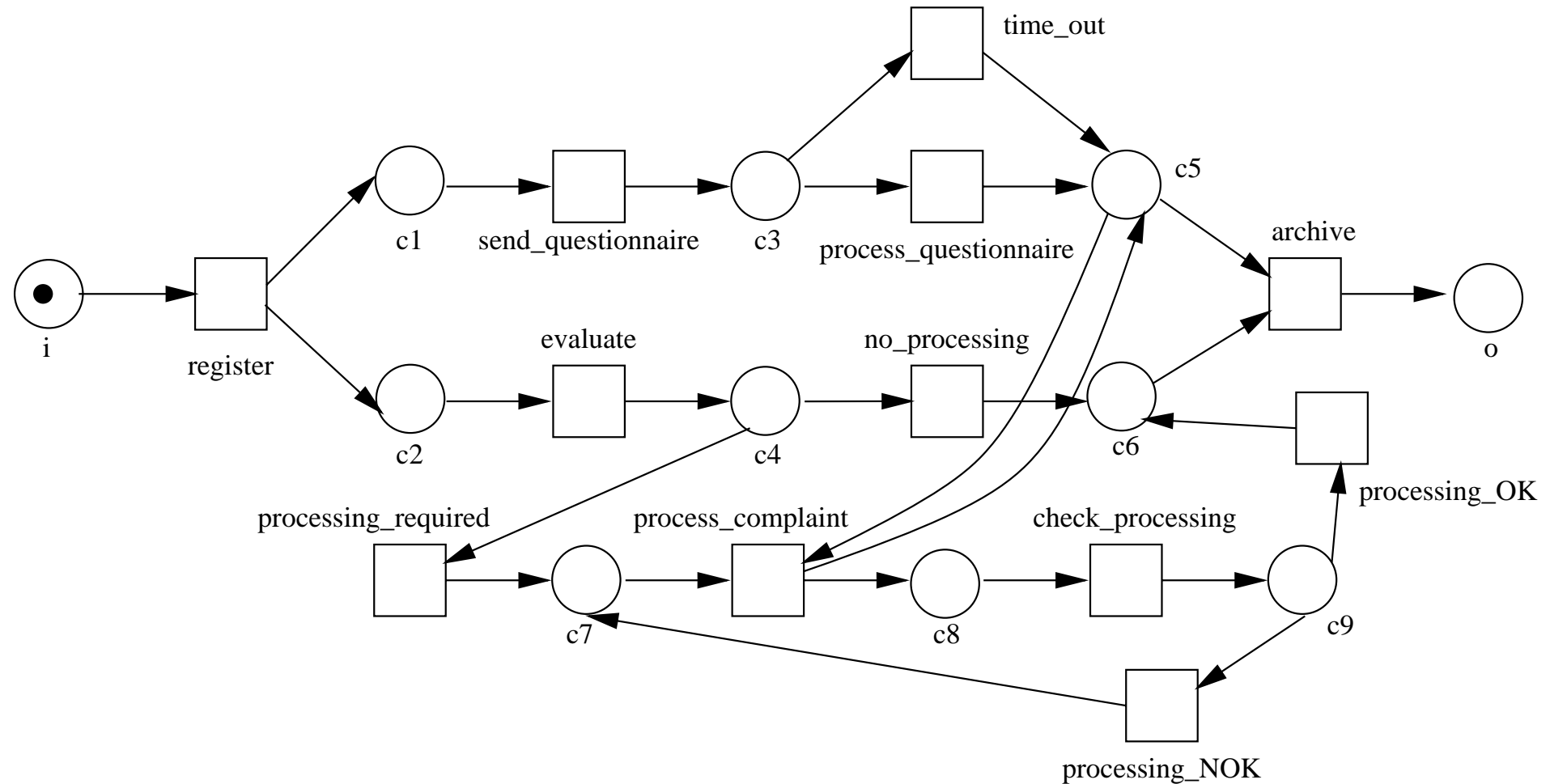


Figure 12: A workflow modeled as Petri net [vdA98].

## Business Process Modelling / Process Modelling Languages

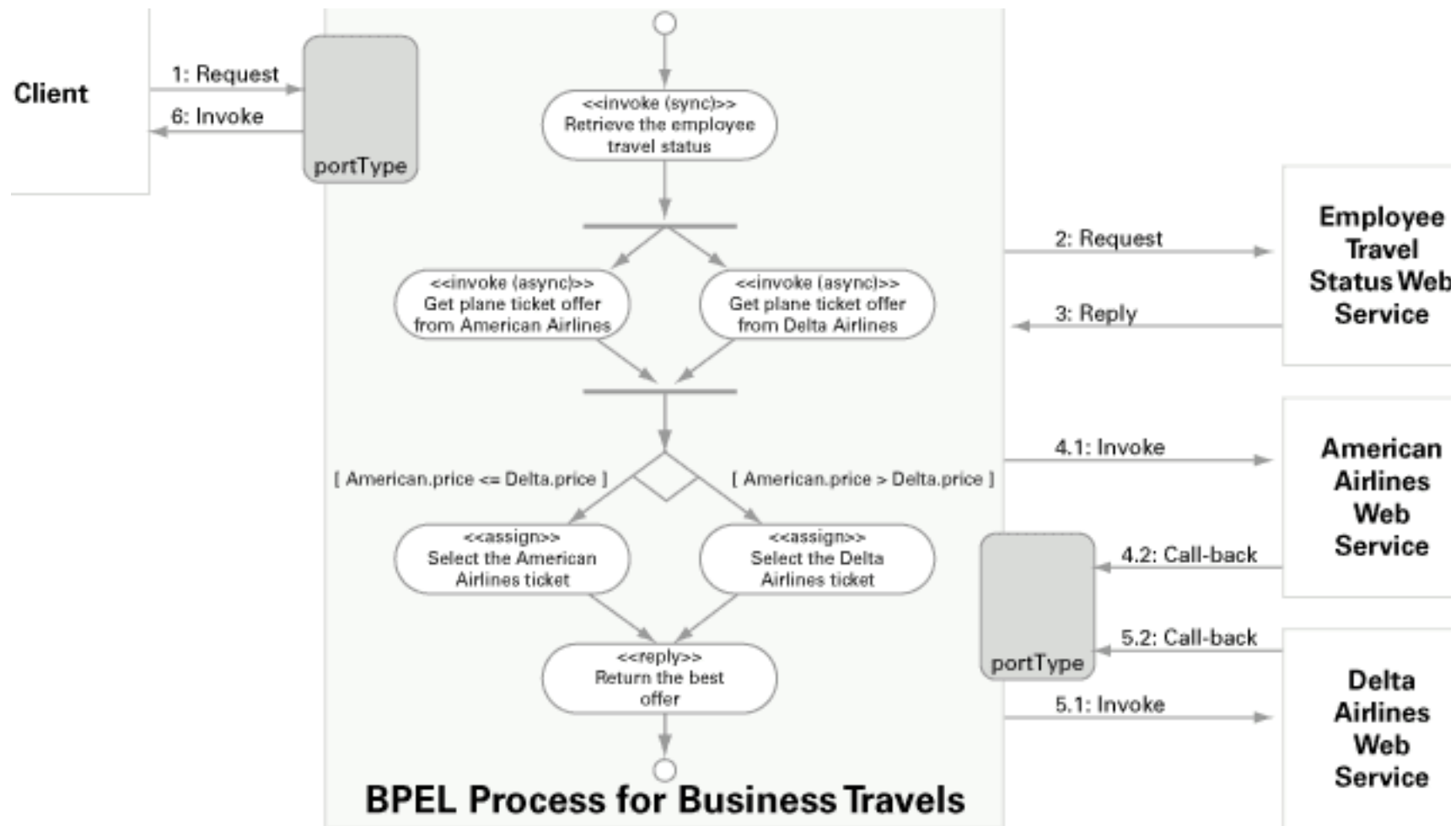
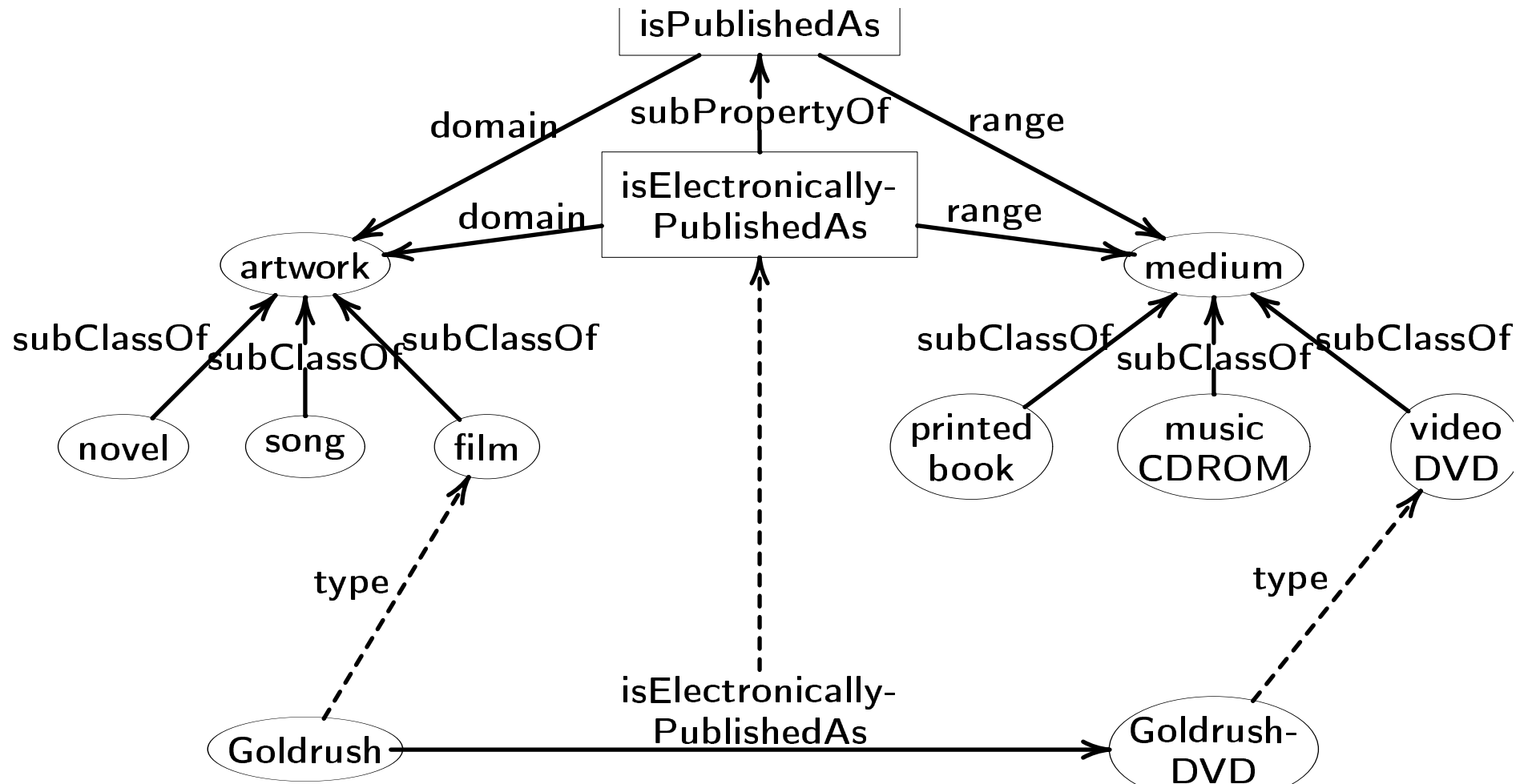


Figure 13: An example business process [Jurar].

# Knowledge Management & Semantic Web Technologies



# Business Intelligence & Data Mining

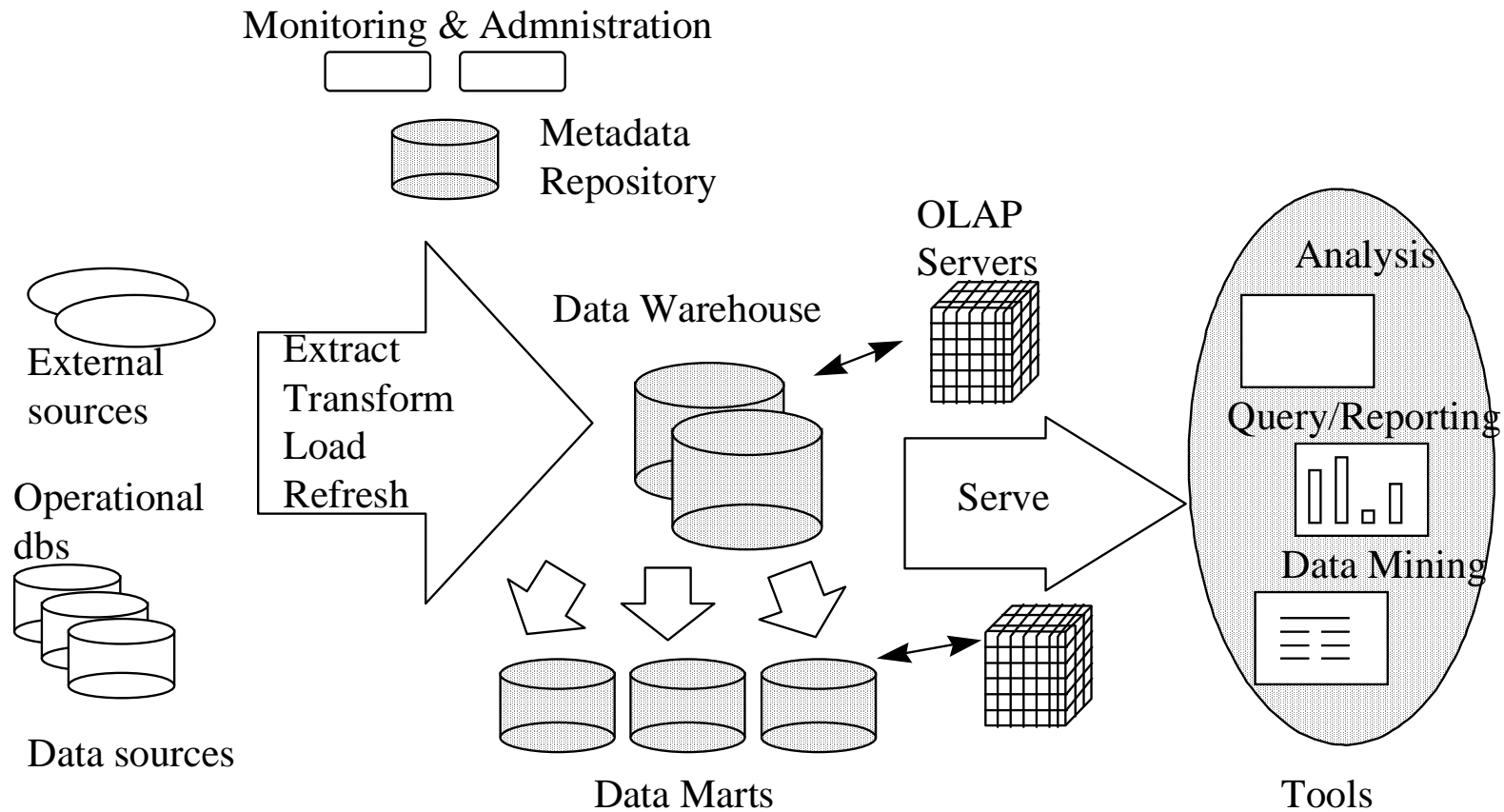


Figure 15: Data Warehouse-Architektur [CD97].



# E-Commerce & E-Business

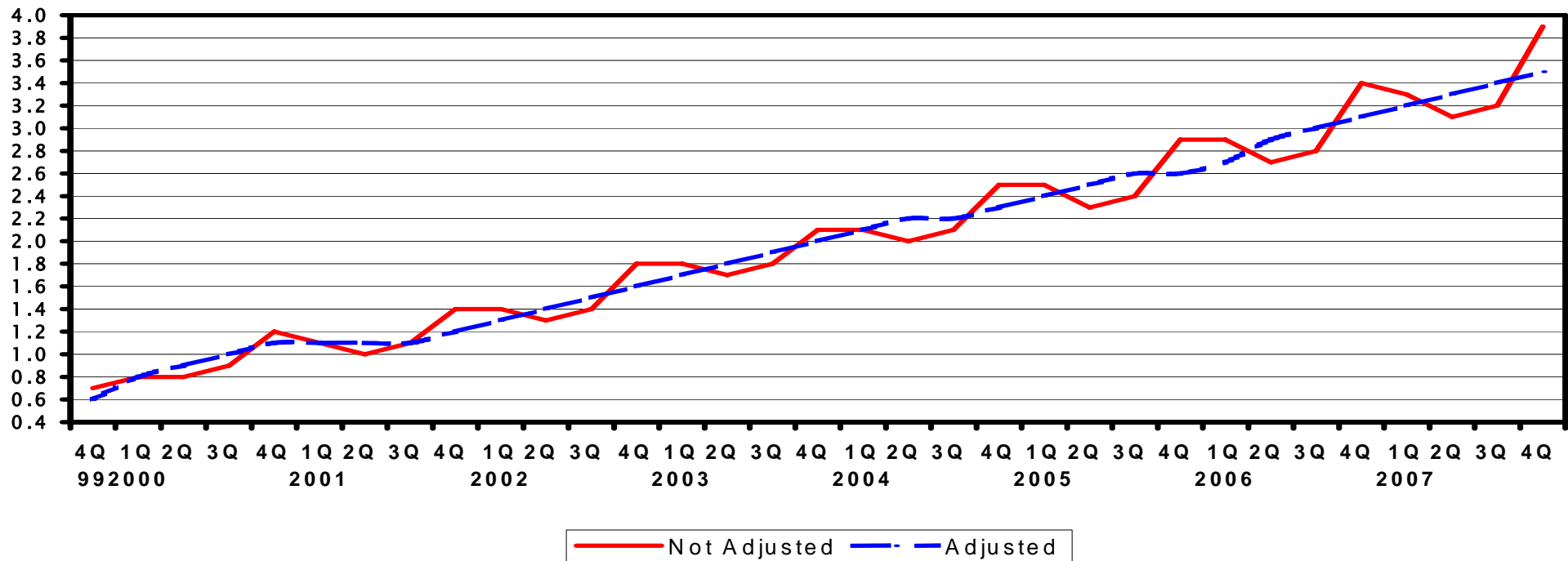


Figure 16: Quaterly Retail E-Commerce Sales (in percent of total retail sales) [SKK08].

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## Exercises and tutorials

- There will be a weekly sheet with two exercises handed out **each Tuesday** in the lecture.  
1st sheet will be handed out Tue. 13.4.
- Solutions to the exercises can be submitted until **next Tuesday before the lecture**,  
1st sheet is due Tue. 20.4.
- Exercises will be corrected.
- Tutorials **each Wednesday 16–18**,  
1st tutorial at Wed. 14.4.
- Successful participation in the tutorial gives up to 10% bonus points for the exam.

## Exam and credit points

- There will be a written exam at end of term (3h, 5 problems).
- The exam covers both courses,
  - IS1 with 3 ECTS by 1 (more detailed) problem and
  - IS2 with 6 ECTS by 4 problems.
- Both courses together give 9 ECTS (2 SWS IS1, 2+2 SWS IS2).
- The IS2 course gives 6 ECTS (2+2 SWS).
  - ECTS = European Credit Transfer System
  - 1 ECTS  $\approx$  30h workload (for the students)
  - 180h: 14 weeks  $\dot{a}$  1.5 h lecture: 21 h
  - 14 weeks  $\dot{a}$  1.5 h tutorial: 21 h
  - $\dot{a}$  5 h solving exercises: 70 h
  - $\dot{a}$  4 h post preparation: 56 h
  - once 16h exam preparation: 16 h
  - total work load: 184 h

## Text books

- Kenneth C. Laudon, Jane P. Laudon, Detlef Schoder (<sup>2</sup>2009):  
*Wirtschaftsinformatik — Eine Einführung*, Pearson Studium.
- Otto K. Ferstl, Elmar J. Sinz (<sup>5</sup>2006):  
*Grundlagen der Wirtschaftsinformatik*, Oldenbourg.
- Franz Lehner, Stephan Wildner, Michael Scholz (<sup>1</sup>2006):  
*Wirtschaftsinformatik — Eine Einführung*, Hanser.

Slides will be available online at the course webpage:

<http://www.ismll.uni-hildesheim.de/lehre/is2-10s/>

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## Persons

Lars Schmidt-Thieme  
Alexandros Nanopoulos  
Tomas Horvath  
— professors

Osman Okcatepe  
Andre Busche  
Krizstian Buza  
Lucas Drumond  
Christoph Freudenthaler  
Zeno Gantner  
Rasoul Karimi  
Artus Krohn-Grimberghe  
Thai Nghe Nguyen  
Christine Preisach  
Steffen Rendle  
— research assistants

Kerstin Hinze-Melching  
— secretary  
Jörg Striewski  
— technician



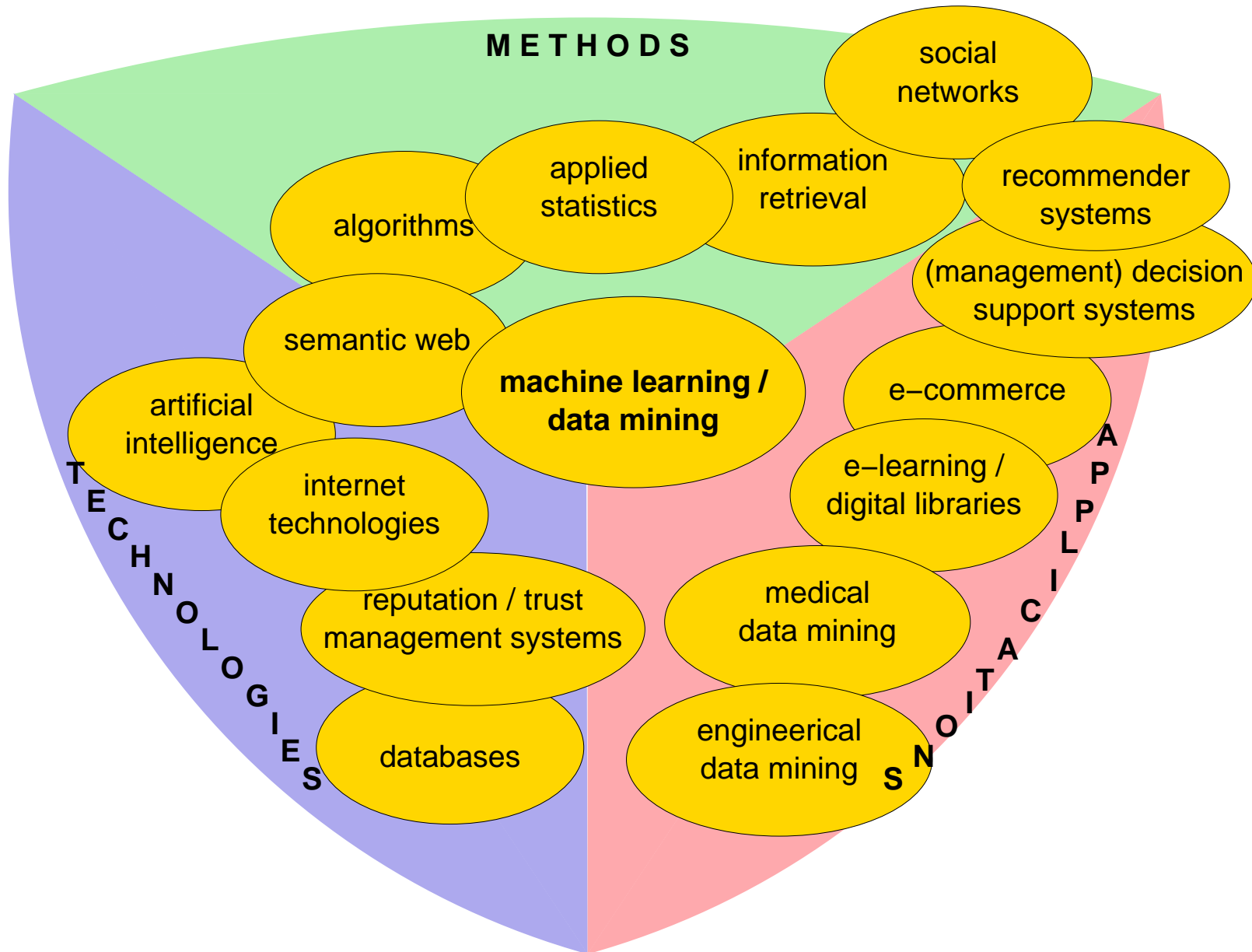
Christian Brauch, Florian Henze, Rodion Marx, Martin

Ortmann, Carsten Witzke

Lars Schmidt-Thieme, Information Systems and Machine Learning Lab (ISMLL), Institute BW/WI & Institute for Computer Science, University of Hildesheim

— Student Research Assistants  
Course on Information Systems 2, summer term 2010

# Research Areas





## References

- [CD97] Surajit Chaudhuri and Umeshwar Dayal. An overview of data warehousing and olap technology. *SIGMOD Record*, 26(1):65–74, 1997.
- [fl03] Gesellschaft für Informatik. Rahmenempfehlung für die universitätsausbildung in wirtschaftsinformatik. *Informatik Spektrum*, 26/2, 2003.
- [FS06] Otto K. Ferstl and Elmar J. Sinz. *Grundlagen der Wirtschaftsinformatik*. Oldenbourg, 5 edition, 2006.
- [Haa03] Hugo Haas. Designing the architecture for web services. Technical report, W3C, 2003.
- [Jurar] Matjaz B. Juric. A hands-on introduction to bpel. Technical report, Oracle, w/o. year.
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- [SKK08] Scott Scheleuer, Carol King, and David Kinyon. Quaterly retail e-commerce sales 4th quarter 2007. Technical report, US Bureau of Census, 2008.
- [vdA98] W.M.P. van der Aalst. The application of petri nets to workflow management. *The Journal of Circuits, Systems and Computers*, 8(1):21–66, 1998.