

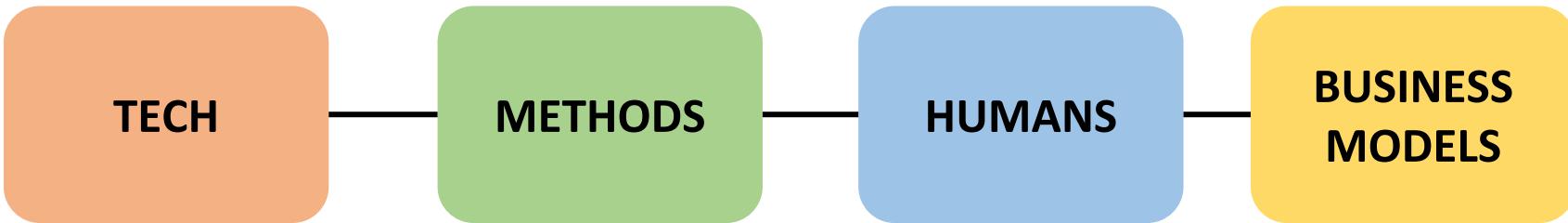
MANAGING IT IN THE DIGITAL AGE

SESSION 2 – TRADITIONAL IT MANAGEMENT 1/2

Thomas Kude

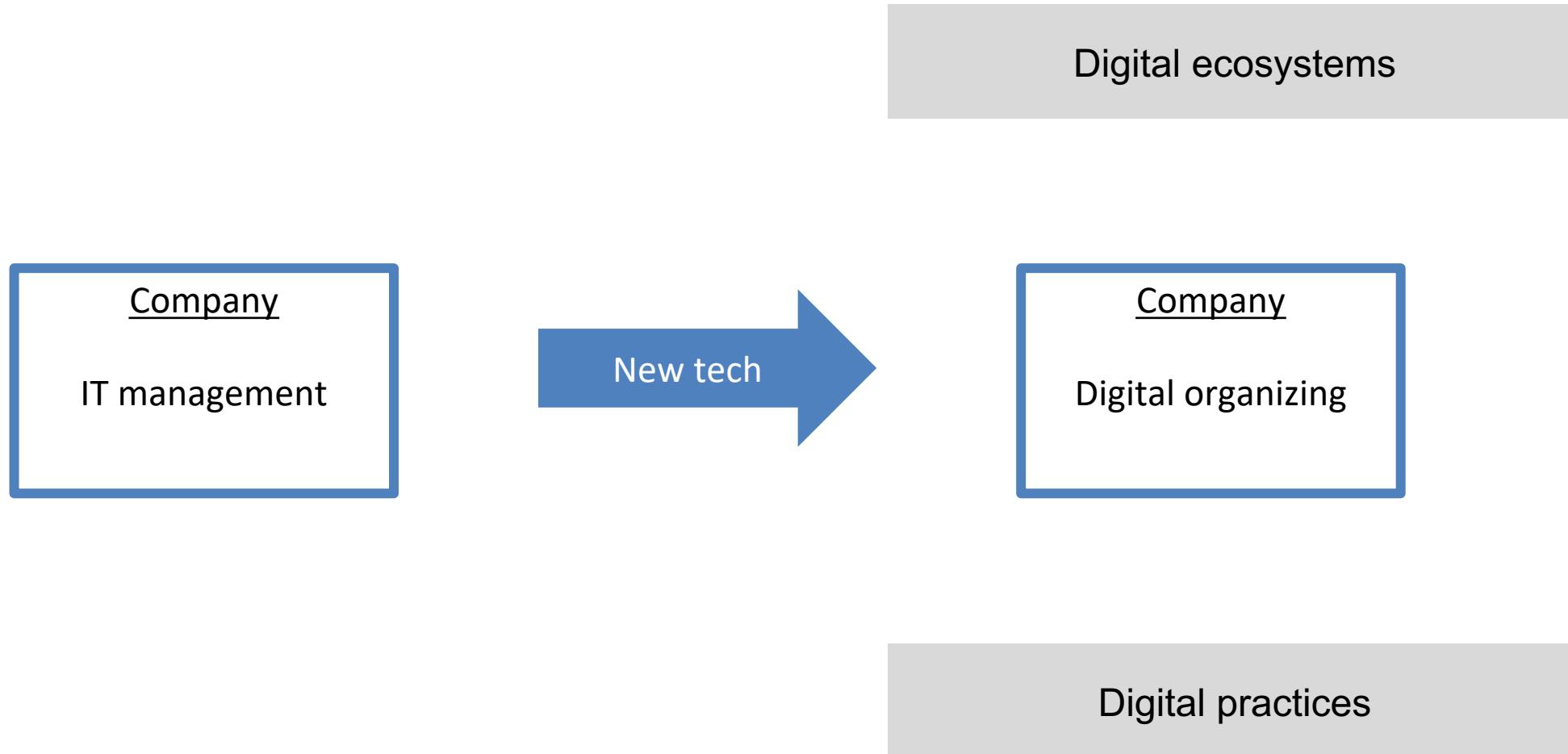


THE DIGITAL AGE



Digital transformation comprises radical and ongoing changes as to how an organization delivers value to its customer building on digital technology

FRAMEWORK: DIGITAL DISRUPTION



COURSE CONTENT

Digital ecosystems



New tech



Session	Topic
1 15/04	Introduction
2 29/04	Traditional IT Management 1/2 (Enterprise systems)
3 06/05	Traditional IT Management 1/2 (IT sourcing and governance)
4 17/05	Tech talks: IoT and edge computing, Quantum computing, 5G, Digital markets act, Corporate digital responsibility
5 20/05	Tech talks: XaaS, Non-fungible tokens, Conversational UI, Digital health, EdTech
6 27/05	Digital platforms
7 03/06	Ant Financial case
8 10/06	Agile transformation
9 17/06	ING case
10 24/06	Final Exam

Digital practices

TOPICS FOR TECH TALKS

Team	Topic
1	IoT and edge computing
2	Quantum computing
3	5G
4	Digital markets act
5	Corporate digital responsibility
6	XaaS
7	Non-fungible tokens
8	Conversational UI
9	Digital health
10	EdTech

Groups (10)**Group members****GROUPS**

Groups (10)	Group members	User count
Group 1	Asrorbek ORZIKULOV, Chiara PALMA, Kavya SHIRKE, Maria Isabel VERA CABRERA, Basma WEHBE, Xinran YAO	6
Group 10	Ying DING, Lucas HÉRAL, Håkon SANDAKER, Marinie TAO, Qiyun WU	5
Group 2	Yago Alessandro BARDI VALE, Anna Holm BIEBER, Enrico BURIGANA, Lionel HOLZAPFEL, Hedi MASMOUDI, Vincent WILMET	6
Group 3	Ross GUTHERY, Alia HAJJI, Hannah HO-LE, Tabea REDL, Lu WANG, Yixin ZHAO	6
Group 4	Sampurna GERA, Felix HANS, Ismail KHALIL, Zhenning LI, Jiaqian MA, Johanna OTT	6
Group 5	Jedrzej ALCHIMOWICZ, Louise DE LEYRITZ, Sarah-Charlotte GRU, Louis LE BRET, Sofya SIMAKOVA, Meduri VENKATA SHIVADITYA	6
Group 6	Nevina Bankim DALAL, Benjamin KARAOGLAN, Michele NASINI, Hugo SAILHEN, Brunehilde SENELLART DE VRIERE, Miao WANG	6
Group 7	Alice DARY, Louis DE COMARMOND, Vivian KOUTROUMANI, Suer LIN, Matteo SALVALAGGIO	5
Group 8	Caterina CONZ, Thomas GAK DELUEN, Xinyu HU, Konstantinos MIRA, Stefano MONETA	5
Group 9	Arthur COLL, Laure DASSY, Patrick LEYENDECKER, Sauraj SAURAJ VERMA, Aoshuang XIE	5

What did technology/IT management look like before digitalization?

What types of systems have organizations used?

What were related organizational challenges?

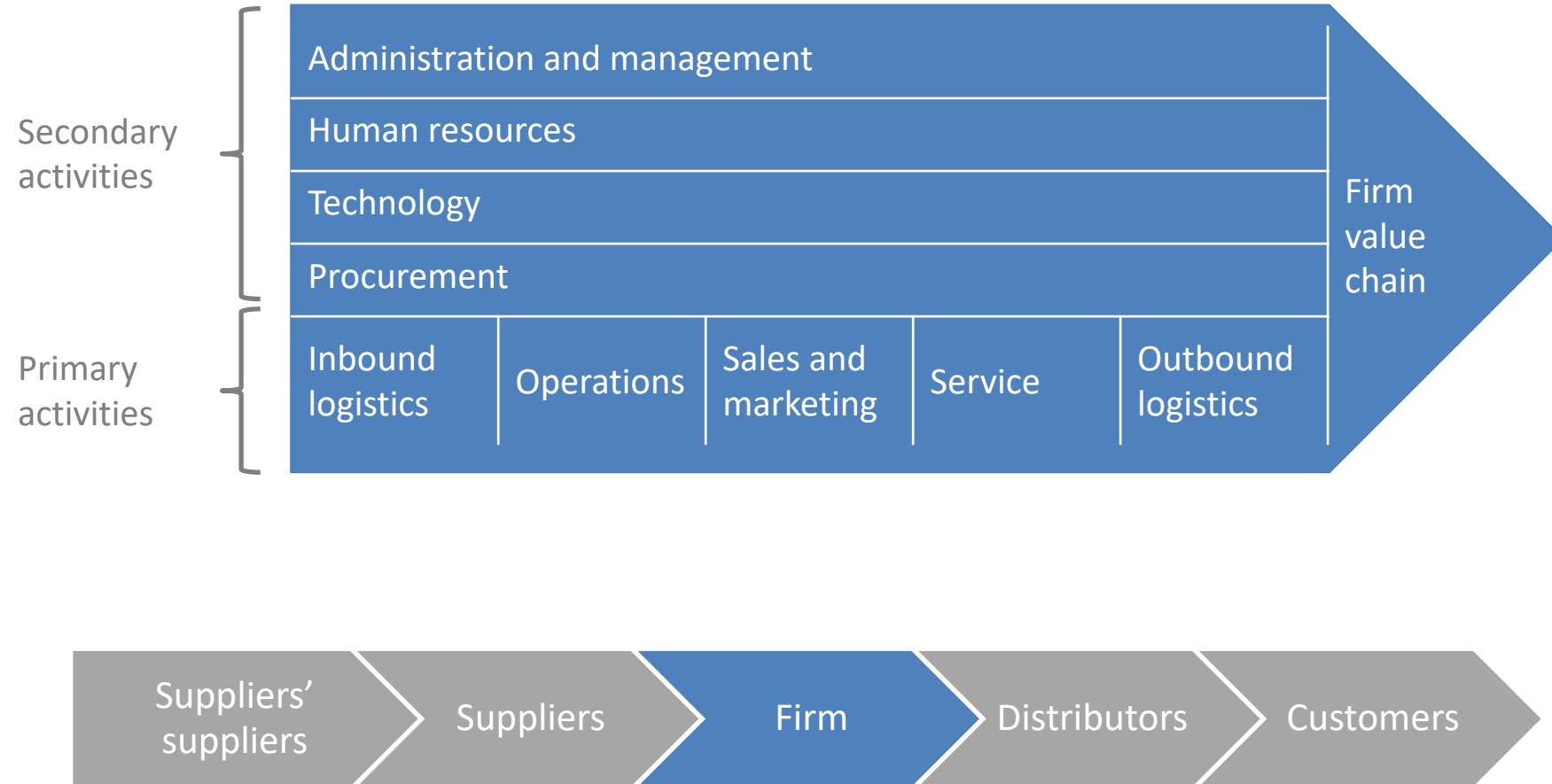
Today: Traditional IT management – Enterprise systems

GOAL OF TODAY'S SESSION

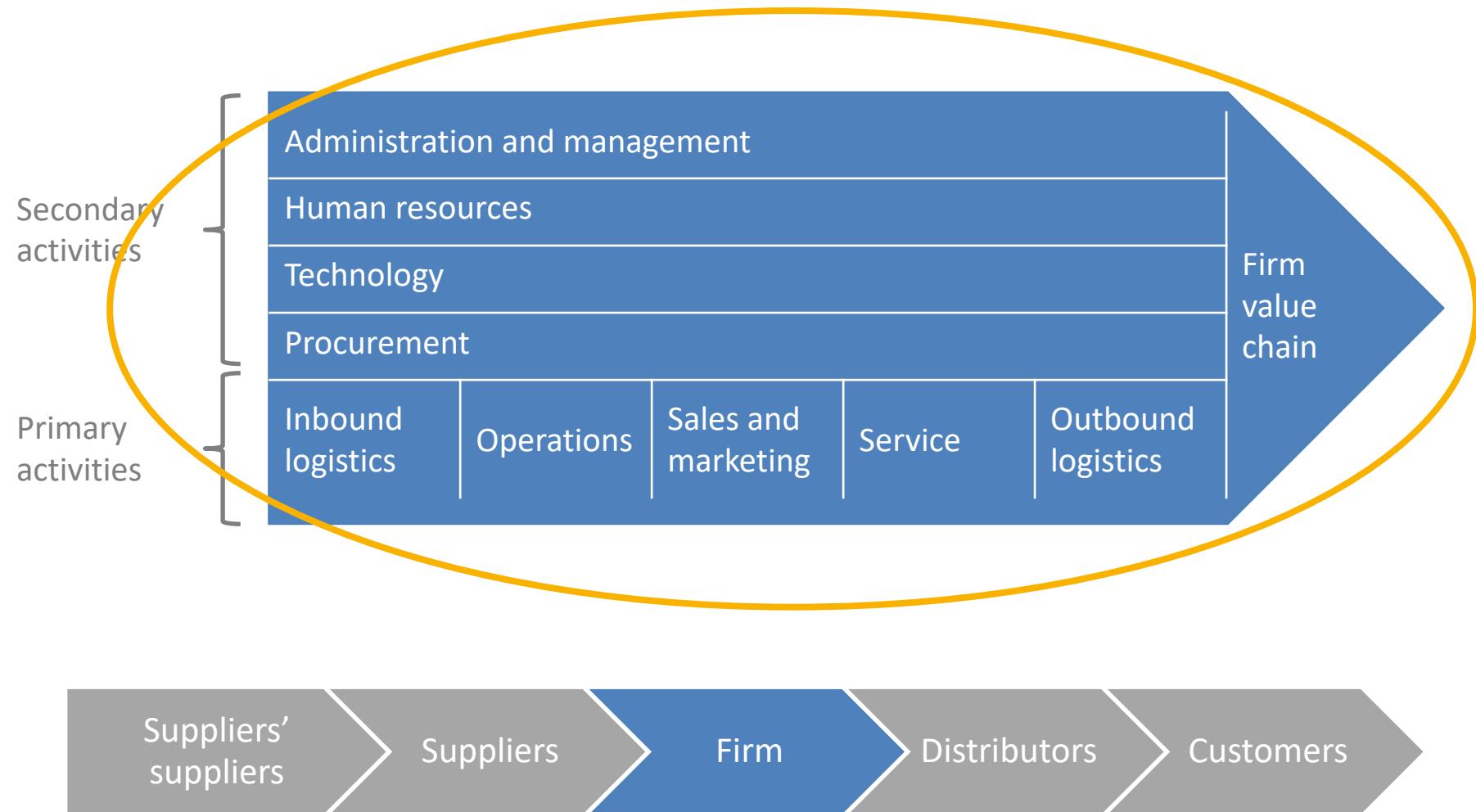
With this session you will able to...

- Explain ERP, CRM, and SCM as three important types of enterprise systems
- Understand the micro-foundations of enterprise systems as representational computing
- Be able to model data using ER models and business processes using EPCs
- Explain different types of knowledge management systems, including expert finders, communication tools, knowledge repositories, and analytics tools

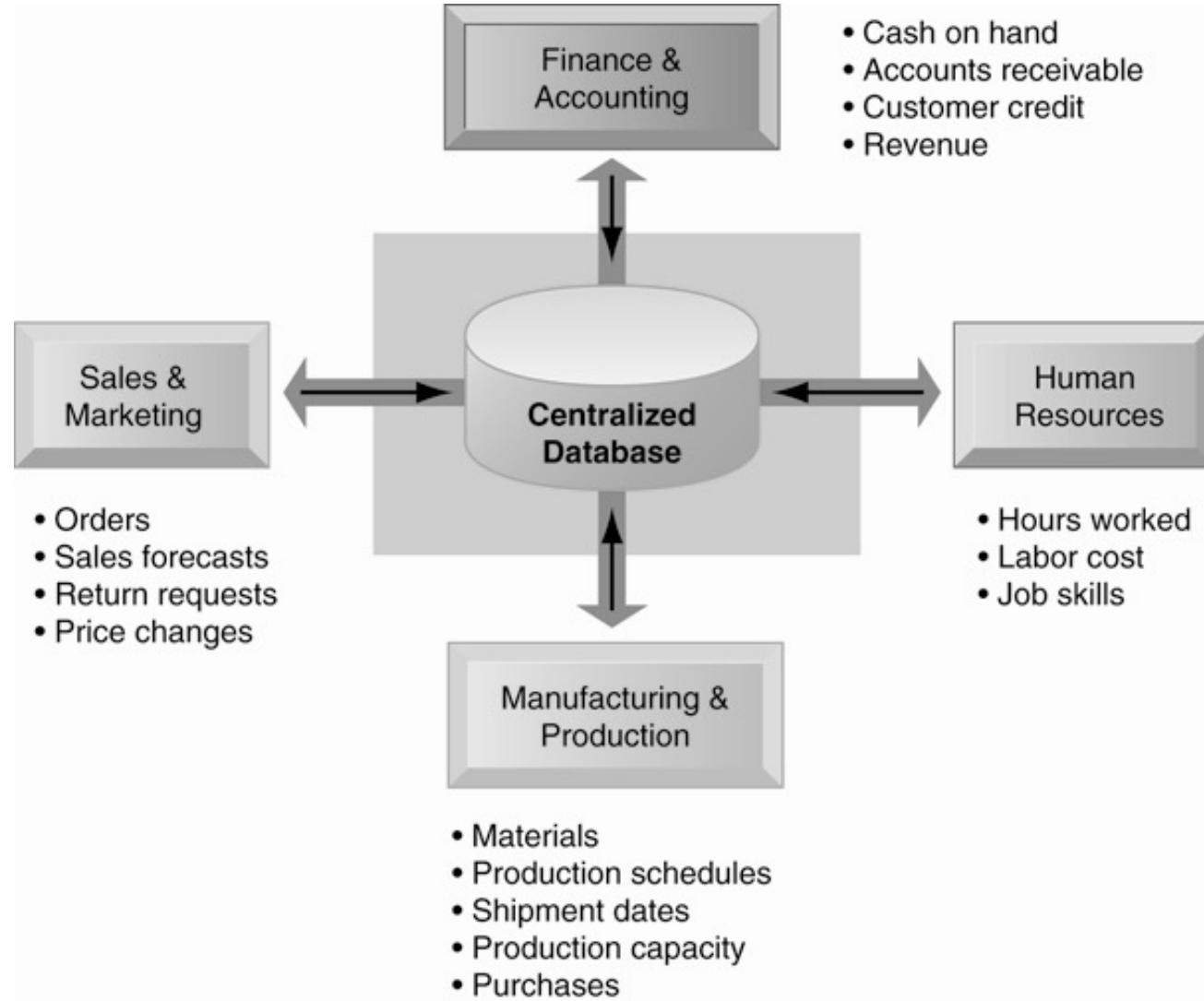
VALUE CHAIN AND ENTERPRISE SYSTEMS



ENTERPRISE RESOURCE PLANNING (ERP) SYSTEMS



ERP SYSTEMS

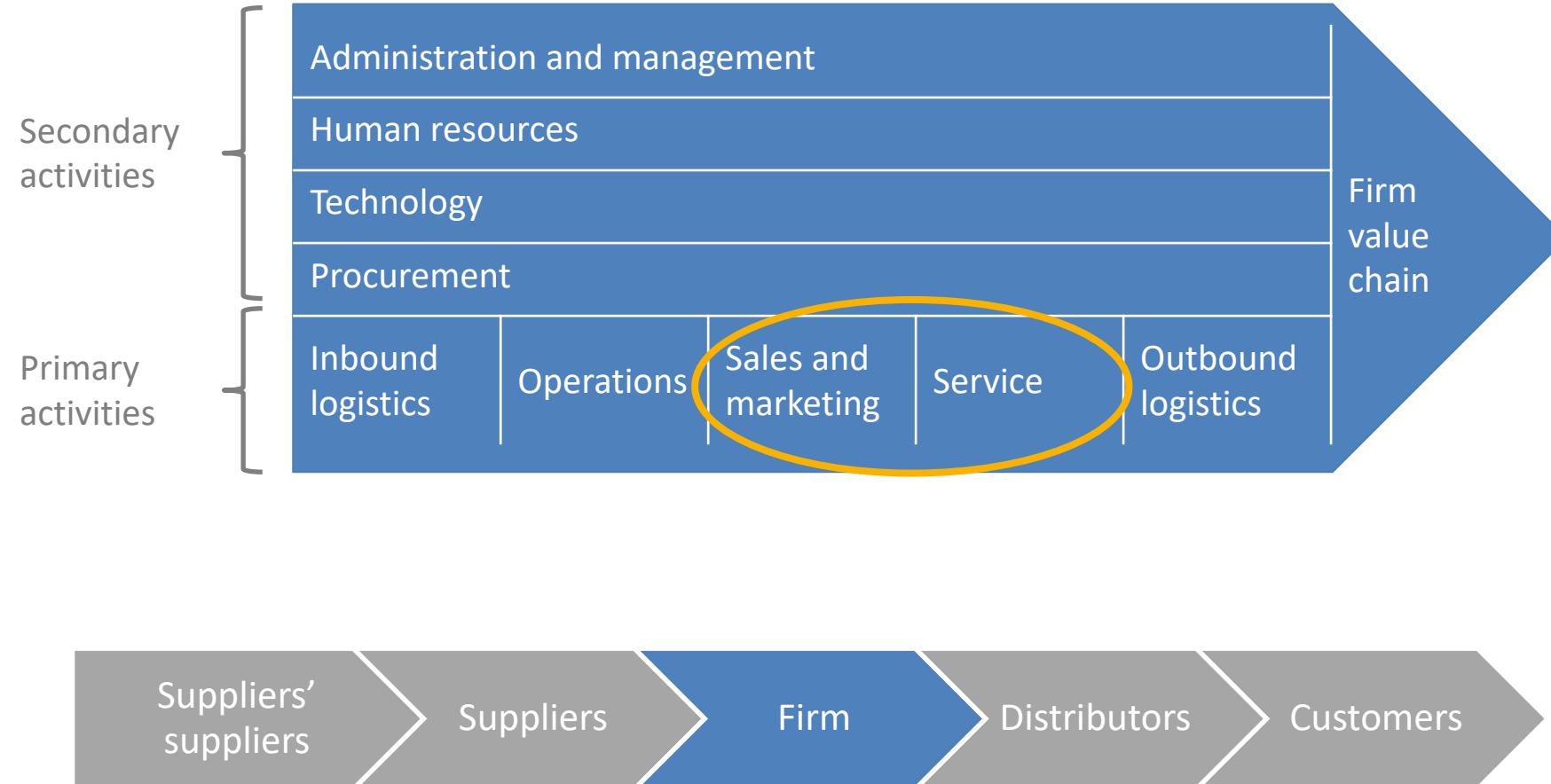


ERP SYSTEMS

- Supports the coordination and integration of all processes of the company
- Provides best business practices in industries, e.g., manufacturing, banking, hospitals,...
- Based on an integrated and consistent database

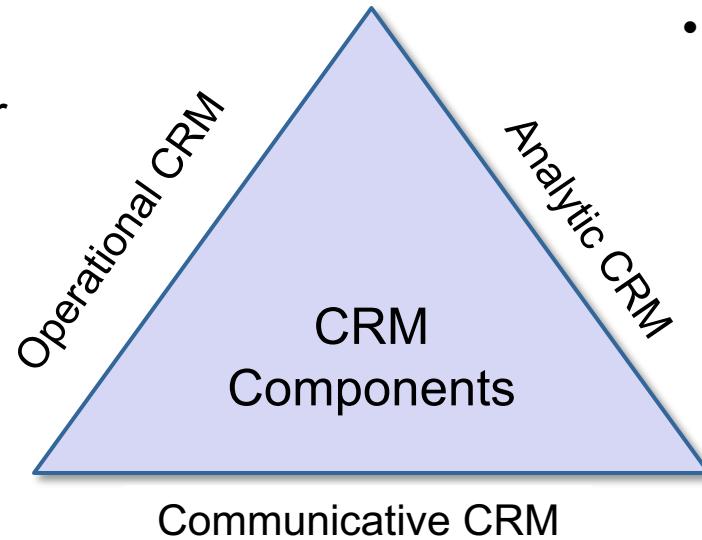


CUSTOMER RELATIONSHIP MANAGEMENT (CRM) SYSTEMS



ELEMENTS OF CRM SYSTEMS

- Supporting direct customer contact, e.g., planning and realization of campaigns or visits of field staff

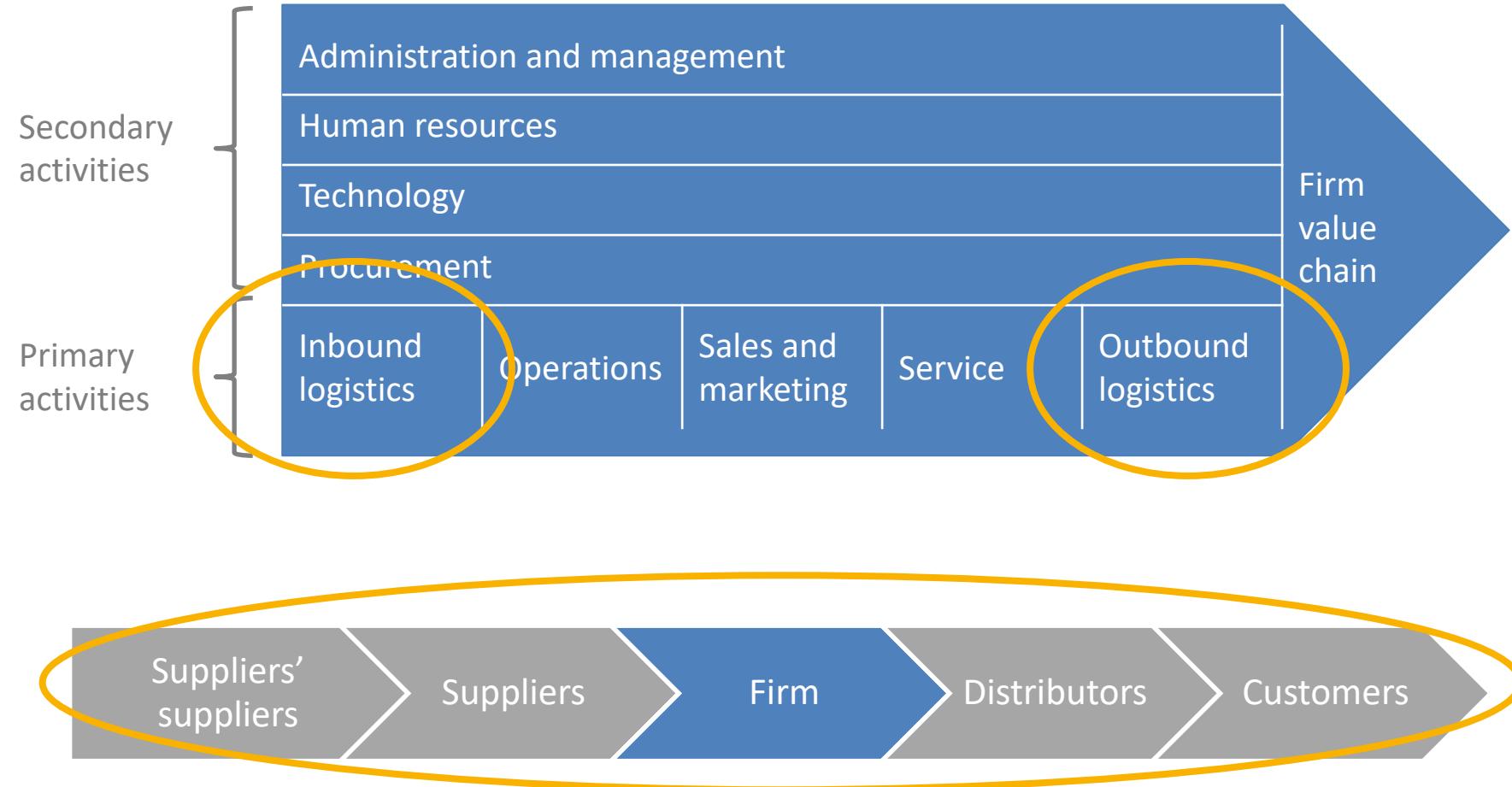


- Tools for communication with customers

- Insights from customer data
- Decision support, e.g., classification of target groups, sales estimations

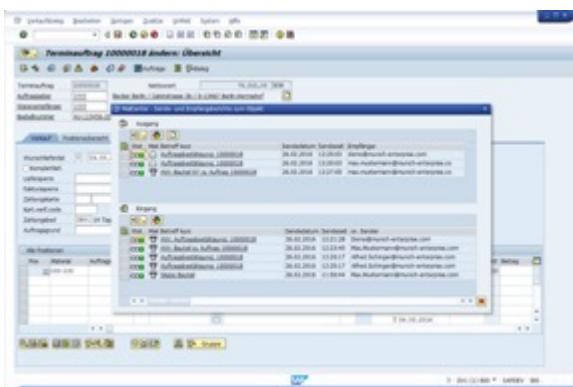


SUPPLY CHAIN MANAGEMENT (SCM) SYSTEMS



ONTOLOGICAL REVERSAL

Representational
computing



Imagined
computing



Experiential
computing

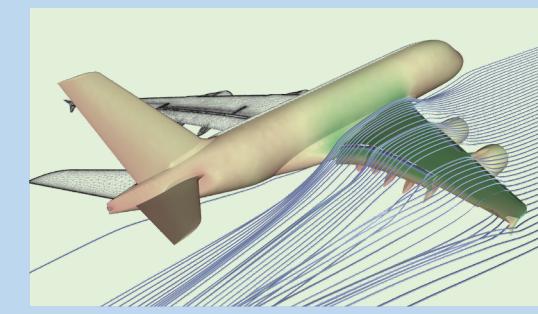
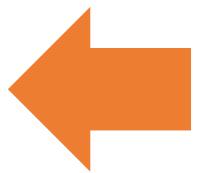


MODELS AS SIMPLIFIED VERSIONS OF THE REAL WORLD

Real world



Model



ENTERPRISE SYSTEM AS A MODEL OF THE REAL WORLD

Real world

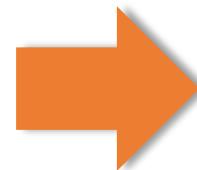


Enterprise system

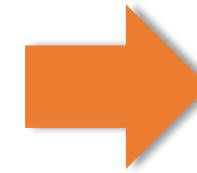
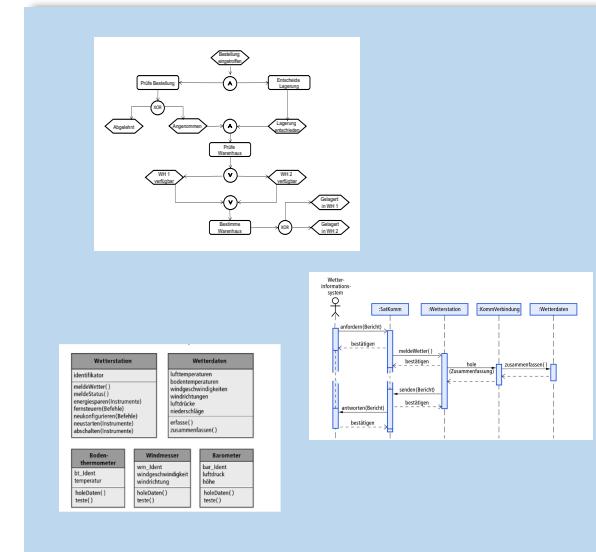
Account-ID	Name	Strasse	City	State	Email
400331	Alice Ernsta	BERLIN	Berlin	Deutschland	destra@tech20
400518	Andrea Lachter	BERLIN	Berlin	Deutschland	destra@yahoo
501048	Anja Rosenfeld	Kollwitzstr. 66	Berlin	Deutschland	destra@zoho
501055	Anke Gryczki	Str. am Friedrichshain 3	Berlin	Deutschland	destra@zoho
400320	Anna Olschok	BERLIN	Berlin	Deutschland	destra@zoho
400313	Anna Stellmach	BERLIN	Berlin	Deutschland	destra@zoho
400318	Arndt Klaus Schling	BERLIN	Berlin	Deutschland	destra@zoho
400708	Alicia Hines	BERLIN	Berlin	Deutschland	destra@zoho

ENTERPRISE SYSTEM AS A MODEL OF THE REAL WORLD

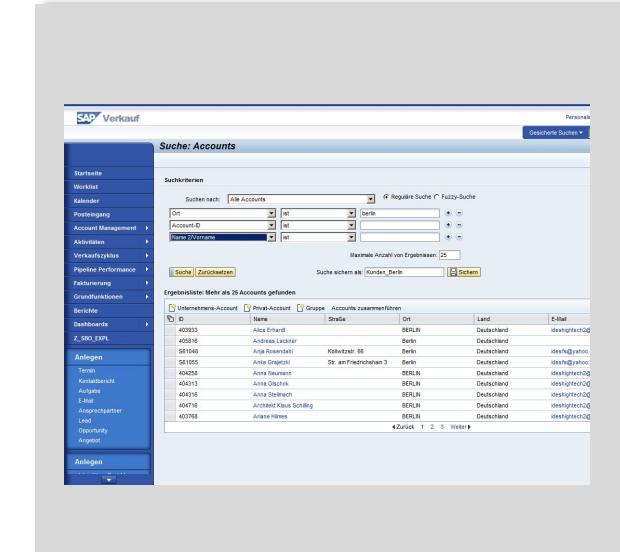
Real world



Conceptual
modeling



Enterprise system



BOTTOM-UP UNDERSTANDING OF ENTERPRISE SYSTEMS

- Enterprise systems represent/model organizations in terms of
 1. Data
 2. Business processes

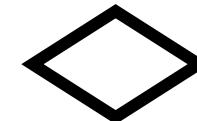
DATA MODELING—ENTITY-RELATIONSHIP (ER) MODELS

- **Entity:** Object in reality (e.g., "customer Mary Smith")
- **Entity type:** Aggregation of similar entities (e.g., customer)
- **Attributes:** Characteristics of entity types (e.g., age, address)
- **Key attribute:** Unique for each entity (e.g., customer number), highlighted by underlining



DATA MODELING—ENTITY-RELATIONSHIP (ER) MODELS

- **Relationship:** Link between two or more entities
- **Relationship type:** Specific relationship between entities (e.g., married to)
- **Connectivity:** Definition of how many entities of one type are assigned to entities of another type (=cardinality)
 - Three forms: 1:1, 1:n, and m:n



EXAMPLES FOR CONNECTIVITY



1 \longleftrightarrow 1

President



One country is commonly governed by one president



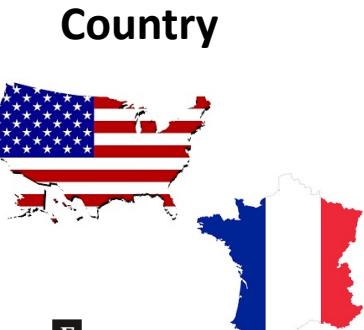
1 \longleftrightarrow n

Headquarters



L'ORÉAL
MOËT HENNESSY • LOUIS VUITTON

Many companies are headquartered in one country



m \longleftrightarrow n

Company



L'ORÉAL

LVMH
MOËT HENNESSY • LOUIS VUITTON

Many companies operate in many countries

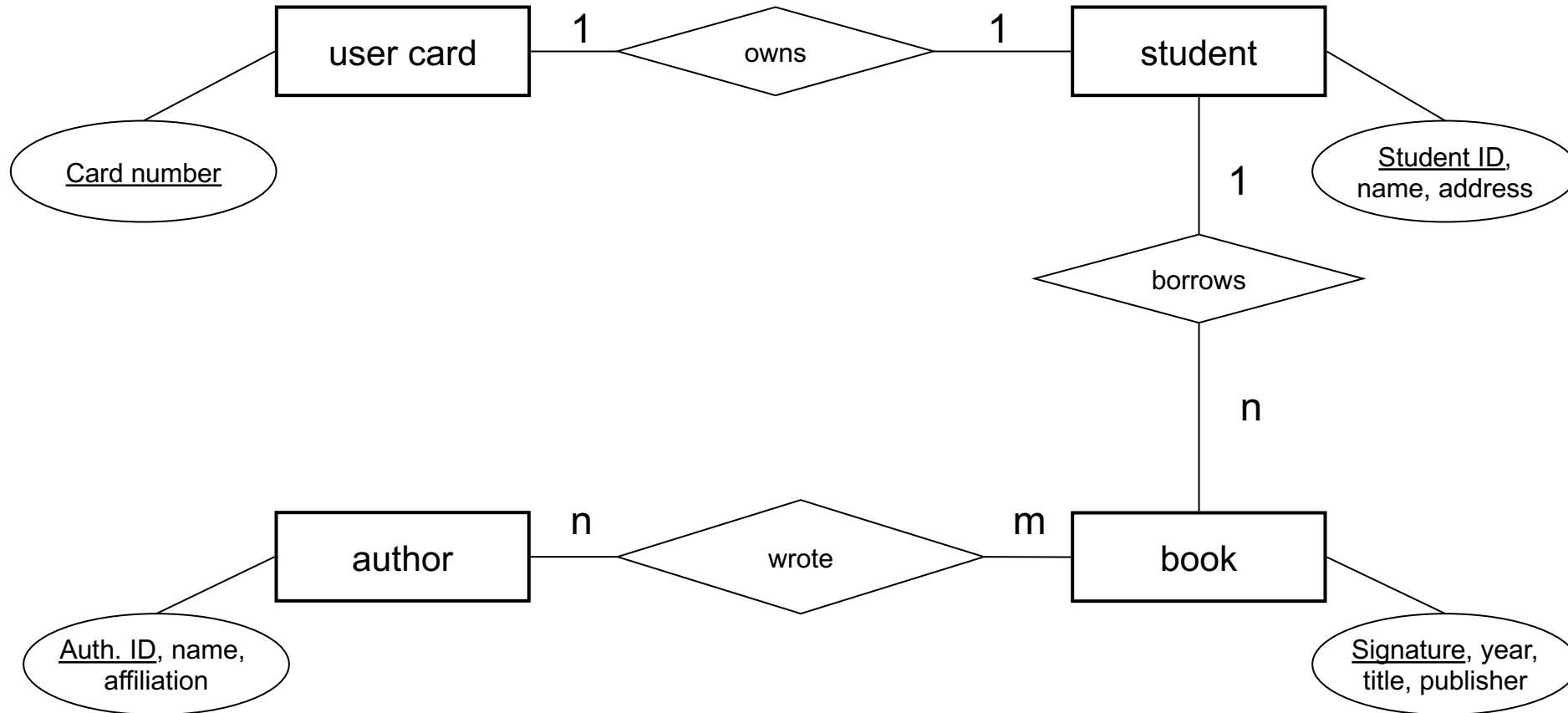
DATA MODELING EXAMPLE—ENTITIES, ATTRIBUTES, RELATIONSHIPS?

At a university library students can borrow books. Libraries hold information about year, title, and publisher of every book, which can be identified by a unique signature. Each student owns exactly one user card with a unique card number, which is used to identify the student when she/he borrows books. In order to be able to contact students, e.g., when they have not returned a book, the library keeps track of the name and address of the corresponding student, along with their student IDs. Every student can borrow as many books as required. Students can search for authors' names and affiliations. Each author can be identified by a unique author ID. Many books are written by the same author. At the same time, many books are written by several authors.

DATA MODELING EXAMPLE—ENTITIES, ATTRIBUTES, RELATIONSHIPS?

At a university library students can borrow books. Libraries hold information about *year*, *title*, and *publisher* of every **book**, which can be identified by a unique *signature*. Each **student** **owns** exactly one **user card** with a unique *card number*, which is used to identify the student when she/he **borrow**s books. In order to be able to contact students, e.g., when they have not returned a book, the library keeps track of the *name* and *address* of the corresponding student, along with their *student IDs*. Every student can borrow as many books as required. Students can search for authors' *names* and *affiliations*. Each **author** can be identified by a unique *author ID*. Many books are **written** by the same author. At the same time, many books are written by several authors.

DATA MODELING EXAMPLE



BUSINESS PROCESS MODELING

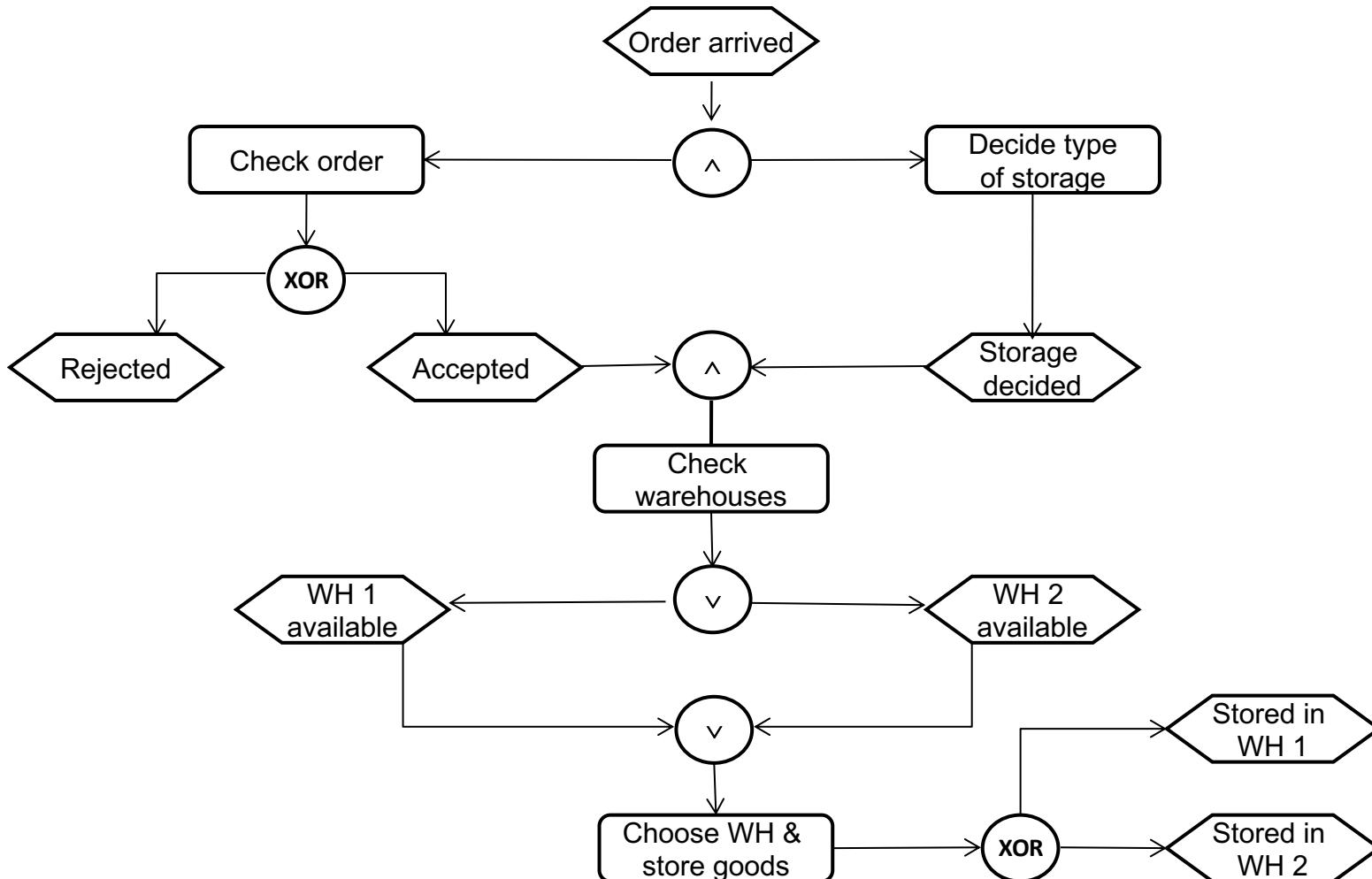
Definition of a business process:

- Set of manual, semi-automated, or automated functions that are run in an organization
 - following certain rules
 - in a certain sequence
 - with a certain goal (fulfilling a job)
 - by units of responsibility (persons or machines)

Examples:

- Claim notification in insurance company
- Workflow within the purchasing department in a manufacturing company
- Opening an account with a bank
- Tax authorities working on filed tax return statements

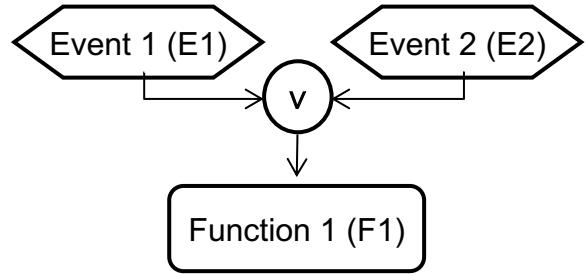
EVENT-DRIVEN PROCESS CHAINS (EPCs)



ELEMENTS OF EPCs

- **Events:** Status in a particular point in time 
- **Functions:** Operations taking place during a certain period of time 
- **Control flow:** Sequence of events and functions 
- **Operators:** Links between events and functions
 - AND: all elements have to occur 
 - OR: one, several, or all elements can occur 
 - Exclusive-OR: one of the elements given is valid 

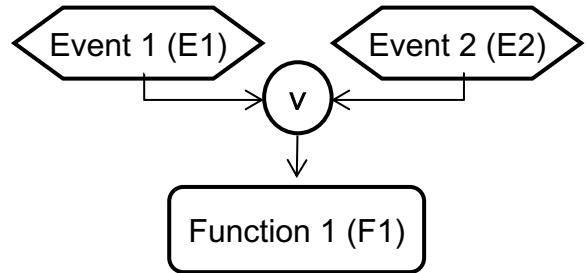
OPERATORS OR



E1	E2	F1
0	0	
0	1	
1	0	
1	1	

?

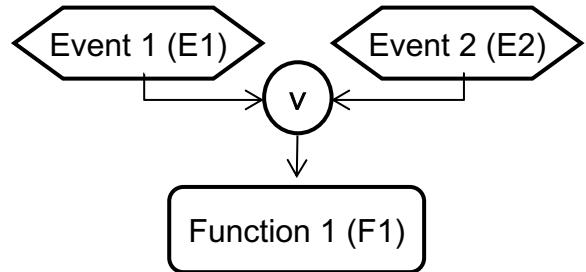
OPERATORS OR



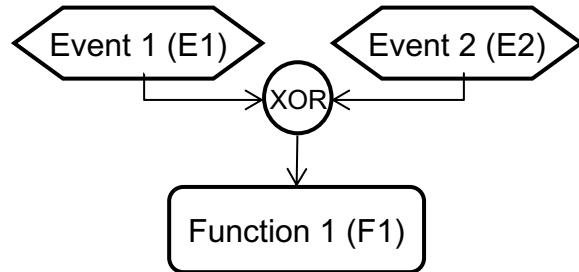
E1	E2	F1
0	0	0
0	1	1
1	0	1
1	1	1

OPERATORS

OR



XOR

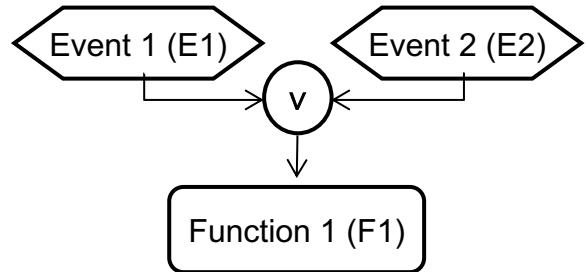


E1	E2	F1
0	0	0
0	1	1
1	0	1
1	1	1

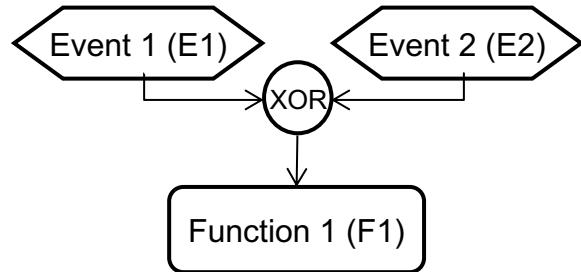
E1	E2	F1
0	0	0
0	1	1
1	0	0
1	1	?

OPERATORS

OR



XOR

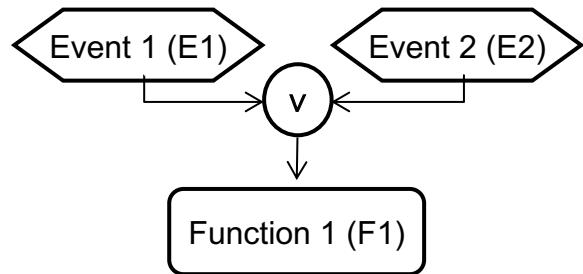


E1	E2	F1
0	0	0
0	1	1
1	0	1
1	1	1

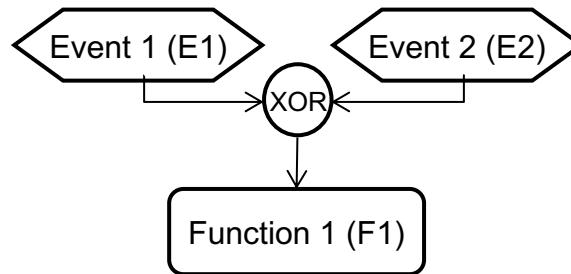
E1	E2	F1
0	0	0
0	1	1
1	0	1
1	1	0

OPERATORS

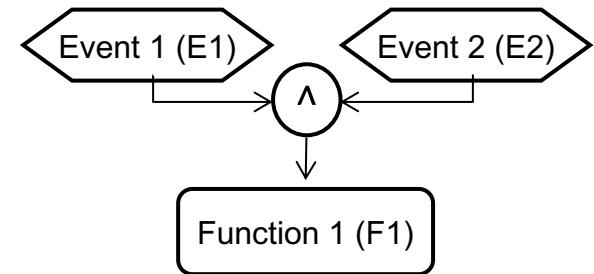
OR



XOR



AND



E1	E2	F1
0	0	0
0	1	1
1	0	1
1	1	1

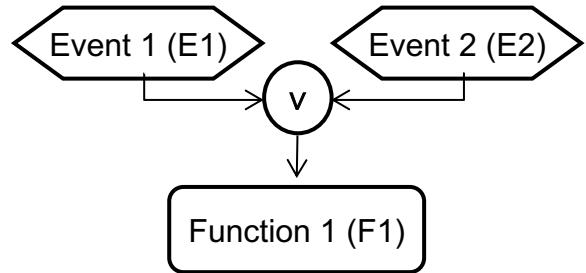
E1	E2	F1
0	0	0
0	1	1
1	0	1
1	1	0

E1	E2	F1
0	0	0
0	1	1
1	0	0
1	1	1

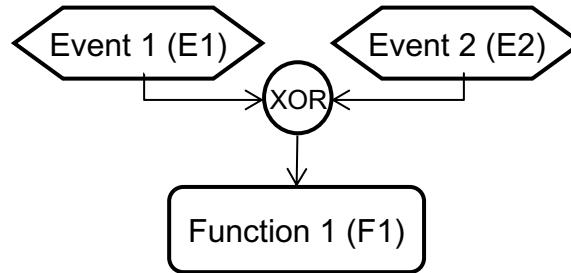


OPERATORS

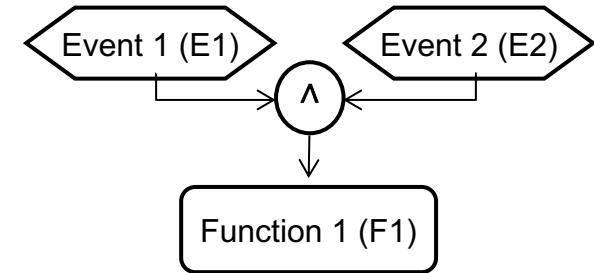
OR



XOR



AND



E1	E2	F1
0	0	0
0	1	1
1	0	1
1	1	1

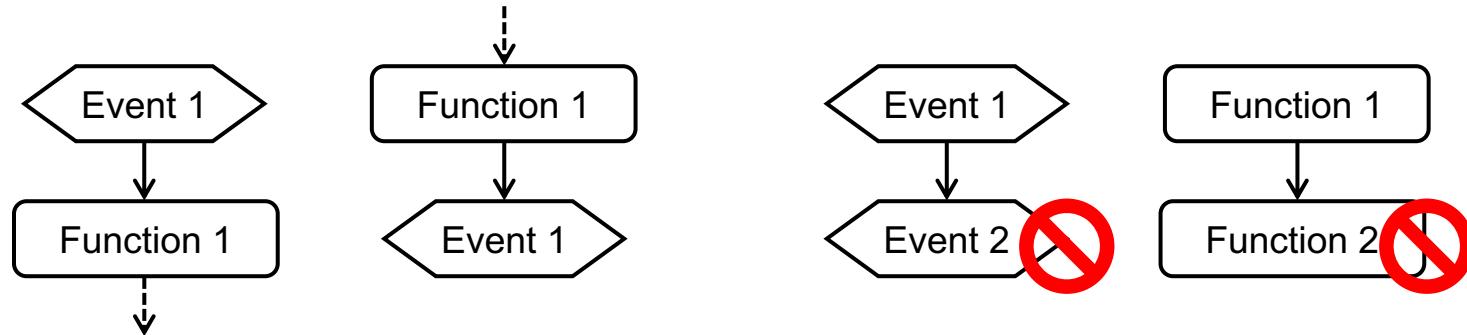
E1	E2	F1
0	0	0
0	1	1
1	0	1
1	1	0

E1	E2	F1
0	0	0
0	1	0
1	0	0
1	1	1

EPC RULES

Rule 1

An event (except the last one) is always followed by a function, a function is always followed by at least one event



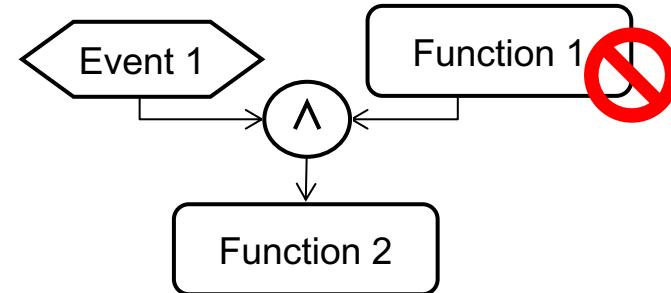
Rule 2

At the beginning and the end of an EPC there is always an event, never a function

EPC RULES

Rule 3

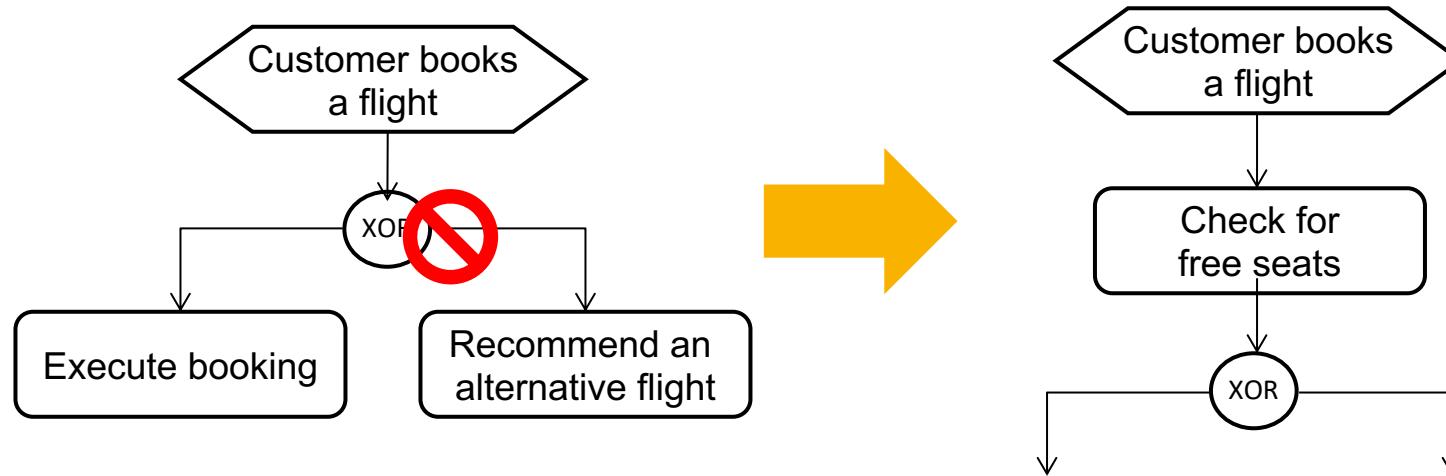
Elements combined by an operator always have to be either functions or events



EPC RULES

Rule 4

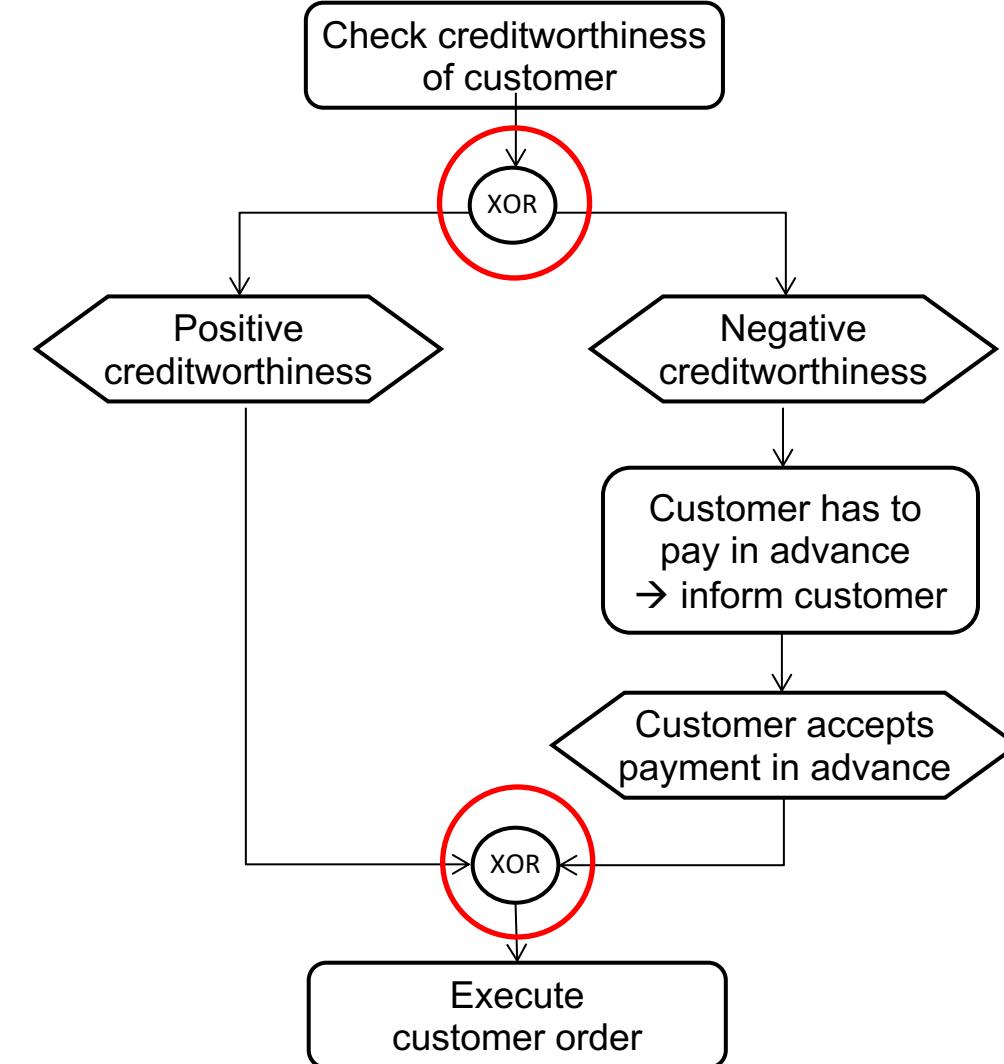
An initiating event cannot be followed by alternative functions



EPC RULES

Rule 5

When splitting up a path: Split operator and join operator have to be identical

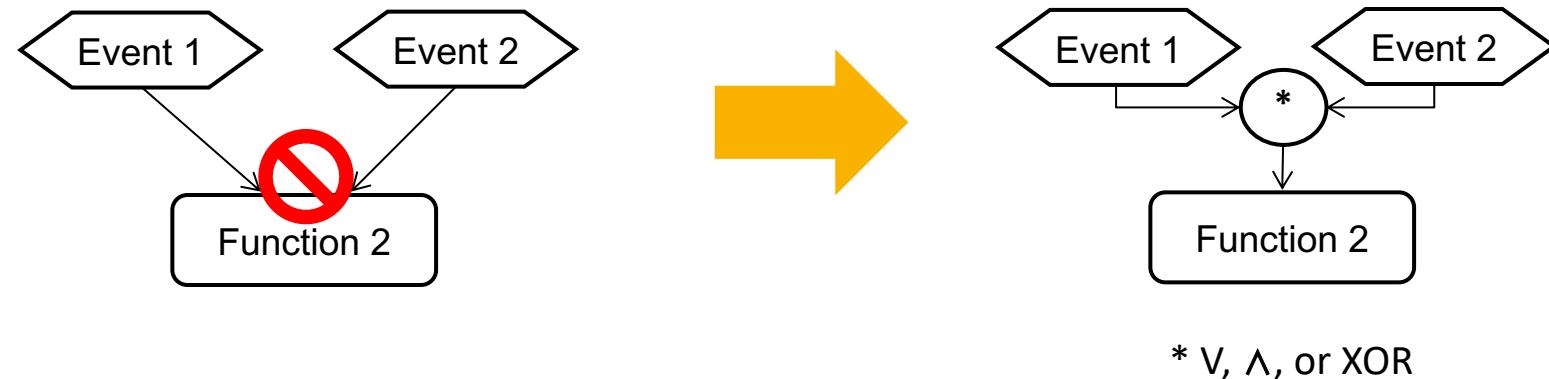


EPC RULES

Rule 6

Functions and events always have only one input path and one output path

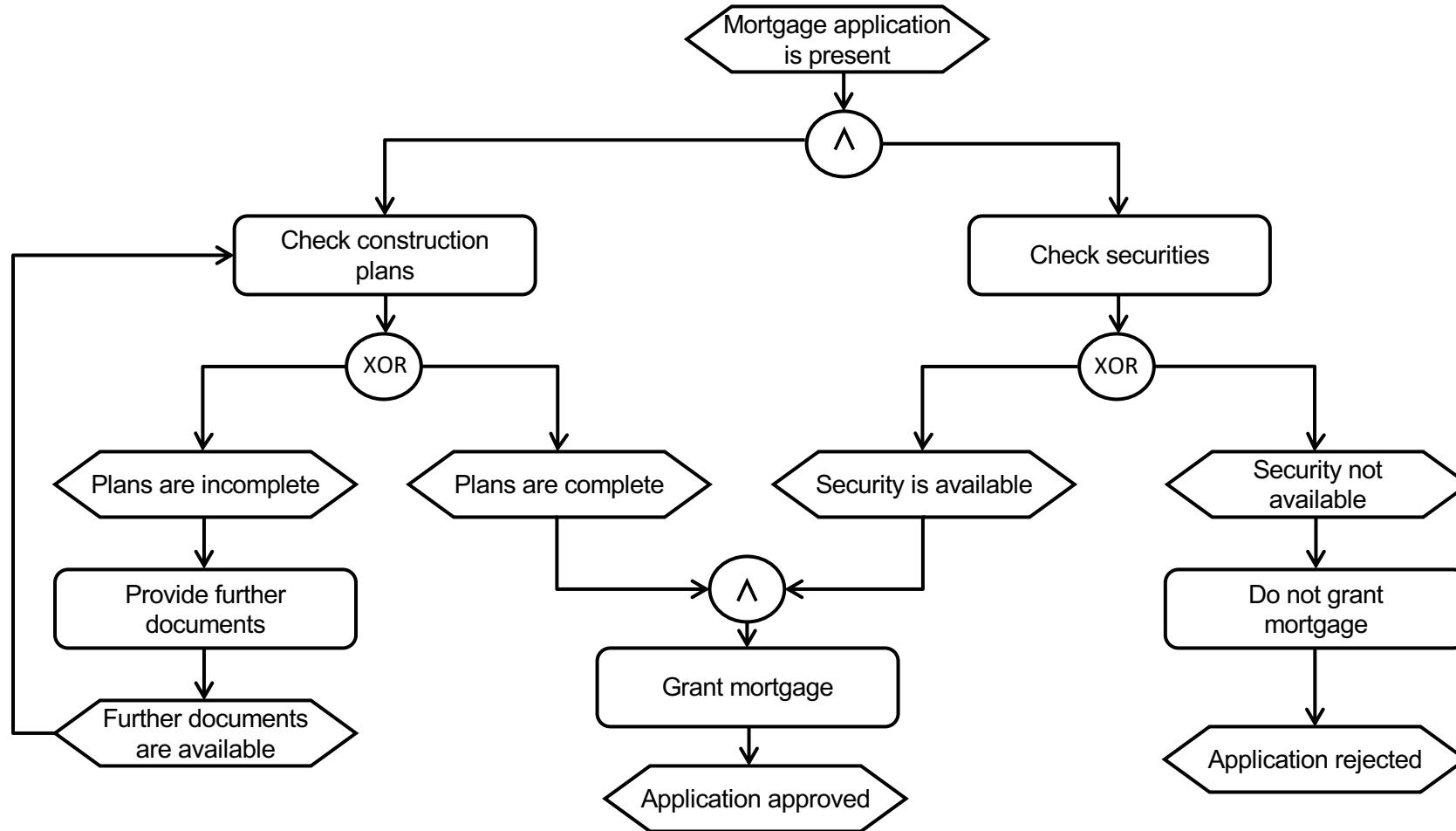
Operators have to be used in order to split up or merge paths



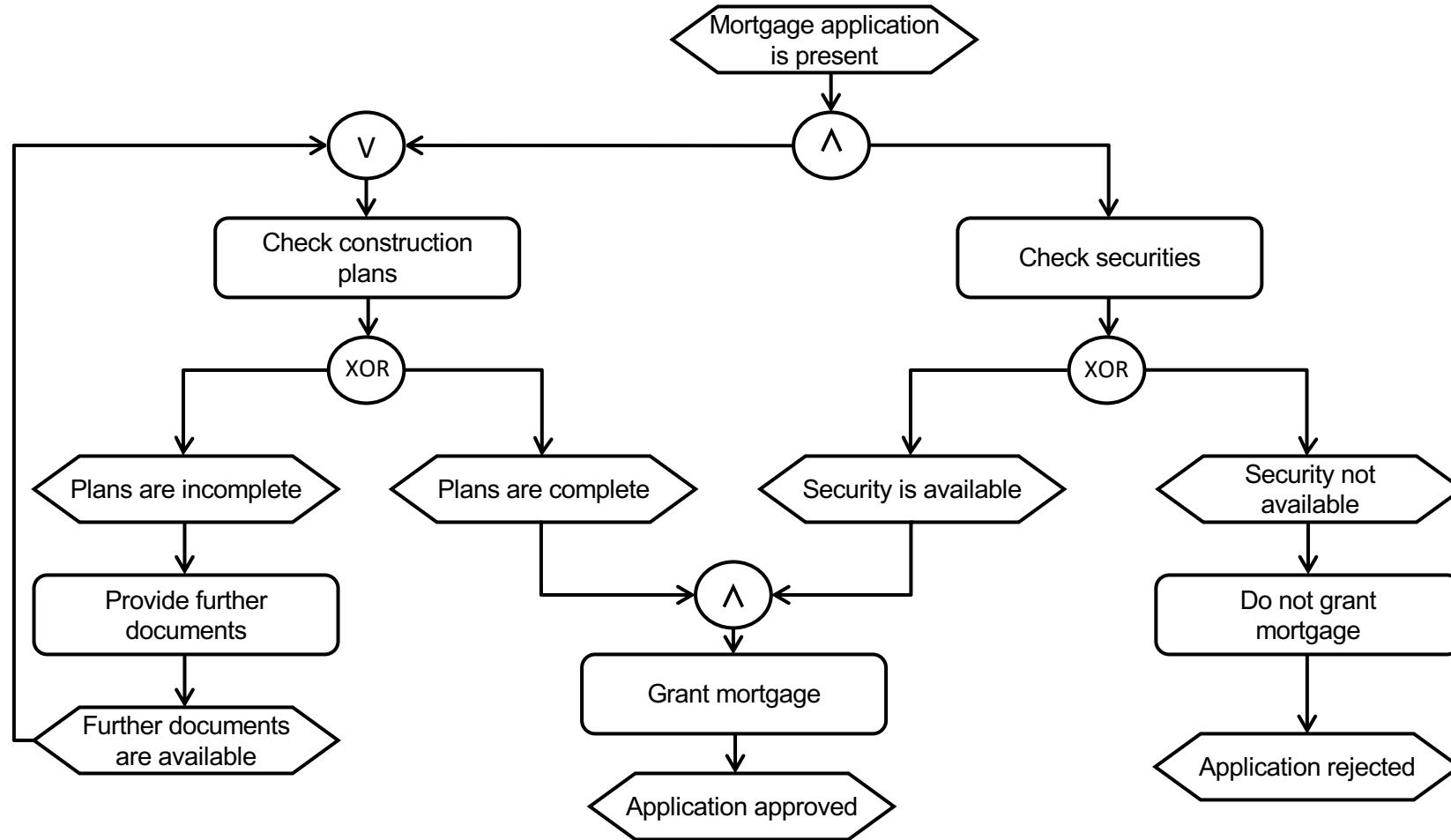
EXAMPLE PROCESS—PROCESSING A MORTGAGE APPLICATION

Whenever a customer applies for a mortgage, two things need to be checked: the construction plans and the securities. The outcome of the security check can be either that securities are available or not. If there are no securities, the mortgage is not granted, and the application is rejected. The outcome of the construction plan check is either that the plans are complete or incomplete. If the plans are incomplete, further documents need to be provided and the construction plans need to be checked again. If the construction plans are complete and securities are available, the mortgage is approved, and the application is accepted.

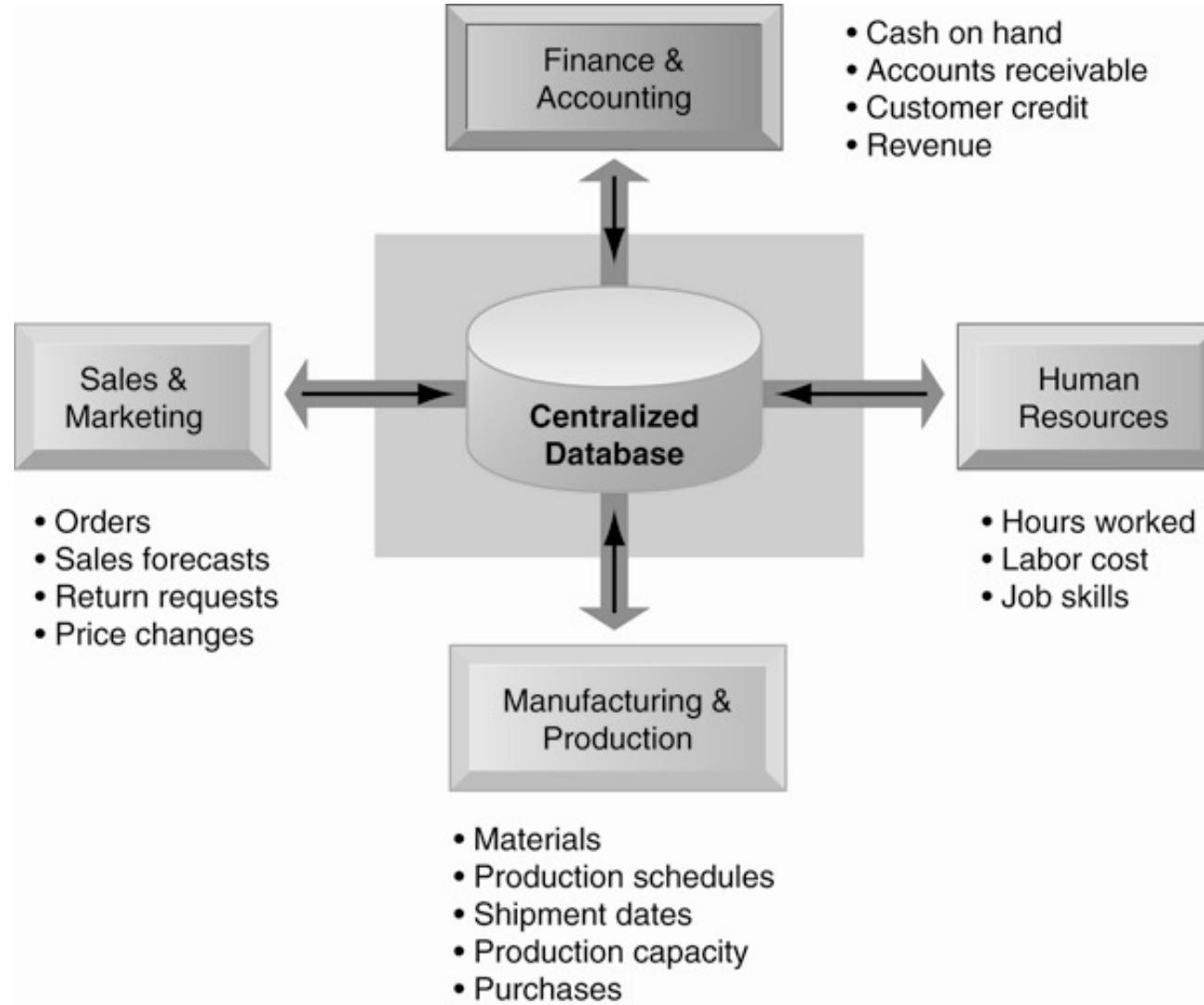
EXAMPLE PROCESS—PROCESSING A MORTGAGE APPLICATION



EXAMPLE PROCESS—PROCESSING A MORTGAGE APPLICATION



ERP SYSTEMS





TARGET

STOP

PARKING
REGULATIONS

MAX 3 HOURS

UNTOUCH

604-992-4133

**AVAIL
TEMPOR
949-**



We're in the process
of stocking up so
you can too.

3 PACK GOGGLES

3 PACK GOGGLES

15.99

1-47-D 1 0002 00010091262
63193 2013/02/10

GIGGLES GOGGLE

SCUBA GIGGLES GOGGLE

10.99

KIDS GOGGLE

KIDS GLOVE GOGGLE

13.99



BREAKOUT SESSION (30 MIN)

- How was the decline of Target Canada related to enterprise software?
- Be prepared for providing a 3-minute summary of your discussion

TYPES OF KNOWLEDGE MANAGEMENT SYSTEMS

(1) Expert finders

(2) Communication tools

(3) Knowledge repositories

(4) Analytics tools

TYPES OF KNOWLEDGE MANAGEMENT SYSTEMS

(1) Expert finders

(2) Communication tools

(3) Knowledge repositories

(4) Analytics tools

EXPERT FINDERS

- Basic idea
 - “Yellow pages” for a company
 - An electronic directory of people and the expertise they possess
 - Enterprise social media
- Typical features
 - Structured list of people
 - People search
 - Contact information to get in touch

TYPES OF KNOWLEDGE MANAGEMENT SYSTEMS

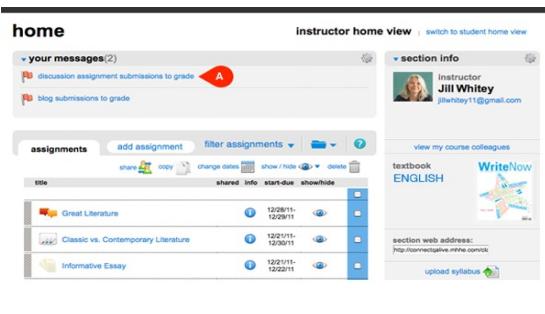
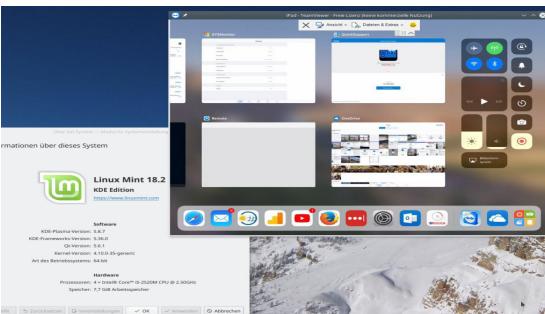
(1) Expert finders

(2) Communication tools

(3) Knowledge repositories

(4) Analytics tools

COMMUNICATION TOOLS



Videoconferencing

- Rich communication
- Small number of parallel users

Screen sharing

- Rich communication
- Smaller number of parallel users

Discussion board

- Asynchronous, text-based communication
- Large number of users

TYPES OF KNOWLEDGE MANAGEMENT SYSTEMS

(1) Expert finders

(2) Communication tools

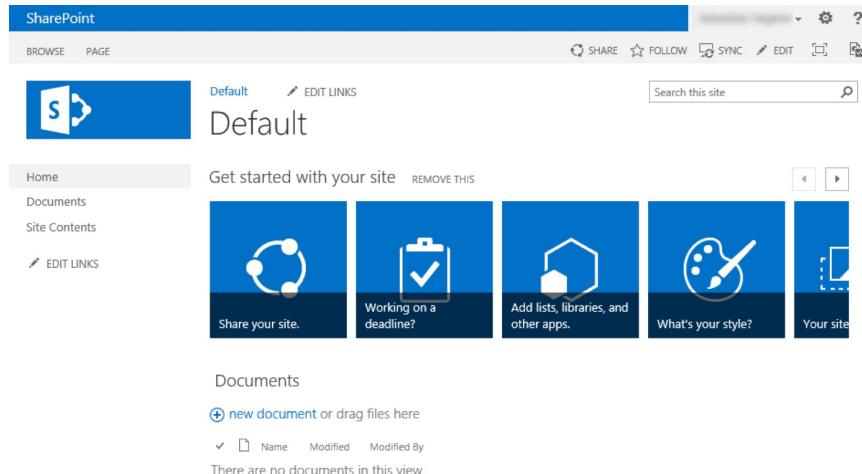
(3) Knowledge repositories

(4) Analytics tools

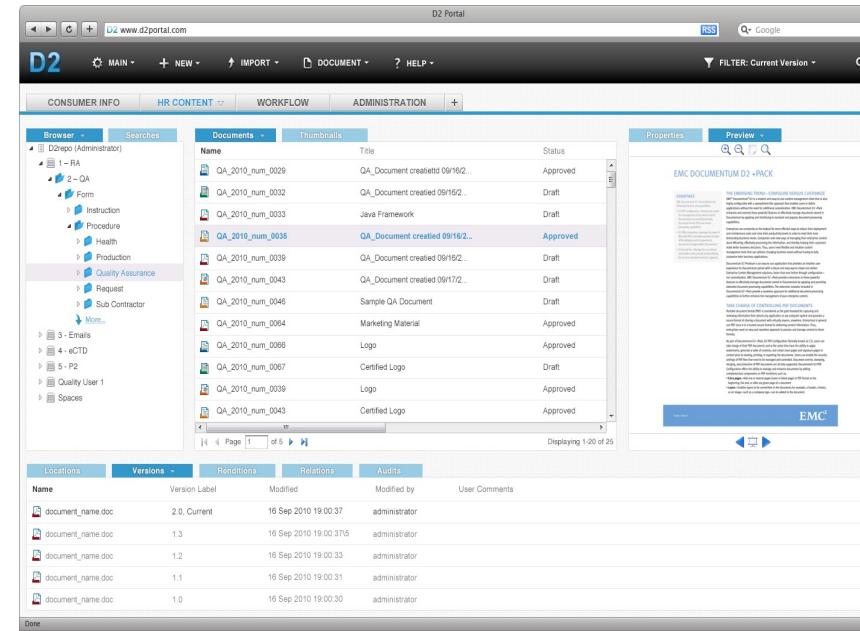
KNOWLEDGE REPOSITORIES



SharePoint



The screenshot shows the SharePoint 'Default' site homepage. At the top, there's a navigation bar with 'SHAREPOINT' and links for 'BROWSE' and 'PAGE'. Below the navigation is a search bar labeled 'Search this site'. The main content area features a large 'Default' title and a 'Get started with your site' section with five cards: 'Share your site.', 'Working on a deadline?', 'Add lists, libraries, and other apps.', 'What's your style?', and 'Your site'. On the left, a sidebar has 'Home', 'Documents', 'Site Contents', and 'EDIT LINKS' buttons. Below the sidebar, there's a 'Documents' section with a 'new document' button and a table for 'Name', 'Modified', and 'Modified By'. A note says 'There are no documents in this view.'



The screenshot shows the D2 Portal interface. At the top, it says 'D2 Portal' and 'www.d2portal.com'. The main area has tabs for 'CONSUMER INFO', 'HR CONTENT', 'WORKFLOW', 'ADMINISTRATION', and 'Properties'. The 'Properties' tab is active, showing a detailed view of a document titled 'EMC DOCUMENTUM D2 +PACK'. Below this are sections for 'Locations', 'Versions', 'Renditions', 'Relations', and 'Audits', each displaying a table of data. The 'Locations' table includes columns for 'Name', 'Version Label', 'Modified', and 'Modified by'. The 'Versions' table includes columns for 'Name', 'Version Label', 'Modified', and 'Modified by'. The 'Audits' table includes columns for 'Name', 'Version Label', 'Modified', and 'Modified by'.

KNOWLEDGE REPOSITORIES

- Storing
 - Indexation
 - Classification
- Managing
 - Database with meta data
 - Versioning, replication, backups, simultaneous access, etc.
- Archiving
 - Unchangeable, audit-proof storage of documents
- Accessing
 - Retrieval of documents via search (keywords, document trees, etc,)
 - Presentation of documents via “Viewers”

TYPES OF KNOWLEDGE MANAGEMENT SYSTEMS

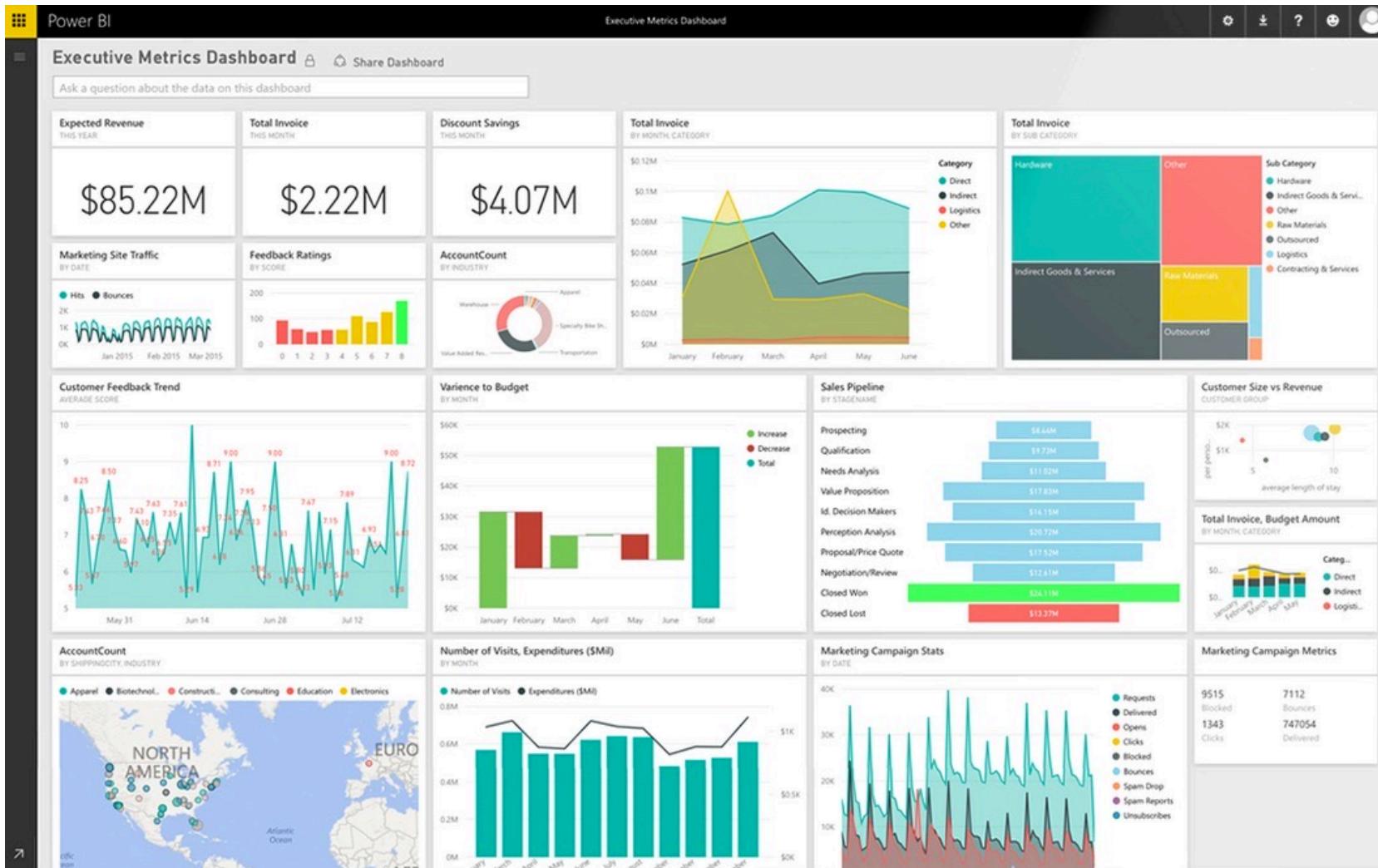
(1) Expert finders

(2) Communication tools

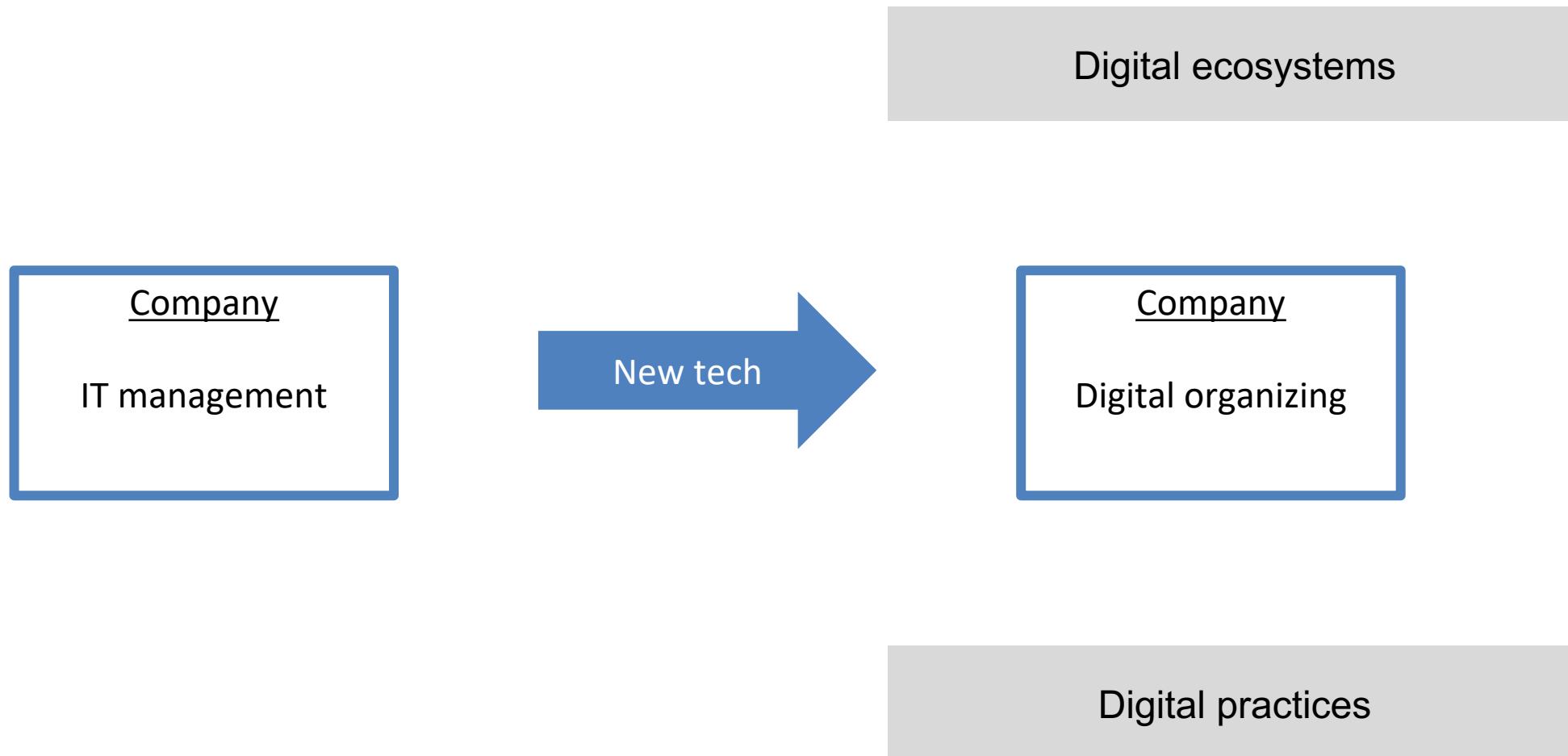
(3) Knowledge repositories

(4) Analytics tools

EXAMPLE—BUSINESS INTELLIGENCE



FRAMEWORK: DIGITAL DISRUPTION



SUMMARY

- ERP, CRM, and SCM are integrated systems that cover different parts of the enterprise's value network
- Data and business process modeling are important because they help analyze an organization's activities and translate them into enterprise systems
- ER models and EPCs are two well-known approaches for data and business process modeling
- Key knowledge management system include expert finders, communication tools, knowledge repositories, and analytics tools

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