Business Rules, Business Motivation and Business Processes
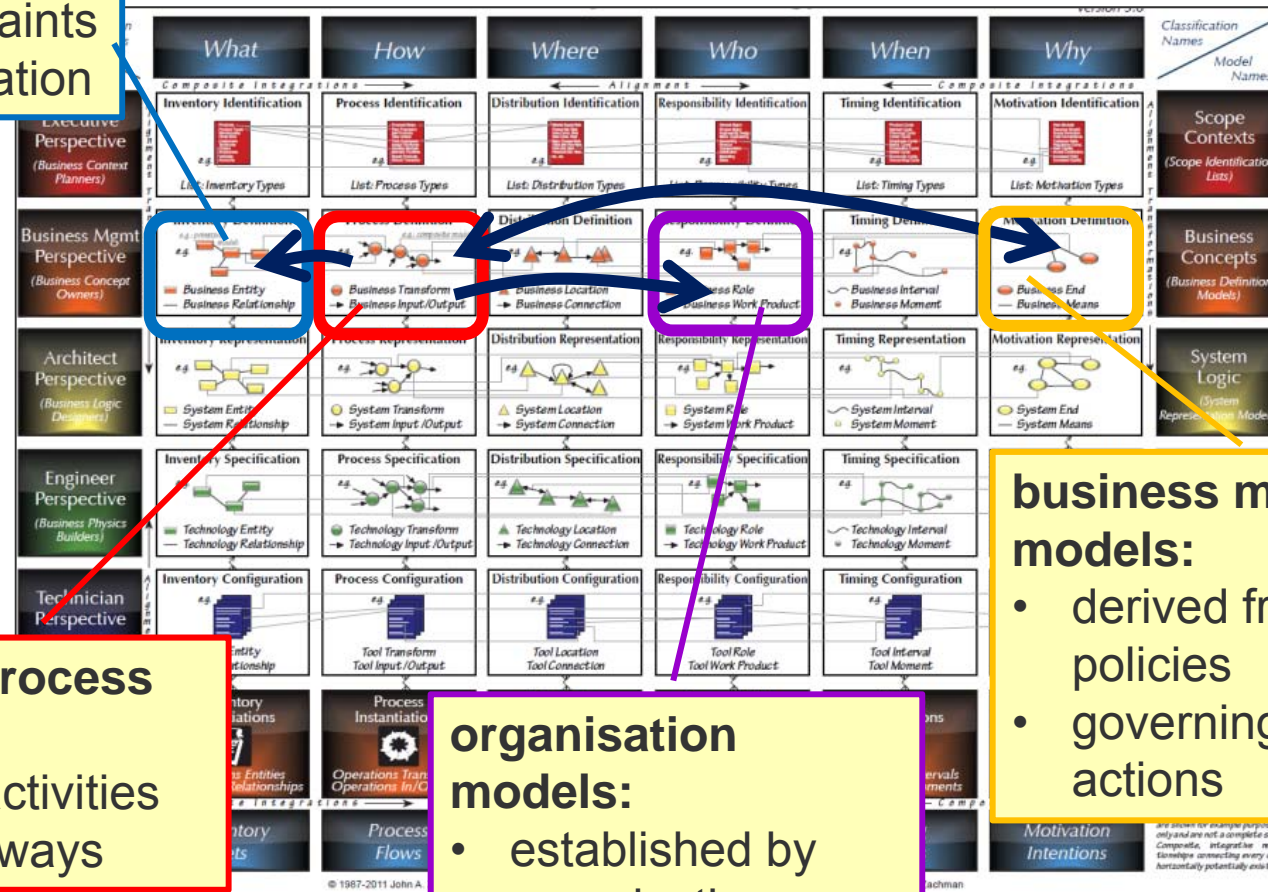
Knut Hinkelmann

Business Rules in the Enterprise Architecture

data models:
- integrity constraints
- infering information

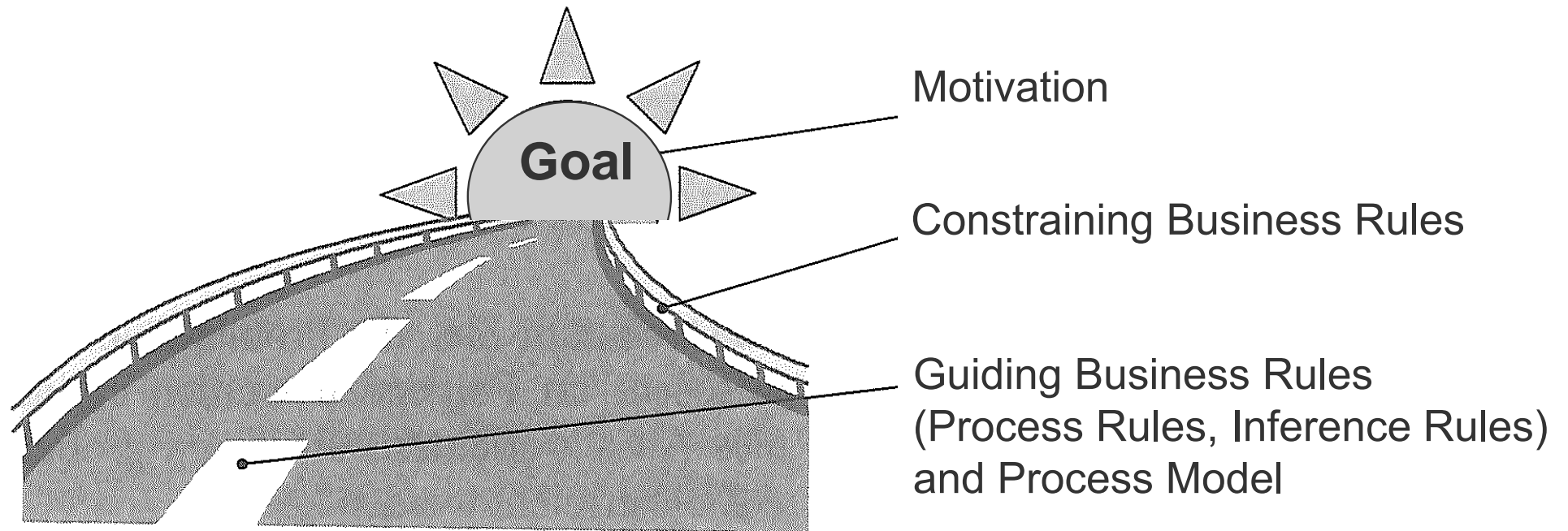**business process models:**
- guiding activities and gateways

organisation models:
- established by organisations
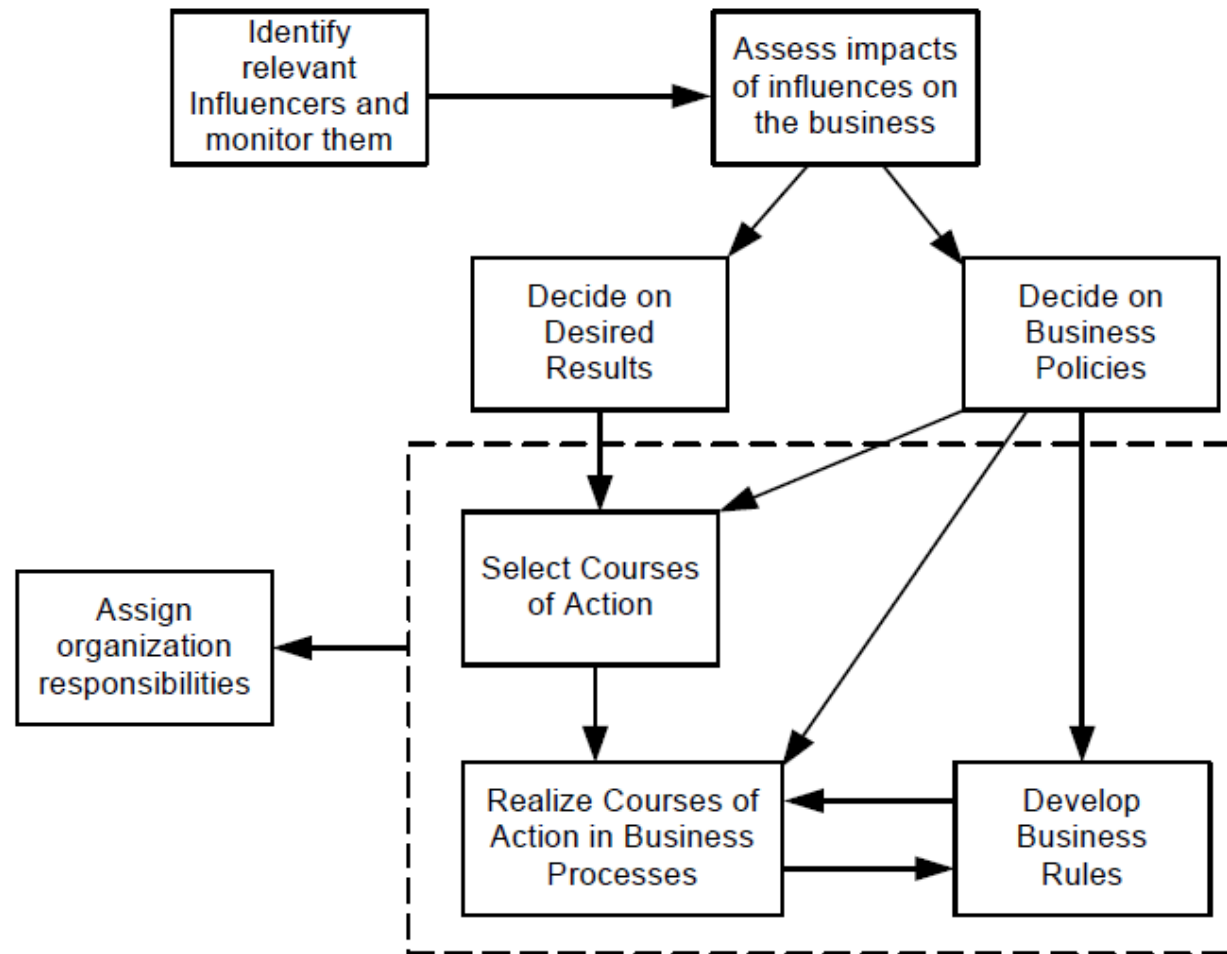
business motivation models:
- derived from business policies
- governing courses of actions

Business Rules show the Way

Motivation

Goal

Constraining Business Rules

Guiding Business Rules
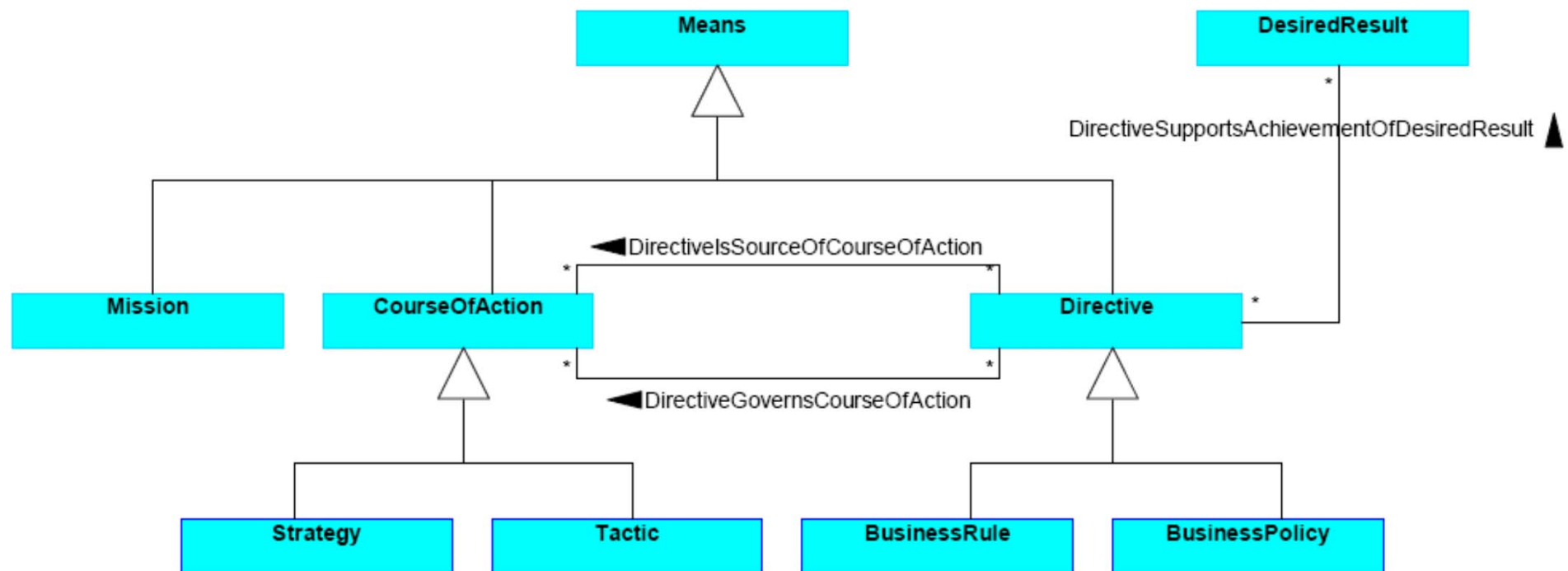(Process Rules, Inference Rules)
and Process Model

adapted from (Schacher and Grässle 2006, p. 18)

Development of Business Processes and Rules from Business Motivation

Business Rules and Business Motivation Model

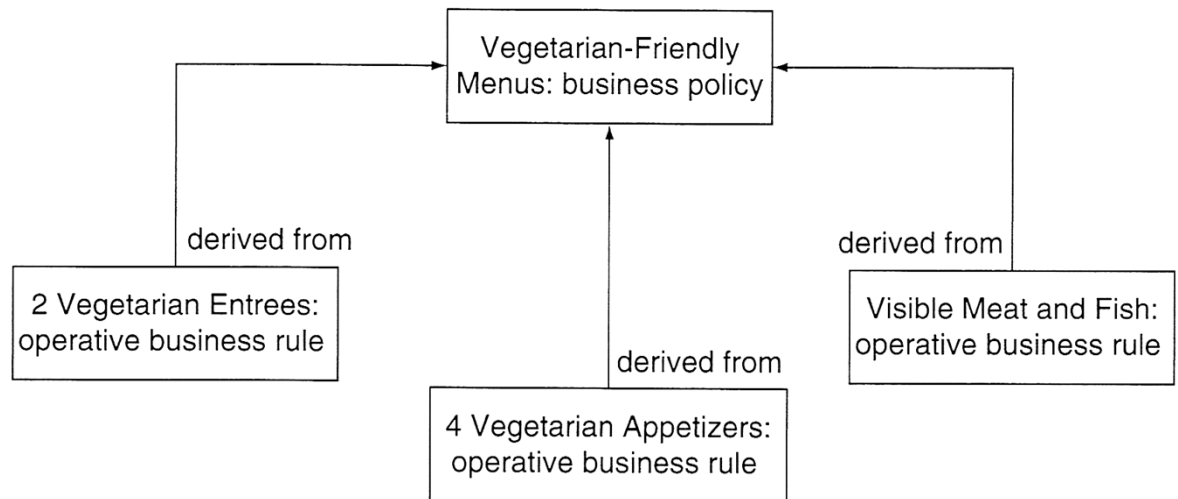■ Business Rules are Directives that have relations to Policies and Courses of Action

Business Policies and Business Rules

- ■ Business rules and business policies shape behavior, but …
    - ♦ A business policy is less precise and more subject to interpretation
    - ♦ In general, business policies are not enforceable, business rules are
- ■ Business policlies can be the reason that a business rule exists:
    - ♦ From a single business policy one or more business rules can be derived
- ■ Examples:

Vegetarian Friendly Menus: All menus must be friendly to vegetarians: *business policy*
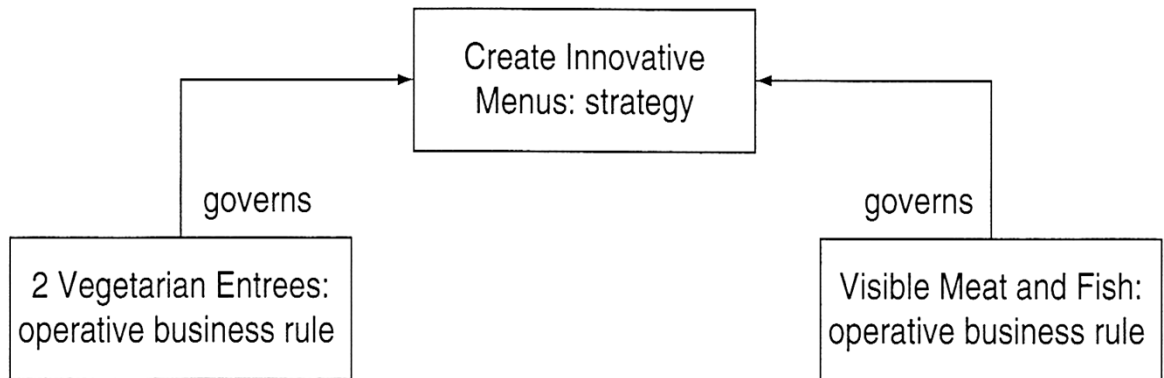
derived from

2 Vegetarian Entrees: It is obligatory that each menu include at least two vegetarian entrees: *business rule*

Vegetarian-Friendly Menus: business policy

derived from

2 Vegetarian Entrees: operative business rule

derived from

4 Vegetarian Appetizers: operative business rule

derived from

Visible Meat and Fish: operative business rule

Strategy and Business Rules

■ Business Rules govern Courses of Action (Strategy and Tactics)

■ A Business Rule shapes the way the Strategy is applied: the rule constrains the Strategy.

■ Example: The business rules **2 Vegatarian Entrees** and **Visible Meat and Fish** could govern the strategy **Create Innovative Menus**

Create Innovative Menus:
All menus must create
innovative menus

Create Innovative
Menus: strategy

governs

governs

2 Vegetarian Entrees:
operative business rule

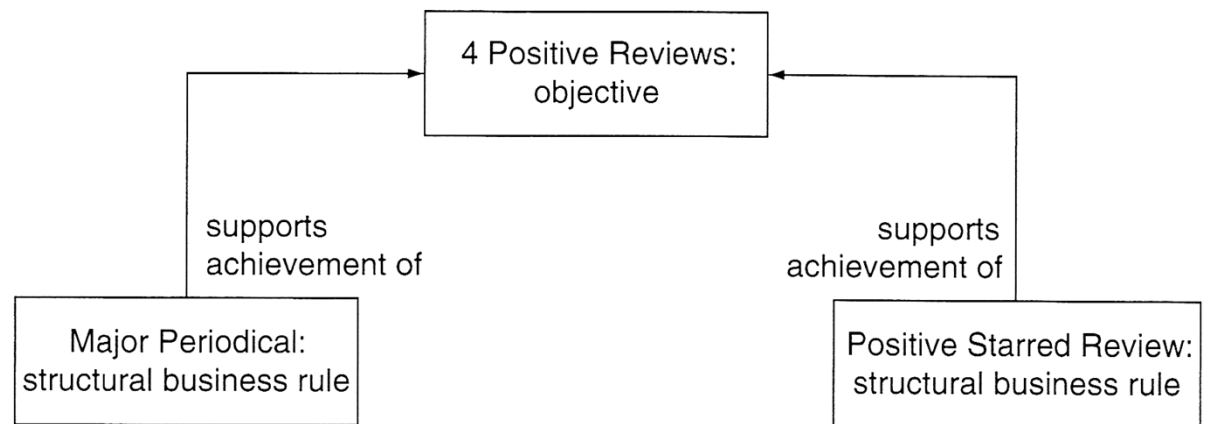Visible Meat and Fish:
operative business rule

2 Vegetarian Entrees: It is
obligatory that each menu include
at least two vegetarian entrees

Visible Meat and Fish: It is obligatory that
the description of a menu item include an
ingredient if the ingredient is a meat or the
ingredient is a fish

Business Rules and Desired Results

- Structural rules can help to make elements more precise

- For example: If the noun concepts used in an Objective are not precisely defined, the Objective might be too vague to be measured.

- Example:

  ♦ Assume the restaurant Nola has an objective, to have 4 positive reviews in major periodicals in 2010. But what is a major periodical?

 ♦ A structural rule can define this noun concept to make an object more precise

Major Periodical: It is necessary that a periodical is major if the periodical has a circulation and the circulation is at least 50'000.

4 Positive Reviews: objective

supports achievement of

supports achievement of

Major Periodical: structural business rule

Positive Starred Review: structural business rule

Organisations and Business Rules

- Business Policies and Business Rules – like Courses of Action – are established by organisation.

- In multi-organisational situations, Business Policies and Business Rules are established by a mix of organisations

- Example:
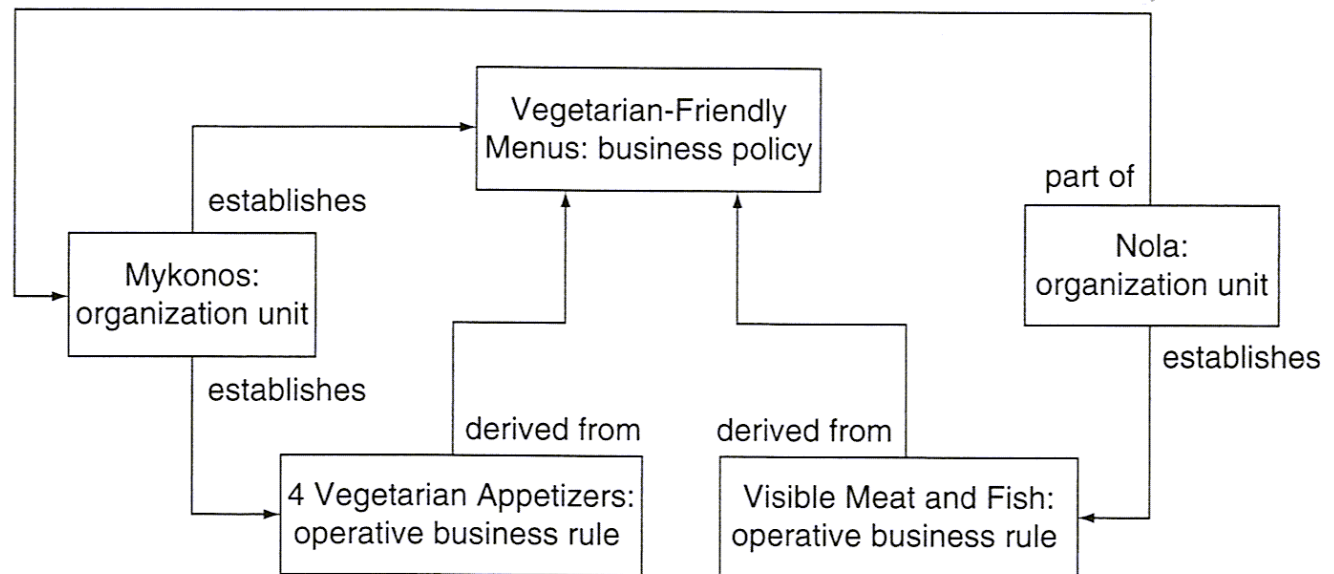
Tactics and Business Rules

■ The decision to apply a specific enforcement level to a rule is itself a tactic

■ Example:

♦ Mykonos might decide that the business rule **2 Vegetarian Menus** is only a guideline

♦ The tactic **Vegetrian Enforcement as Guideline** determines the enforcement levels of the rules **2 Vegetarian Menus** and **4 Vegetarian Appetizers**.
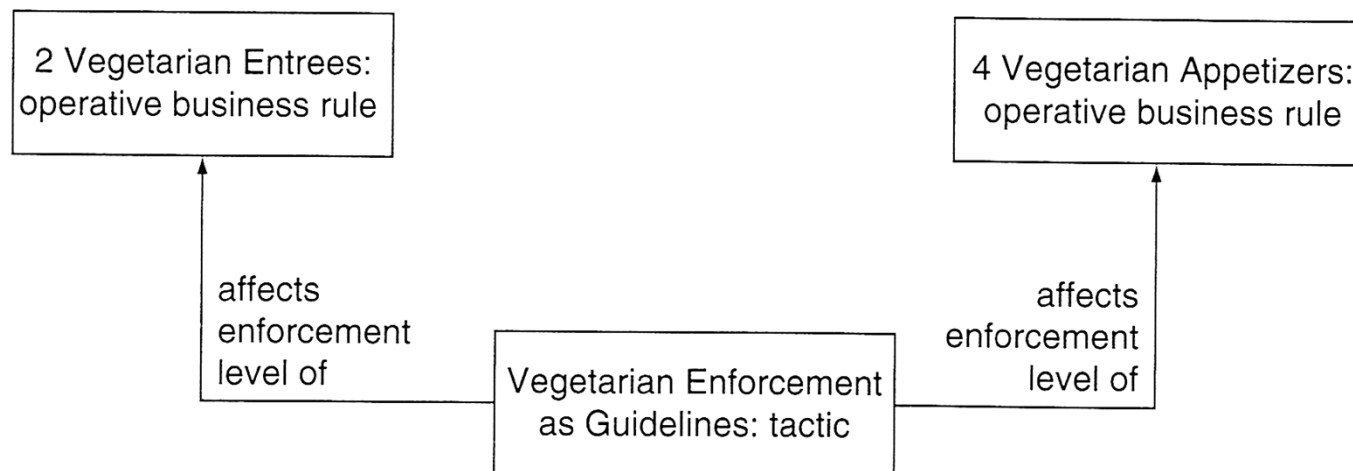
Business Rules and Processes
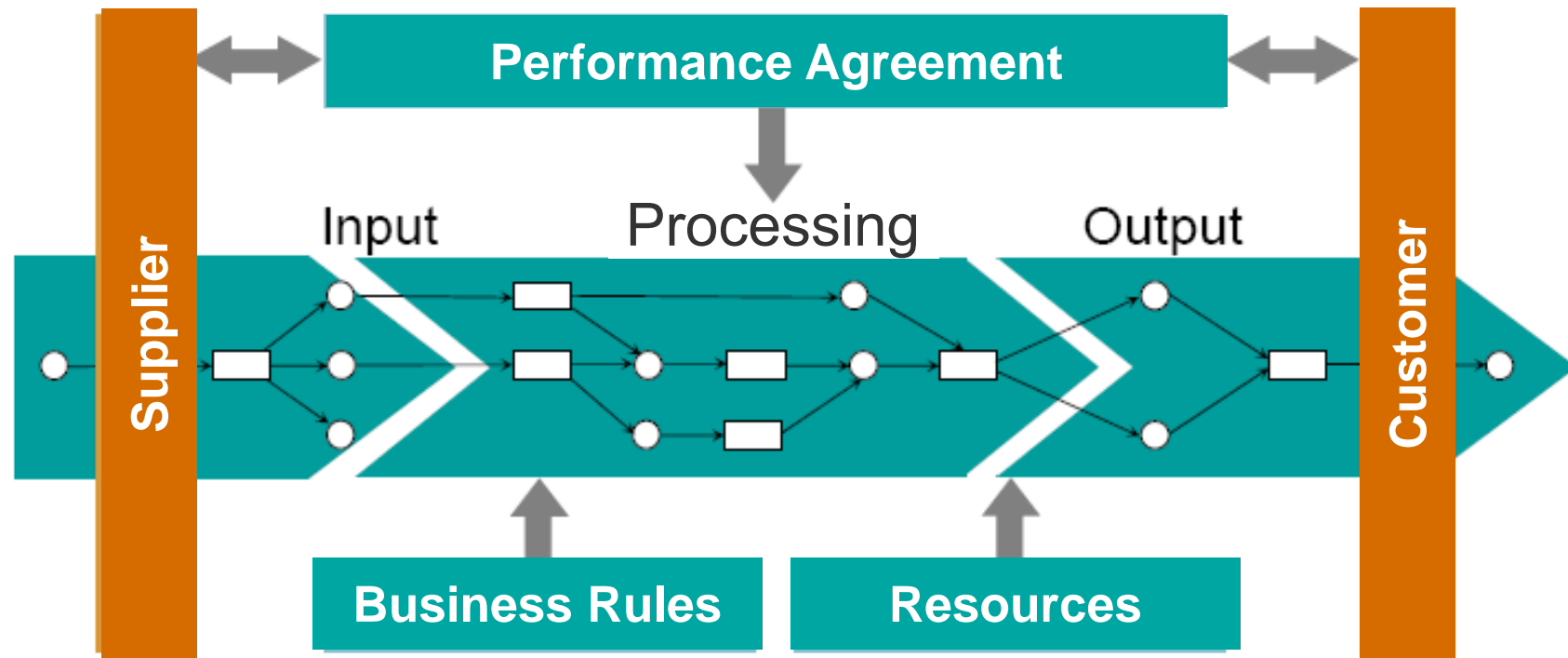
Source: Rainer Endl (2004): Regelbasierte Entwicklung betrieblicher Informationssysteme, EUL-Verlag, S. 16
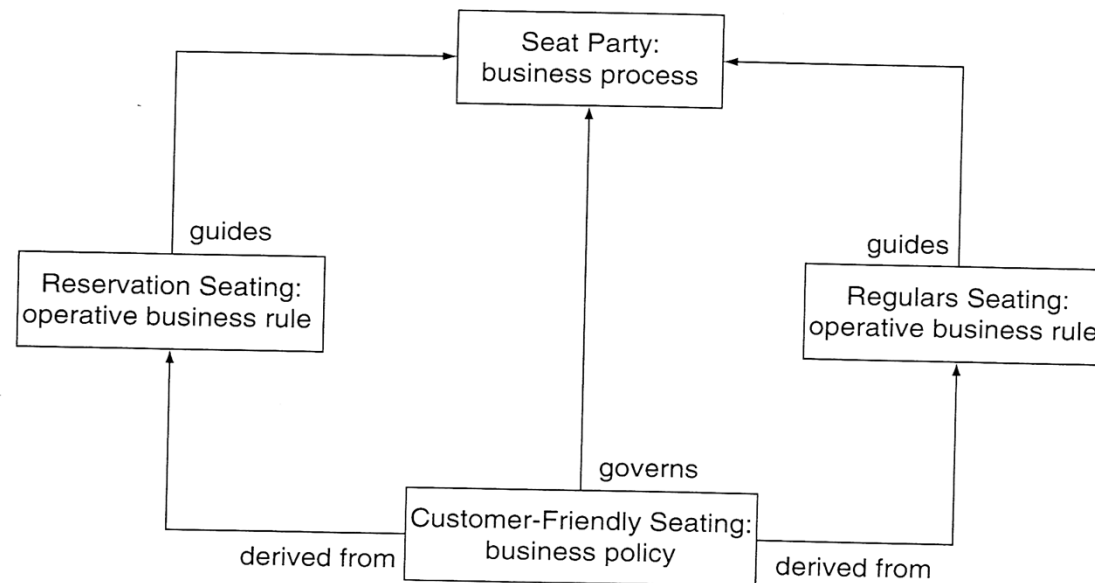siehe auch:
R. Endl: Modellierung von Geschäftsprozessen. http://www.brportal.org/German/vertInformationen/Regelbasierte_Prozessmodellierung.pdf
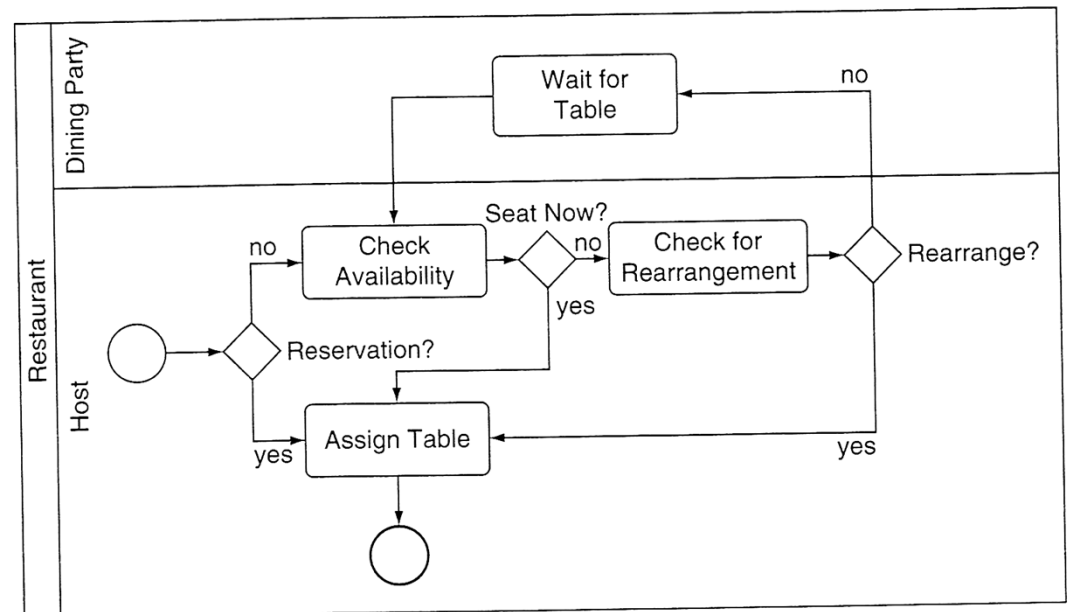
Business Processes and Business Rules

■ **Business Policies govern Business Processes**

■ **Business Rules guide the Business Process by specifying how the work is to be done**

```
                        ┌─────────────────┐
                        │ Seat Party:     │
                   ┌───▶│ business process│◀───┐
                   │    └─────────────────┘    │
                   │             ▲             │
       guides      │             │          guides
┌──────────────────┴─┐           │        ┌──┴─────────────────┐
│ Reservation Seating:│          │        │ Regulars Seating:   │
│ operative business  │          │        │ operative business  │
│ rule                │          │        │ rule                │
└─────────────────────┘          │        └─────────────────────┘
          ▲                   governs                ▲
          │          ┌────────────────────┐          │
          │          │ Customer-Friendly  │          │
          └──────────│ Seating:           │──────────┘
    derived from     │ business policy    │   derived from
                     └────────────────────┘
```

Business Rules guiding a Business Process

■ On a more detailed level, business rules can be related to individual model elements of a business process

■ Typically, business rules can guide

♦ gateways

♦ activities

■ Example: Consider the business process Seat Party. It contains three gateways, which could be guided by business rules
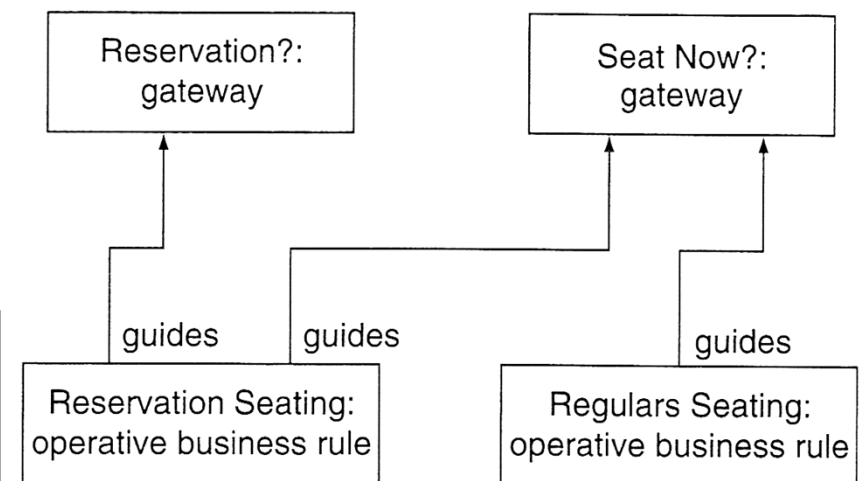
Business Rules guiding Gateways

■ Example: The business process Seat Party

♦ Business rules guide the two gateways by inference rules deriving the conditions for the different paths

Reservation Seating: It is obligatory that a party is seated if the party has a reservation and a table is available and the table has appropriate size for the party

Regular Seating: It is obligatory that a party is seated if the party includes a regular and a table is available and the table has appropriate size for the party
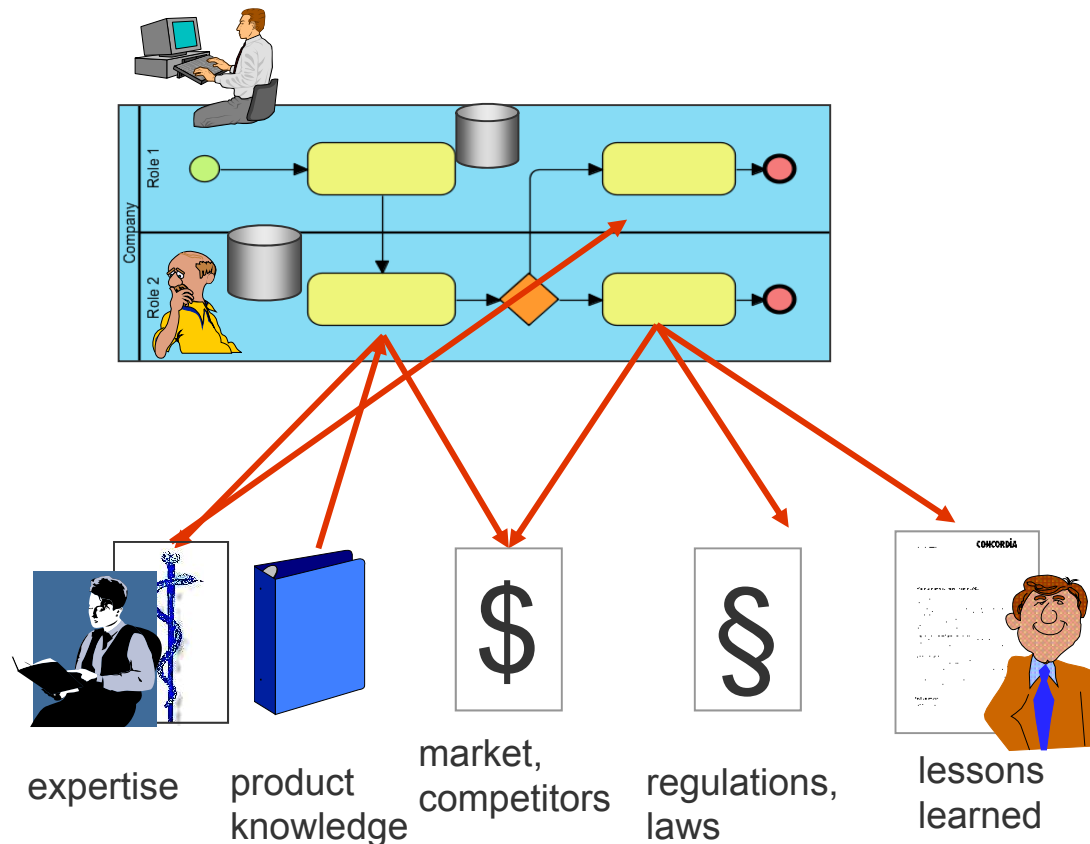
Reservation?:
gateway

Seat Now?:
gateway

guides   guides   guides

Reservation Seating:
operative business rule

Regulars Seating:
operative business rule

Business Rules guiding Activities

■ An activity is guided by a business rule when the business rules helps the person performing the activity do his or her work.

■ Example: The business rule **Large Party Gratuity** is used by a server when she performs the activity **Produce Bill**.

♦ If it is a manual activity, the server might include a line item on the bill for the mandatory gratuity

♦ If a software application is used to produce the final bill, the application must be aware of the **Large Party Gratuity** rule.

Produce Bill: activity

↑ guides

Large Party Gratuity: operative business rule
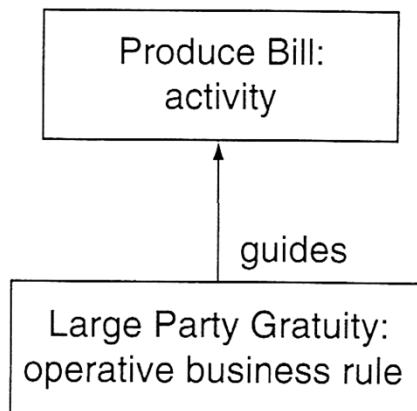
Large party gratuity: It is obligatory that the gratuity is at least 15% if the gratuity is applied to a bill and the bill is incurred by a party and the party is greater than 7 people.

Knowledge and Processes

knowledge *about* processes**:**
- workflow
- roles

→ **process logic**

used at **design time**

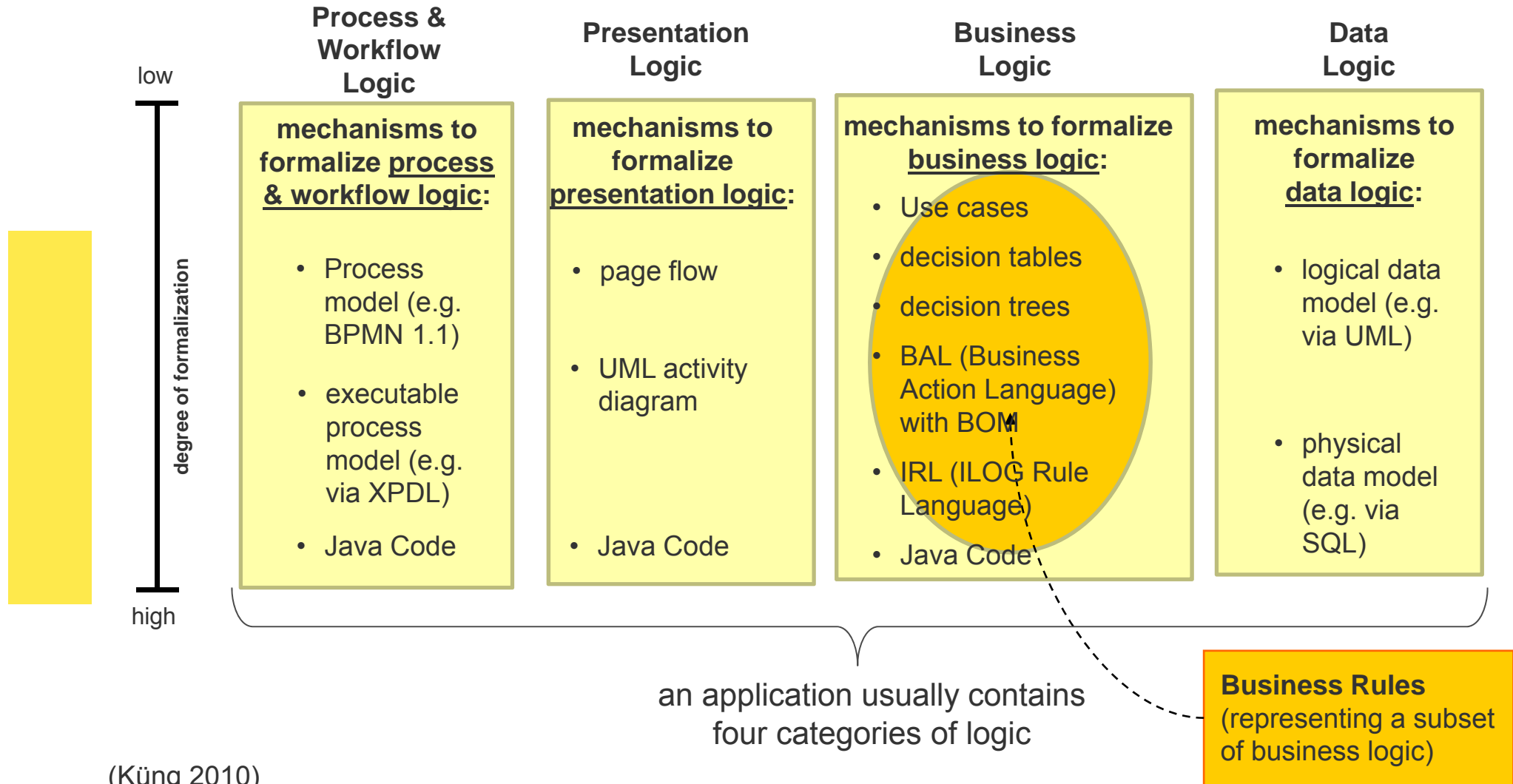expertise product knowledge market, competitors regulations, laws lessons learned

knowledge *in* processes**:**
- skills, experiences
- background knowledge

→ **business logic (expert knowledge)**

used at **run time**

BRs belong to the category 'Business Logic'

Process & Workflow Logic	Presentation Logic	Business Logic	Data Logic
mechanisms to formalize process & workflow logic:	**mechanisms to formalize presentation logic:**	**mechanisms to formalize business logic:**	**mechanisms to formalize data logic:**
• Process model (e.g. BPMN 1.1) • executable process model (e.g. via XPDL) • Java Code	• page flow • UML activity diagram • Java Code	• Use cases • decision tables • decision trees • BAL (Business Action Language) with BOM • IRL (ILOG Rule Language) • Java Code	• logical data model (e.g. via UML) • physical data model (e.g. via SQL)

low

degree of formalization

high

an application usually contains four categories of logic

Business Rules (representing a subset of business logic)

(Küng 2010)

Separating Business Logic from Process Logic – Example (Part 1)

This process model does NOT separate business logic from process logic

- ♦ Decisions and events are based on business logic
- ♦ Any change of the business logic (i.e. other threshold for risk score) would result in a change of the process model
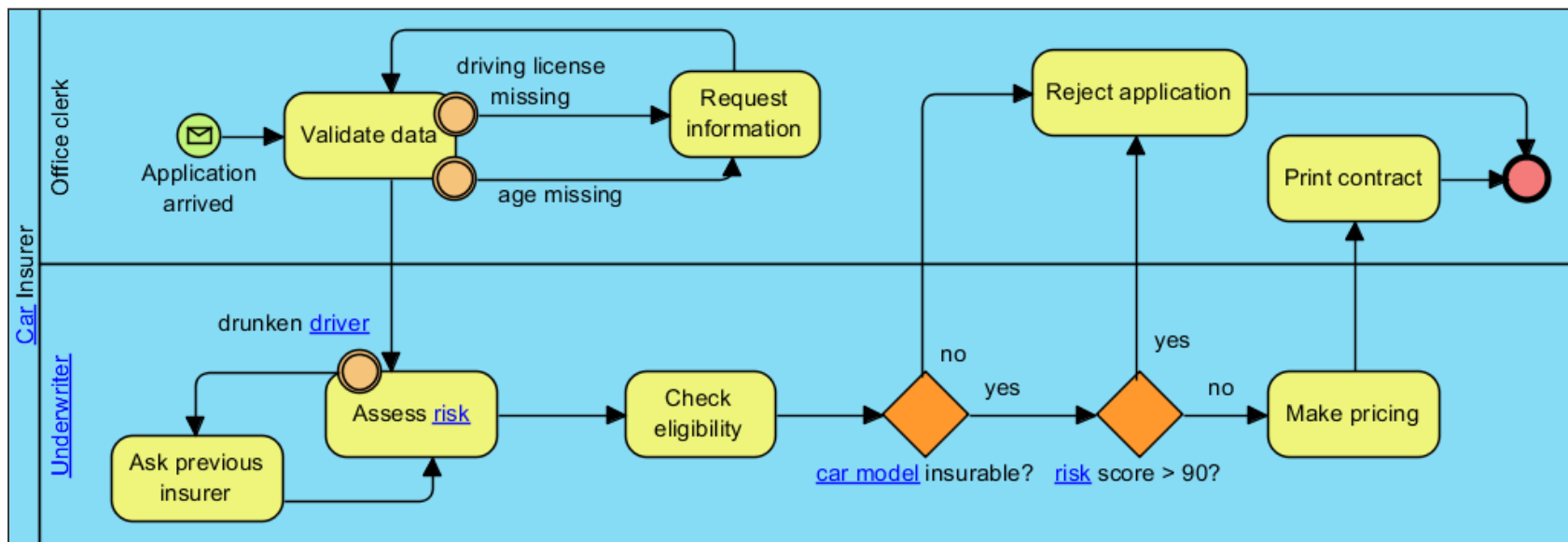
Separating Business Logic from Process Logic – Example (Part 2)

This process model separates business logic from process logic

- Business rules represent the business logic, e.g.
  - ♦ *customer is eligible if risk score is less than 90 and car model is insurable*
  - ♦ *Previous insurer is asked if the application has been drunken*
  - ♦ *Driving licence and age are compulsory information of the applicant*
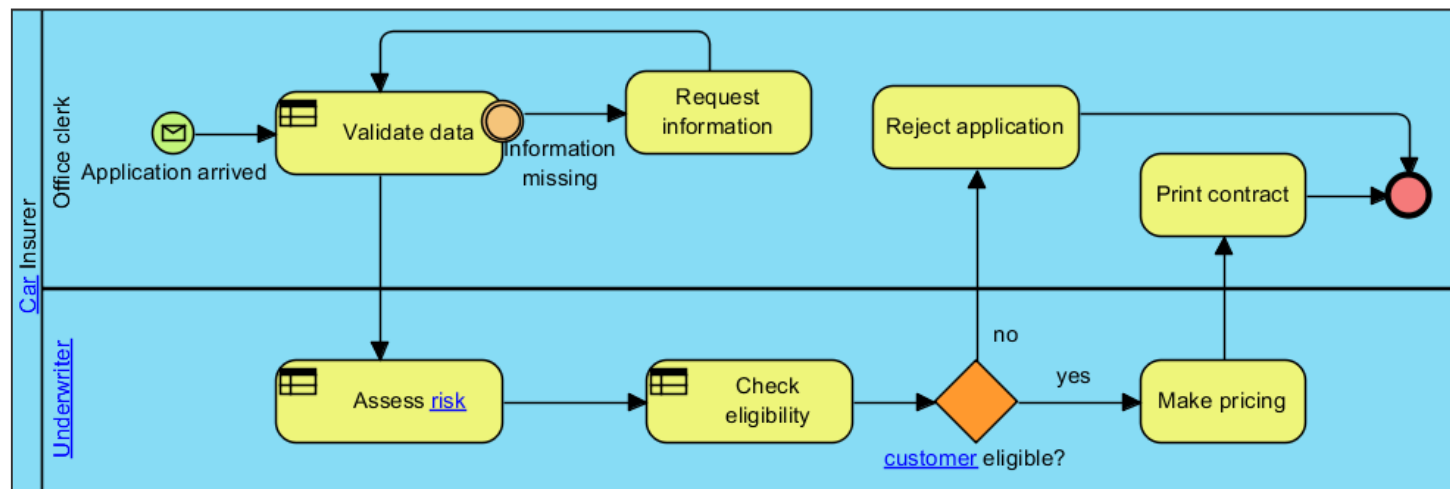
Business rules make the business logic transparent

if the loan to value of the mortgage is more than 90%

and the state of application is not California

then the application is not eligible

A natural language rule

Grade	Amount of loan		Insurance required	Insurance rate
	Min	Max		
A	< 100,000		false	⊘
	100,000	300,000	true	0.001
	300,000	600,000	true	0.003
	≥ 600,000		true	0.005
B	< 100,000		false	⊘
	100,000	300,001	true	0.0025
	300,000	600,000	true	0.005
	≥ 600,000		true	0.0075
C	< 100,000		true	0.0035
	100,000	300,000	true	0.006
	300,000	600,000	true	0.0085
	≥ 600,000		true	0.0145
Otherwise			true	

A Decision Table

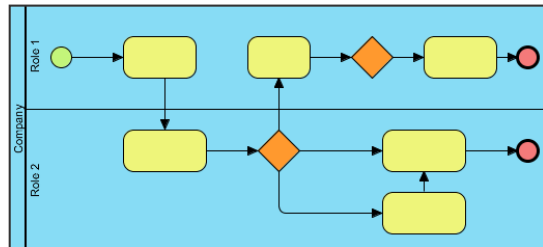Source: Friedlander, IBM

This makes agility happen
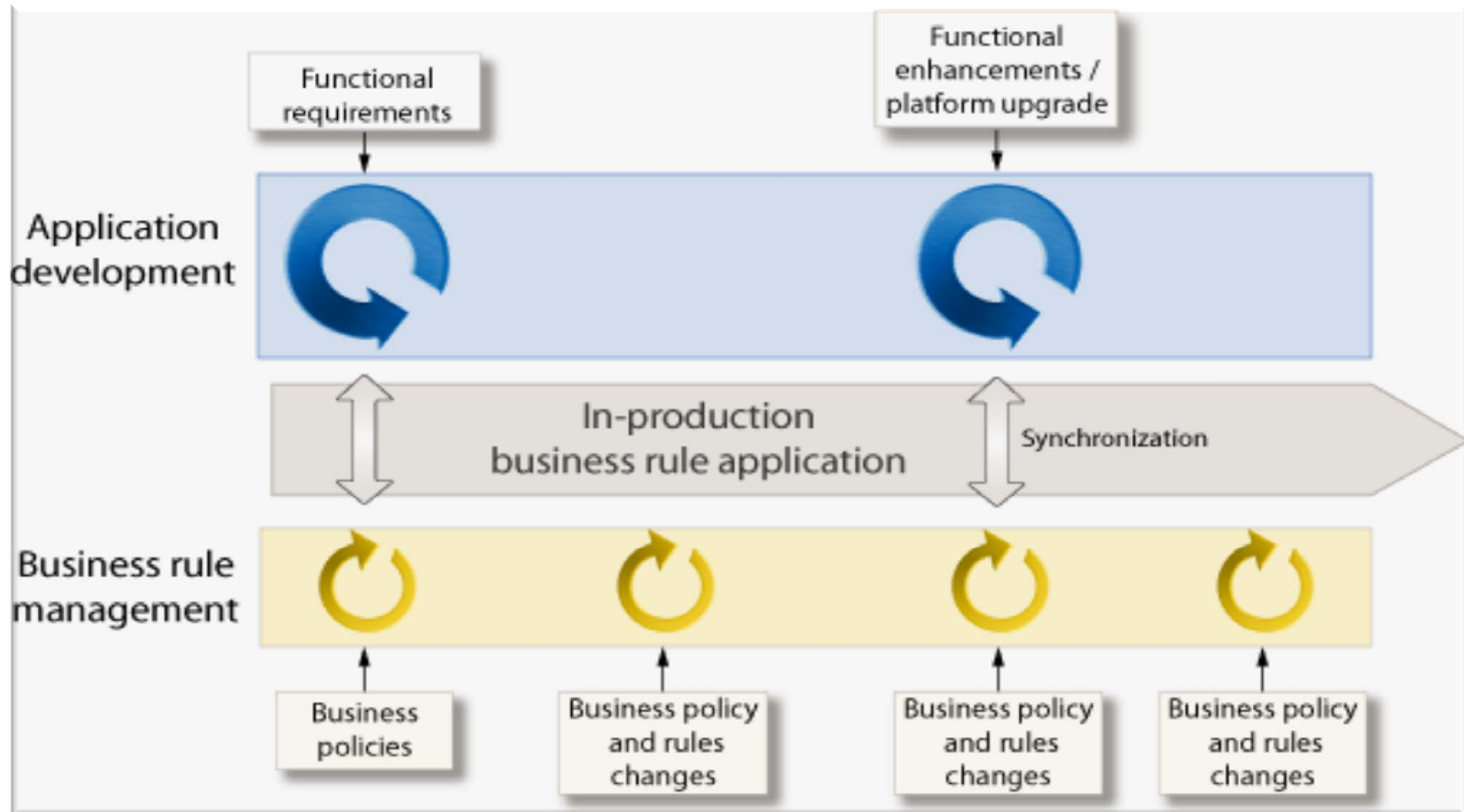
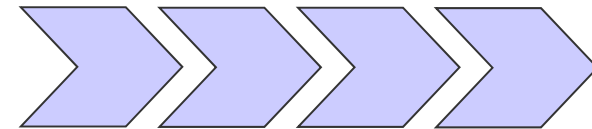Source: Friedlander, IBM

Structured Processes vs. Knowledge Work

Structured Processes

- **Characteristics**
  - Routine processes

- **Objectives**
  - Efficiency, productivity
  - Traceability
  - Uniformity
  - Automation

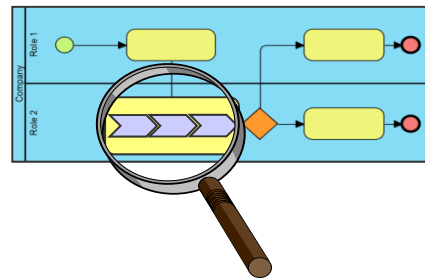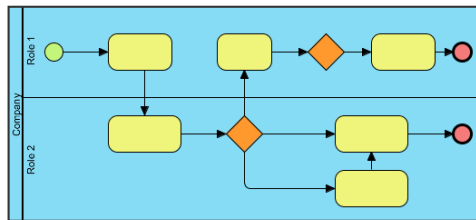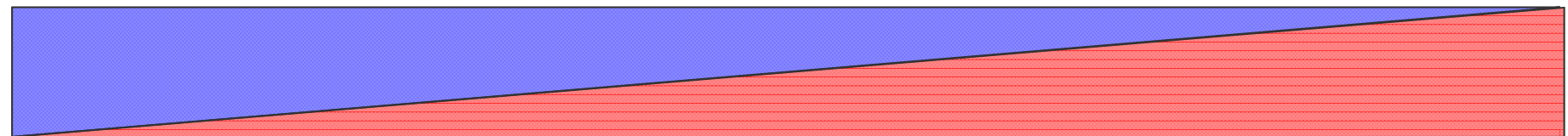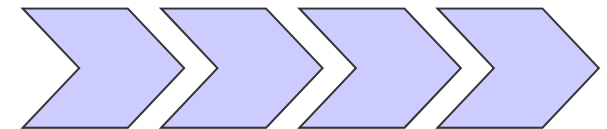- **Process flow defined at design time**

Knowledge Work

- **Characteristics**
  - Unforeseeable events
  - exceptional situations
  - High variability
  - Complex tasks

- **Objectives**
  - Flexibility
  - Autonomy of the workers

- **Process flow determined at run time based on expert knowledge**

Structured Processes vs. Knowledge Work

**Structured Processes**

Knowledge Work

Different proportions of process logic and business logic (expert knowledge)

Modelling Knowledge Work:
Separating Business Logic from Process Logic

■ Approach: Combine business process modeling with the business rules approach

  ♦ Simplified process model - representing process logic

  ♦ Business logic could be represented in business rules

    ● assigned to knowledge-intensive tasks and gateways

    ● no detailed process model for knowledge-intensive tasks

➢ Separating business logic from process logic
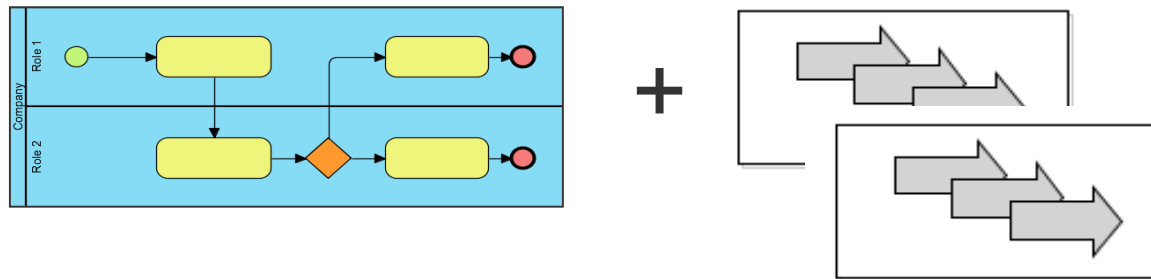
This will be dealt with in the module Business Process Management

Advantages of Combining Business Processes and Business Rules

- Business rulesSupporting knowledge work

- Design-time agility: Simplified Process Models
  - ♦ Define a process skeleton: structured process part
  - ♦ No sub-structure for knowledge-intensive tasks
  - ♦ Change of business logic does not affect process models

- Run-time agility: Business Rules take into account process context to guide execution of knowledge-intensive tasks
  - ♦ Decision Support
  - ♦ Resource allocation
  - ♦ Ad-hoc process execution

Four Principles of the Business Rules Approach

The business needs systems in which rules are …

… *separated* from other components so that everybody knows *that* they exist

… *externalized* so everybody knows *what* the rules are

… *tracable* to their origins and their implementation so everybody knows *where* they come from

… deliberately *positioned for change* so everybody knows *how to improve* them

(von Halle 2002, p. 4)

Goals of the Business Rules Approach

1) **Visibility** of Business Logic (Business Rules)

2) **Maintainability** of Business Logic (Business Rules)

3) **Empowerment** of the business domain