Research Institute for Operations Management
at RWTH Aachen University

Enterprises Thinking!

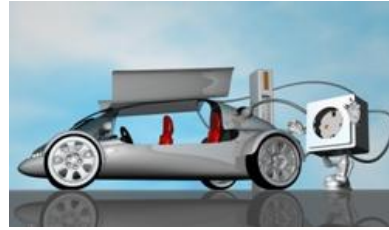## Mapping collaborative technologies for organizational workflows

Ali Imtiaz

Accra, Ghana
15th of Feb. 2011

ACTIVE
Knowledge-Powered Enterprise

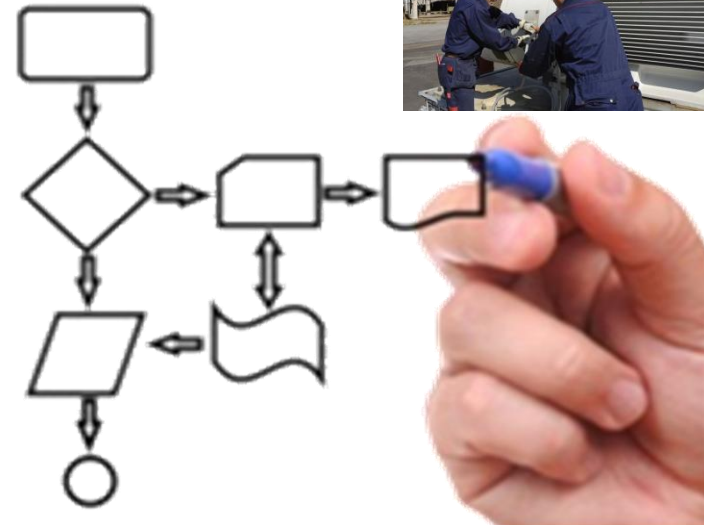# Scope of the presentation

- **FIR**
  - Who we are and
  - what we do

- **ACTIVE project**
  - Enterprise
  - Process types and scope
  - Some thoughts on Incentives

FIR in the Network with its partner institutes

RWTH Aachen
- founded in 1870
- 30.000 students
- 5.000 students in Mechanical Engineering

Institute for Industrial Management (FIR)
- founded in 1954
- 140 employees
  (approx. 45 scientific employees)

Laboratories of Machine Tools and Production Engineering (WZL)
- founded in 1906
- 600 employees
  (approx. 160 scientific employees)

Fraunhofer Institute for Production Technologies (IPT)
- founded in 1980
- 340 employees
  (approx. 60 scientific employees)

FIR Organisational Map

Prof. Dr. Günther Schuh
Director

Prof. Dr. Volker Stich
CEO

Information Management	**Service Management**	**Production Management**
▪ Information Logistics	▪ Service Engineering	▪ Supply Chain Design
	▪ Lean Services	▪ Order management
▪ Information Technologies	▪ Community Management	▪ Logistic Management
▪ Competence Center Electronic Commerce	▪ Competence Center Maintenance	▪ Competence Center IT-Management
▪ *Smart Object Innovation Lab*	*Service Science Innovation Lab*	▪ *ERP Innovation Lab*

RWTHAACHENCampus

RWTH Aachen Campus   2 Areas – up to 19 Cluster

- n.n.
- Geo-resources
- Security & Safety Engineering
- n.n.
- Integrative Production Technology
- On Highway Powertrain
- Surface Engineering
- Sustainable Energy
- Logistics
- Advanced Metals & Aluminium Engineering
- Fibre-based Materials
- Heavy Duty & Off Highway Powertrain
- Future Internal Combustion Engines
- Bio-Medical Engineering
- Chipless Forming
- UHSM & Car Communication
- Photonics
- Plastics Technology
- Future Fuels & Tailormade Chemical Products

Legende: UHSM Communication = Ultra High-Speed Mobile Communication

fir at RWTHAACHEN 5

The clusters

- **Cluster Definition:**

- Long Term Topic, > 5 years.

- Strong acceptance from industrial partners

- Intensive exchange between research results and industrial approval

- Minimum 3 research chairs (Professors) and minimum 10 industrial partners

- Each starting with min. 10000 m², 300 employees

sketch: rha reicher haase + associierte, Aachen

Events and Activities

Key events and activities

- ICE Conference 2011

- Executive MBA for technology managers

- Service Engineering Forum - Aachener Dienstleistungsforum
- ERP days – Industrial forum
- AIT days – Industrial forum

- RWTH-Certificate Course Chief Logistic-Manager
- RWTH-Certificate Course Chief RFID-Manager
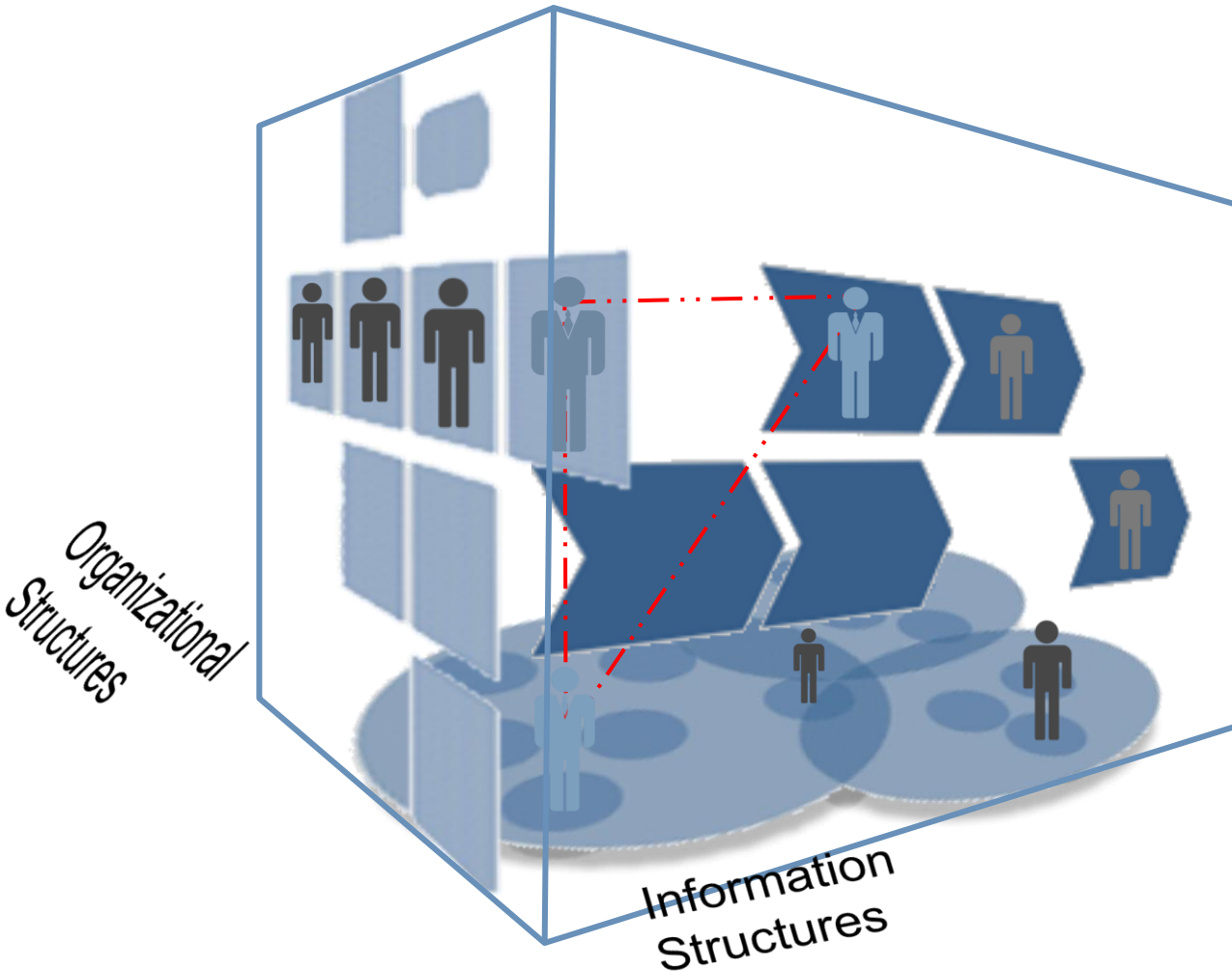- RWTH-Certificate Course Chief Service-Manager

ACTIVE

Knowledge Activated Enterprise
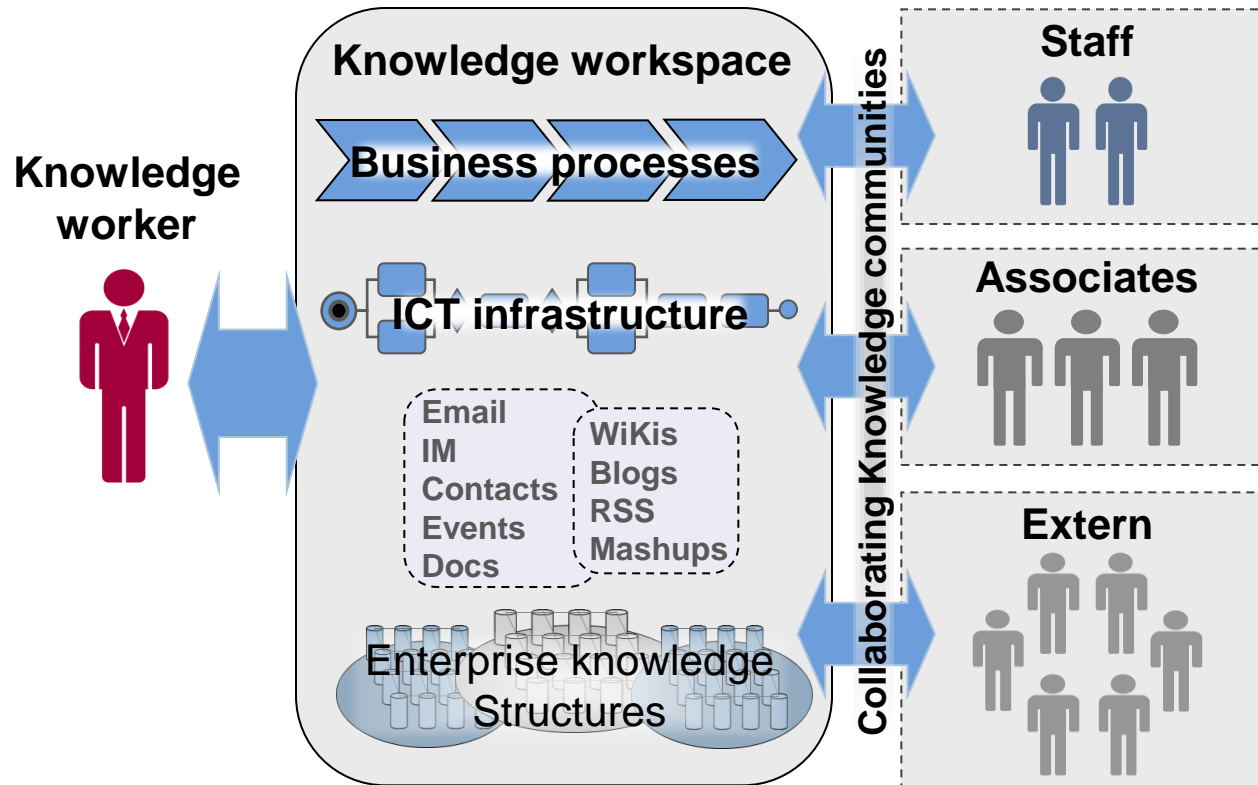
Target group

Organizational
Structures
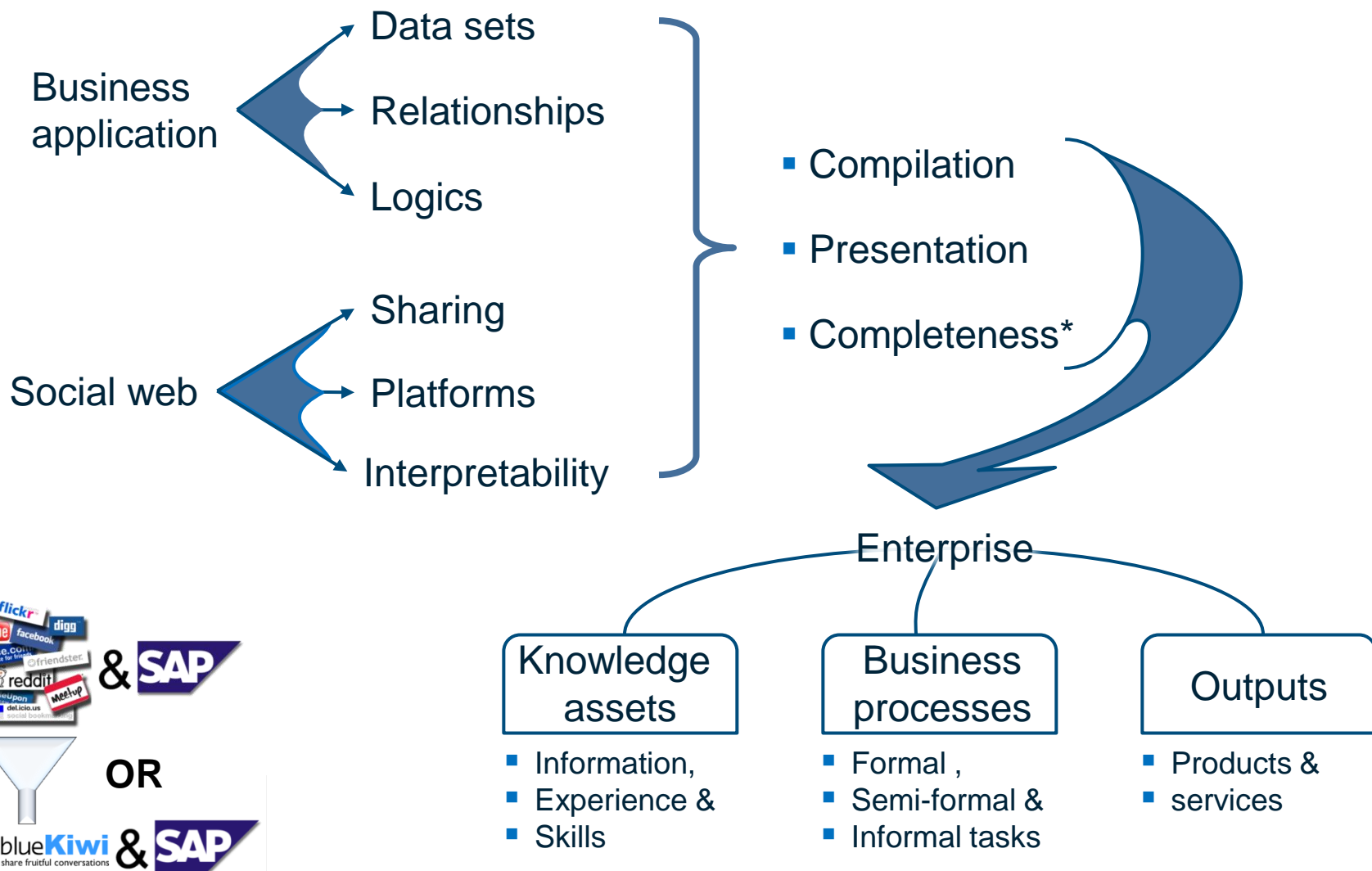
Operational
Structures

Information
Structures

Knowledge
workers

Enterprise

Organizational community

Knowledge worker

Knowledge workspace

Business processes

ICT infrastructure

Email
IM
Contacts
Events
Docs

WiKis
Blogs
RSS
Mashups

Enterprise knowledge Structures

Collaborating Knowledge communities

Staff

Associates

Extern

User role identification → Org. processes identification → Application placement
= Harmonisation of organisational processes and application impact
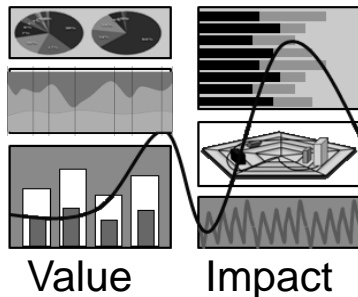
Business application
- Data sets
- Relationships
- Logics

Social web
- Sharing
- Platforms
- Interpretability

- Compilation
- Presentation
- Completeness*

& SAP

OR

blueKiwi & SAP

Enterprise

Knowledge assets
- Information,
- Experience &
- Skills

Business processes
- Formal ,
- Semi-formal &
- Informal tasks

Outputs
- Products &
- services

Two complementary perspectives

- **CIO**
  - Too many upcoming technologies
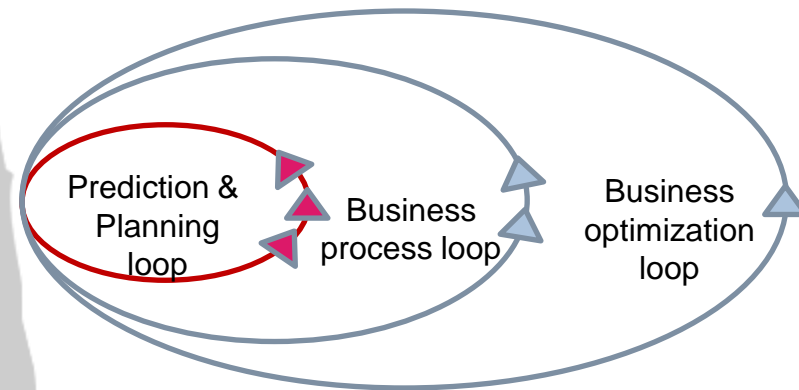 - No readily available approach to measure the value and impact
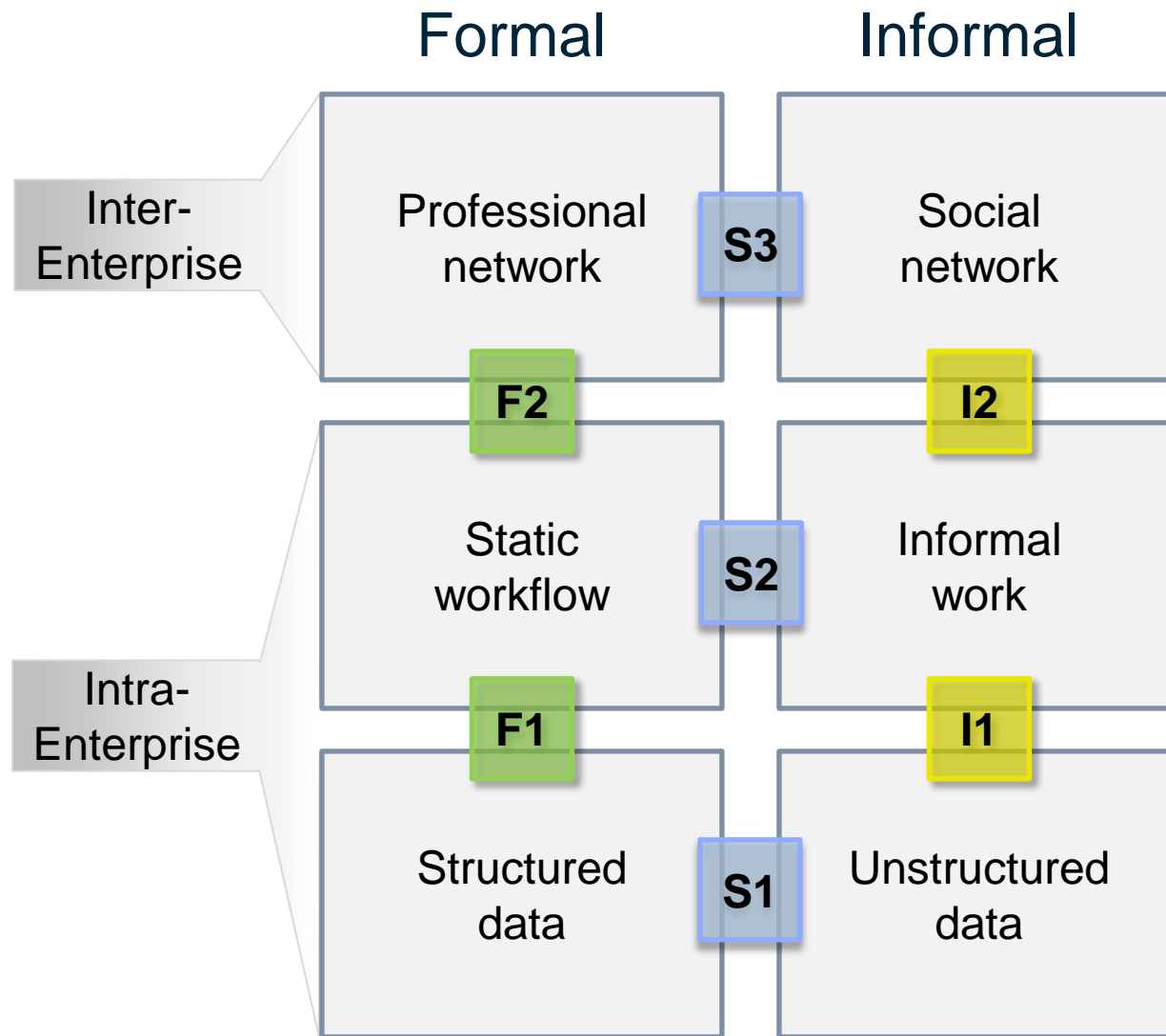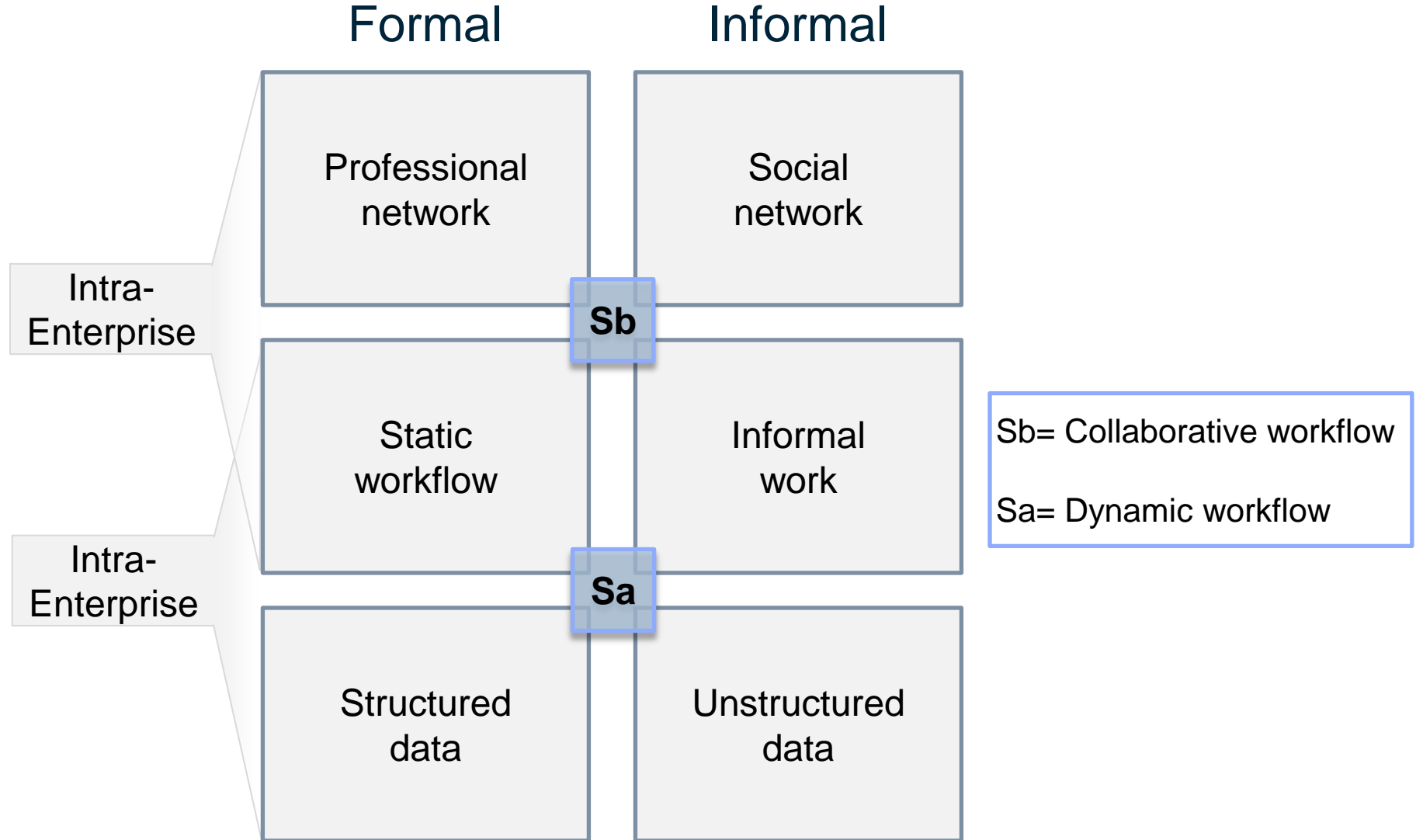
- **Knowledge worker**
  - technology savvy profiles
  - exposure, skill, experience, towards judgment to use new technologies
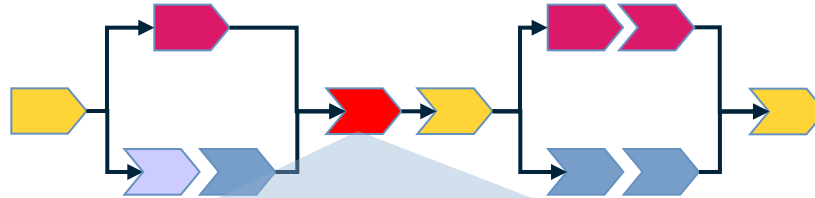 - understanding the needs of the processes

- **Role**
  - Decision support
  - Visibility in processes
  - Accountability based on value and impact

Value   Impact

Prediction & Planning loop

Business process loop

Business optimization loop

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Collaborative Technologies

Customized representation based on MIT-EIA 2004; Linß 1995; Kaib 2002

Collaborative Technologies

	Formal	Informal
Intra-Enterprise	Professional network	Social network
Intra-Enterprise	Static workflow	Informal work
	Structured data	Unstructured data

Sb

Sa

Sb= Collaborative workflow

Sa= Dynamic workflow

Customized representation based on MIT-EIA 2004; Linß 1995; Kaib 2002

Context levels

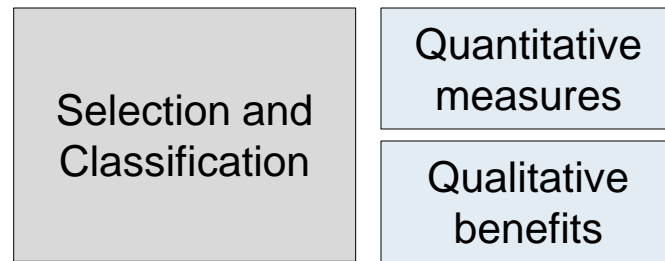|	
Core Business Process	Core business context
Information system	Task context
Pool of flexi-services	Activity context / Action context
Data Backbone	
Data source	
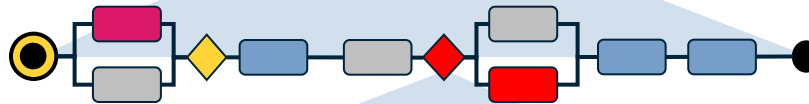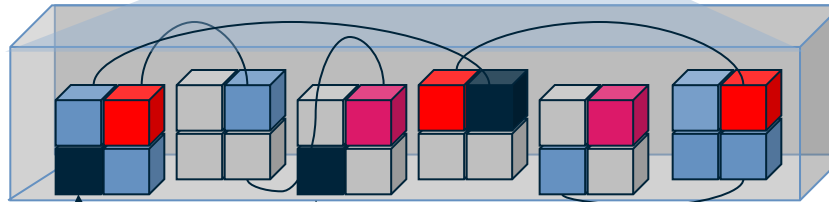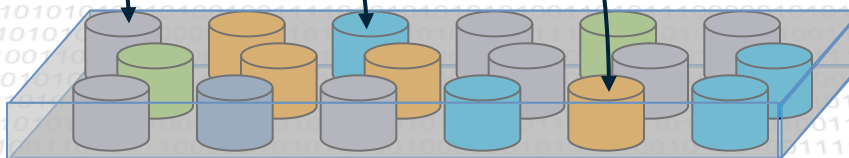
Construct of the framework (EVEKS)

| Selection and Classification | Quantitative measures |
| | Qualitative benefits |

Individual component level

(Intrinsic value)

Organizational strategy

Organization level

(Extrinsic value)

Individual component level

Selection & classification		Assessing & calculating value	
Identify functionalities	Generate value drivers	Determine interfaces	Asses actual impact

Organization level

Integration strategy

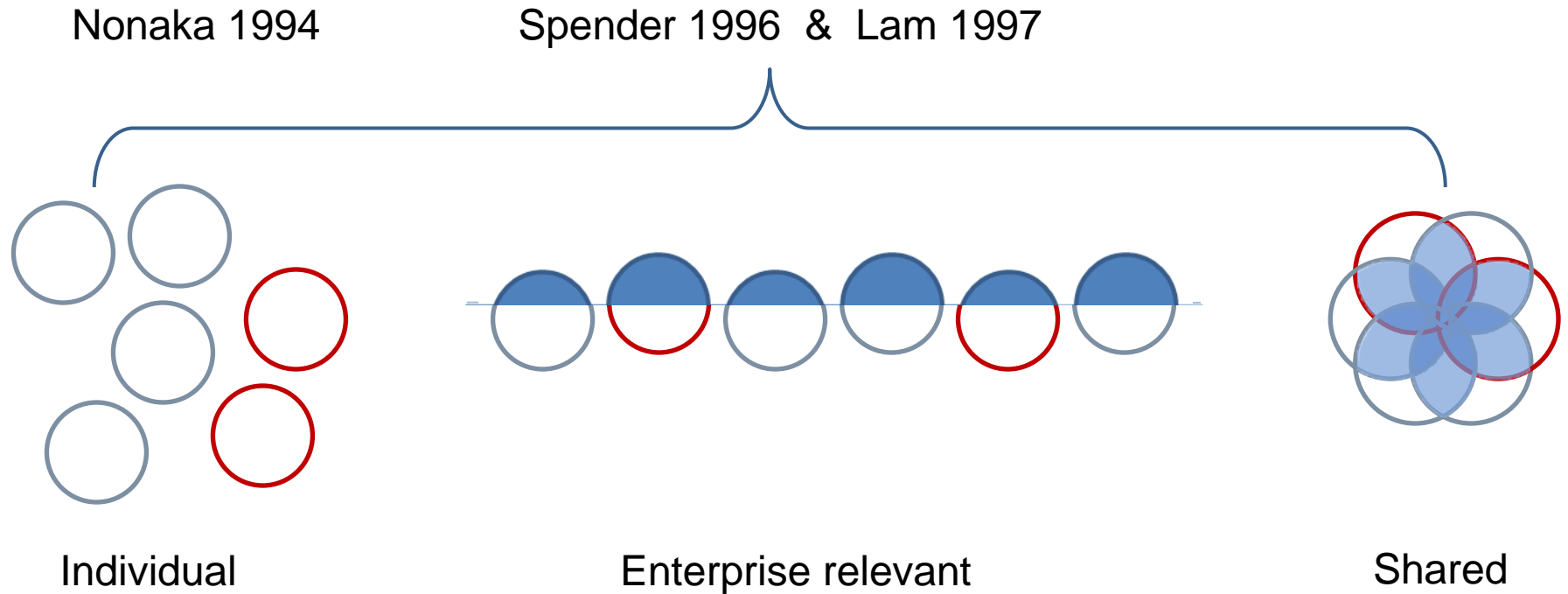# EVEKS framework

Identify & isolate functionalities	Generate value drivers	Determine interfaces	Access value	Derive integration strategy

Quantitative (€)
Cost model:
Benefit model:

Qualitative
(% weight)

List of all KM supporting functionalities	Dictionary of benefit drivers and relevant domains	Matrix of interfaces between key parameters and domains	Intrinsic value: Qualitative & quantitative measures	Predictive extrinsic value measures and their impact

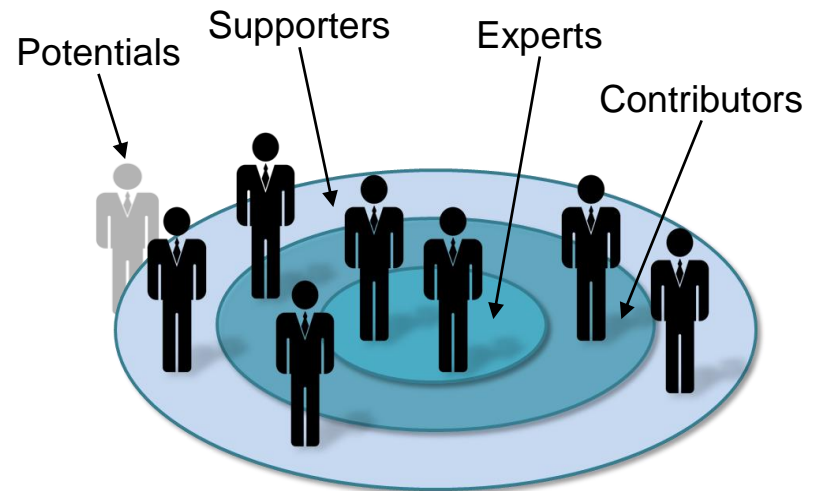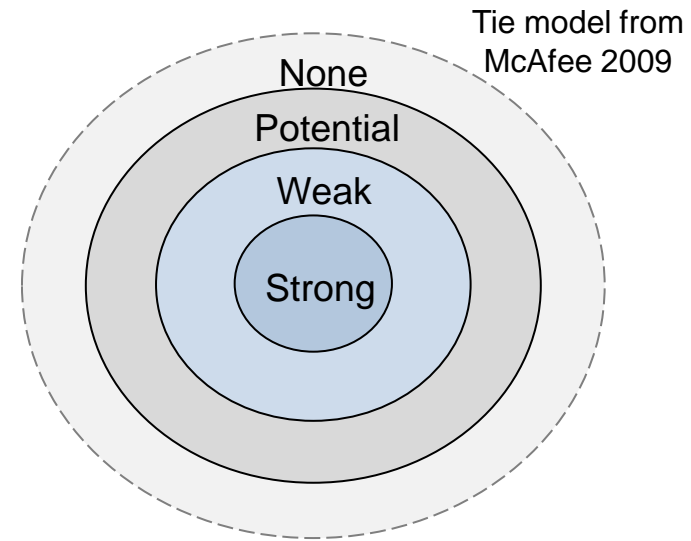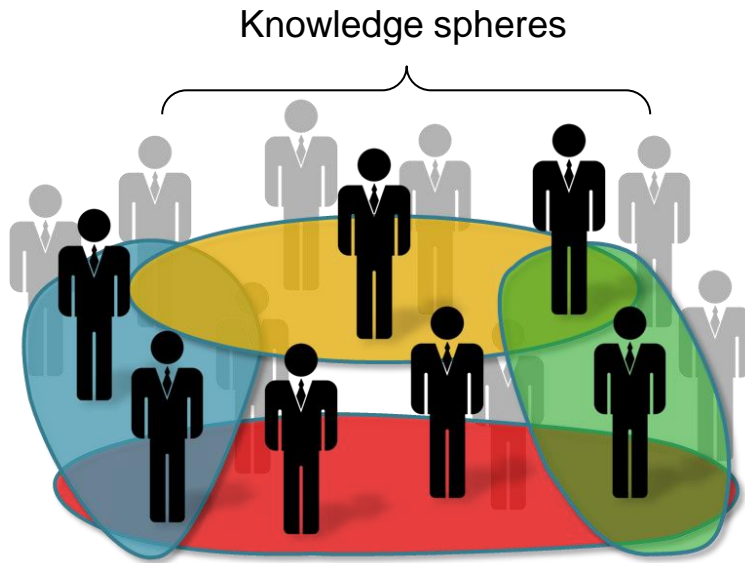● Functionality   ⬡ Application domain   — Interrelation

Description of pillars

	Identify & isolate functionalities	Generate value drivers	Determine interfaces	Access value	Derive integration strategy
Analyses	Identify domain specific application functionalities	Isolate the relevant domain specific benefit drivers and align with each functionality	Identify interfaces between benefit drivers, task level processes, and business level processes	Assign quantitative values to the drivers	Develop overall process to task and IT system to task landscapes
Measures	Catalogue of requirement classification	Meta-study on relevant benefit drivers	-Expert interviews -Task descriptions - Alternative flow	-Cost model -Benefit model -Assessment tool for impact	-Knowledge representation table -Reorganization charts
Outcome	List of all KM supporting functionalities	Dictionary of benefit drivers and relevant domains	Matrix of interfaces between parameters and domains	Intrinsic value: Qualitative & quantitative measures	Predictive extrinsic value measures and their impact

© FIR 2011

Collaboration

Nonaka 1994

Spender 1996 & Lam 1997

Individual

Enterprise relevant

Shared

Knowledge Spheres

Knowledge spheres

Tie model from McAfee 2009

None

Potential

Weak

Strong

Potentials

Supporters

Experts

Contributors
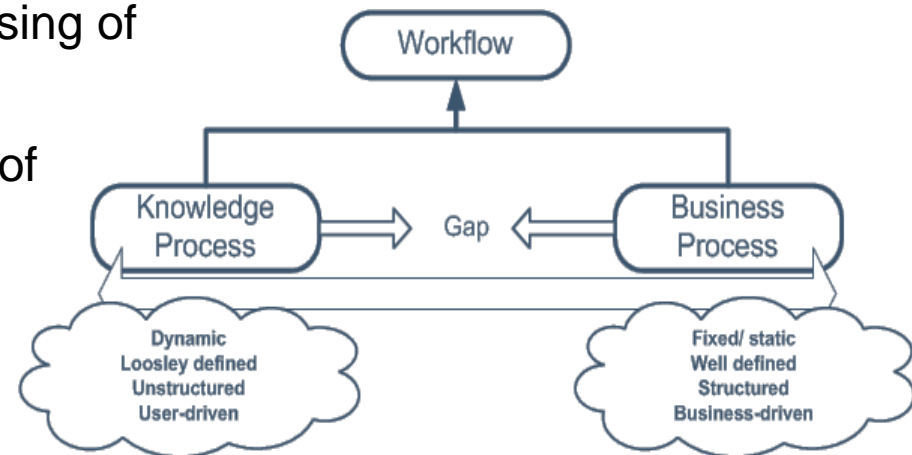
Workflows, Business Processes, Knowledge Process

- **Workflow** is a finite set of sequential/ parallel activities triggered by events.*

- **Business Process** is a collection of sequential/ parallel activities necessary for processing of economically relevant objects.*

- **Knowledge Process** is a collection of <u>loosely defined and ramified activities</u> (actions) necessary for processing of <u>user relevant data</u>.

	Business Process	Informal Knowledge Process
Goal	Business-goal driven	User-goal driven
Scope	Enterprise	Individual
Structure	Static	Ramified
Description	Formal	Informal
Guided	Externally Coordinated	Ad-hoc/ Spontaneous
Analyzed	Monitored, Analyzed, Optimized	Not Monitored, Emerging

*taken from: Computer/Supported Coorperative Work, Uwe m. Borghoff and Johann H. Schlichter, Springer, 2000
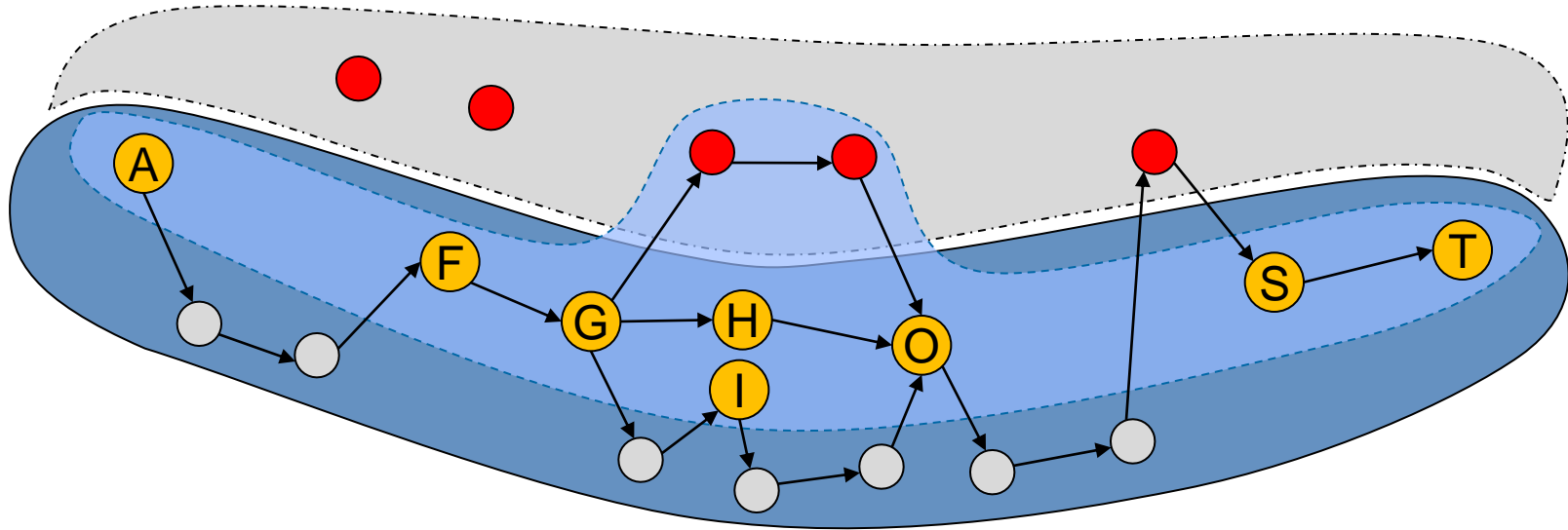
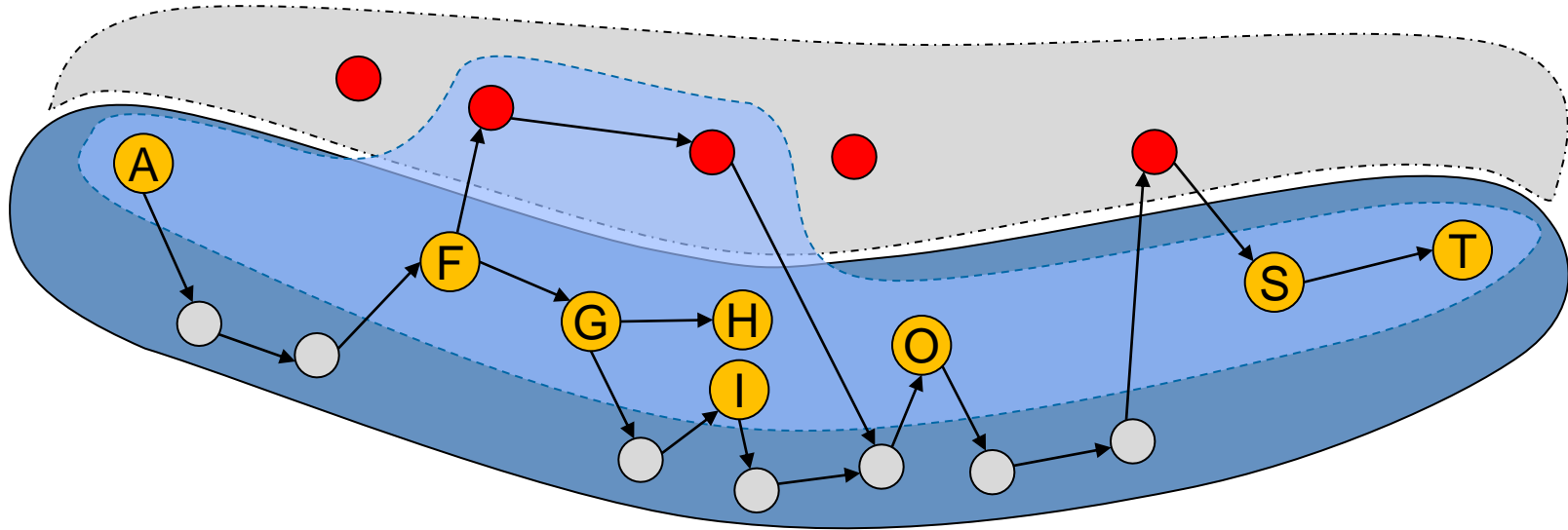Knowledge workspace   Enterprise   Inter-prise

Active nodes   Dumb nodes   External nodes

- Active node are specialists that define the process dynamics and can only have an interface to the Enterprise knowledge portals
- Dumb nodes are non specialists and are information/data pushers and these roles may be incorporated into the enterprise information systems
- External node are specialists in a sub-process level and therefore should be considered while designing the enterprise information systems

Knowledge workspace   Enterprise   Inter-prise

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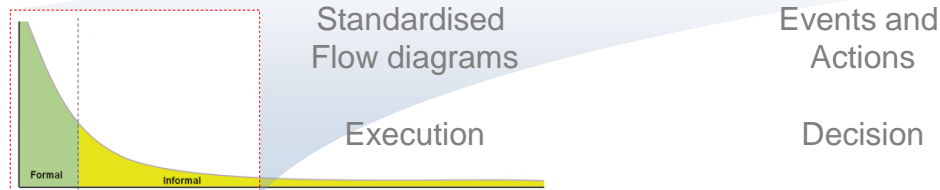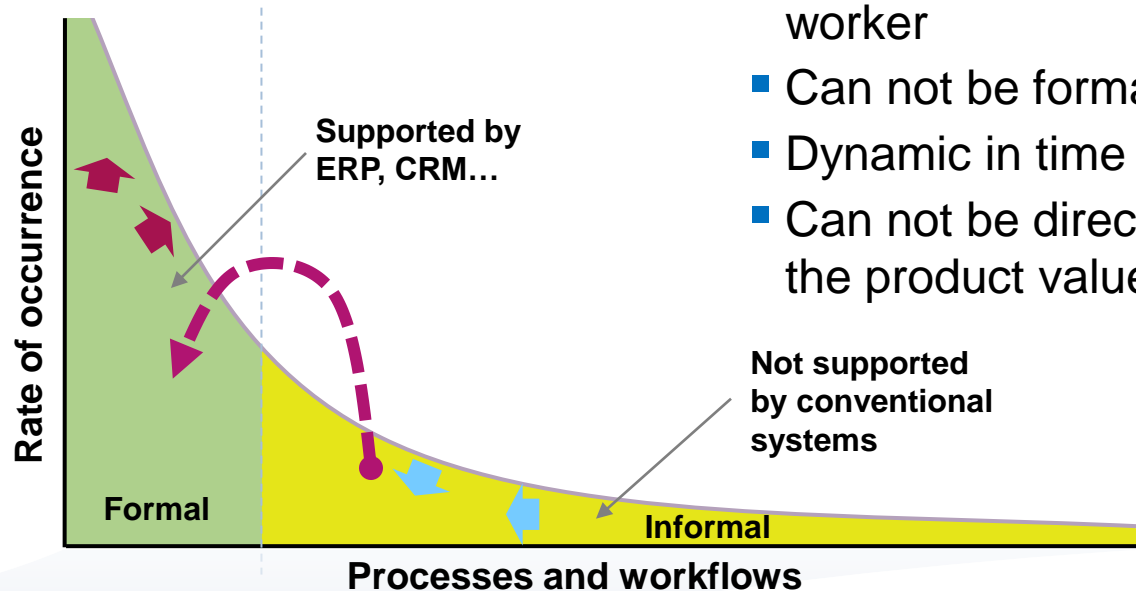
Process: Conventional perspective

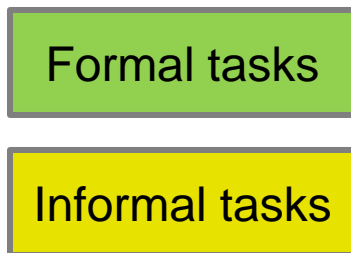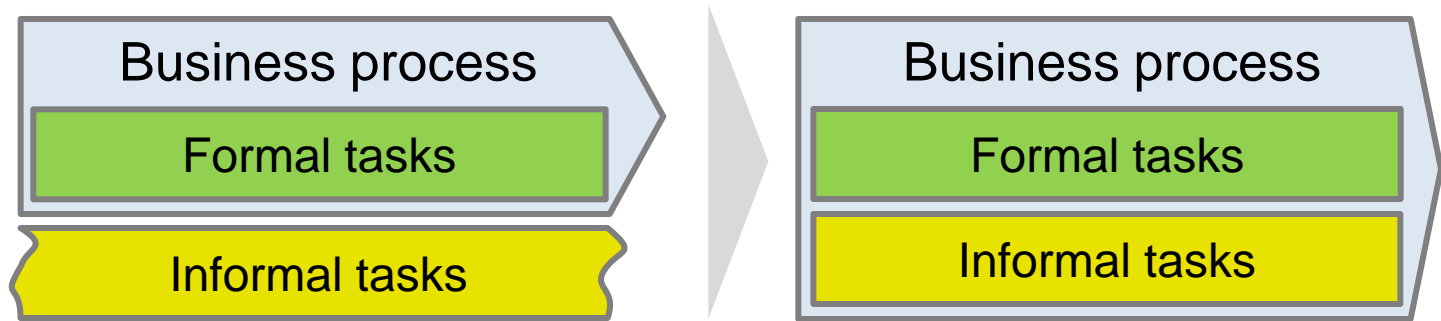- **Formal Business processes**
  - High repetition rate
  - Standardized
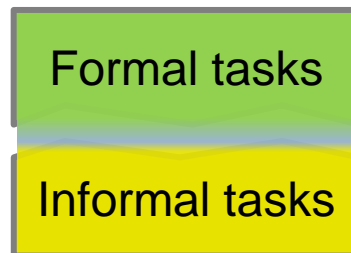 - Defined roles

- **Informal Processes**
  - Scope of user or small team
  - Repetition rate is low
  - Depend on skill, experience, and judgment of the knowledge worker
  - Can not be formalized
  - Dynamic in time and scope
 - Can not be directly traced to the product value

Supported by ERP, CRM…

Not supported by conventional systems

Rate of occurrence

Formal

Informal

Processes and workflows

Standardised Flow diagrams

Events and Actions

Execution

Decision

Process: Spectrum blend

Business process
- Formal tasks
- Informal tasks

Business process
- Formal tasks
- Informal tasks

Formal tasks	Formal tasks	Formal tasks
Informal tasks	Informal tasks	Semi-formal
		Informal tasks

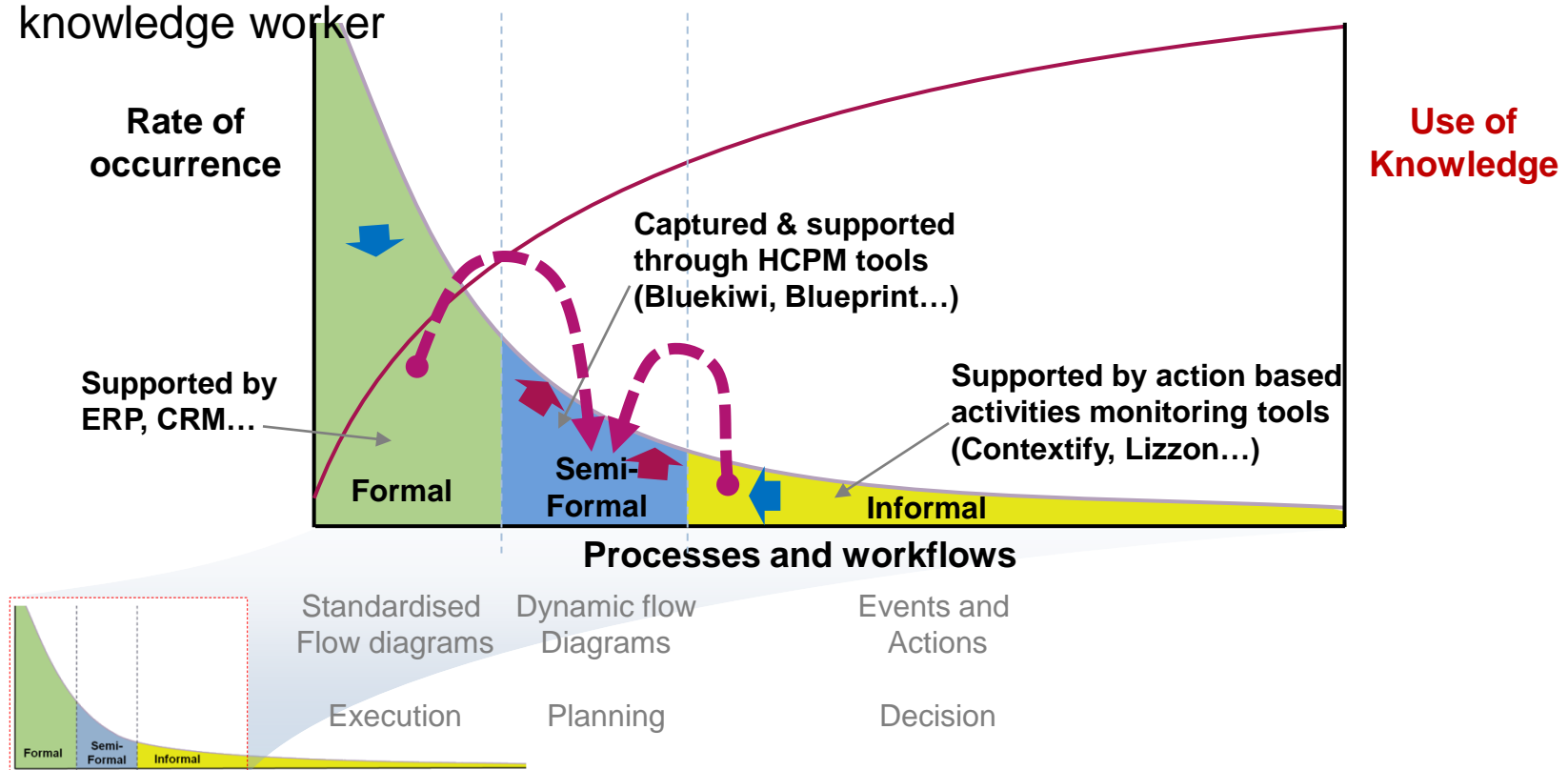Isolating the formal and informal tasks
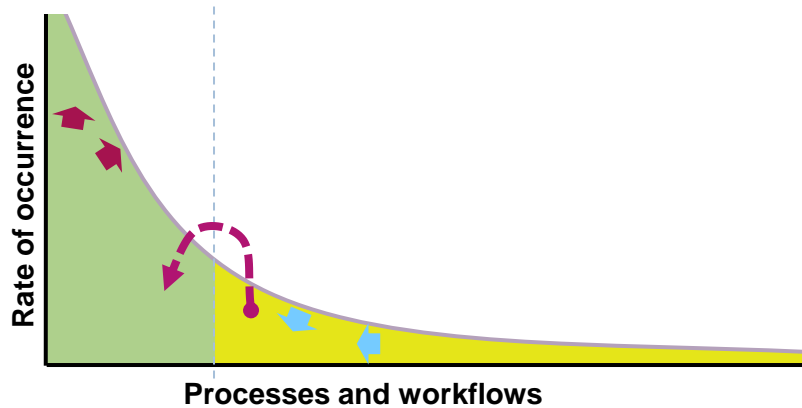
Identifying the semi-formal tasks
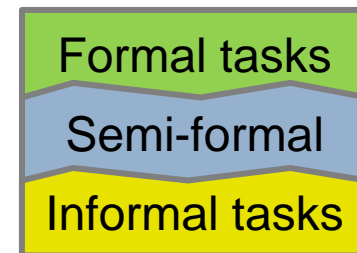
Identifying and segregate the semi-formal tasks

Process: Relevant perspective

- **Semi-formal**
  - Scope of mid to large teams
  - Repetition rate is low to medium
  - Depend on domain relevant skill, experience, and judgment of the knowledge worker

- Known sequential tasks therefore can be formalized at execution time
- Can be directly traced to the product value

Rate of occurrence

Use of Knowledge

Captured & supported through HCPM tools (Bluekiwi, Blueprint…)

Supported by ERP, CRM…

Supported by action based activities monitoring tools (Contextify, Lizzon…)

Formal

Semi-Formal

Informal

Processes and workflows

Standardised Flow diagrams

Dynamic flow Diagrams

Events and Actions
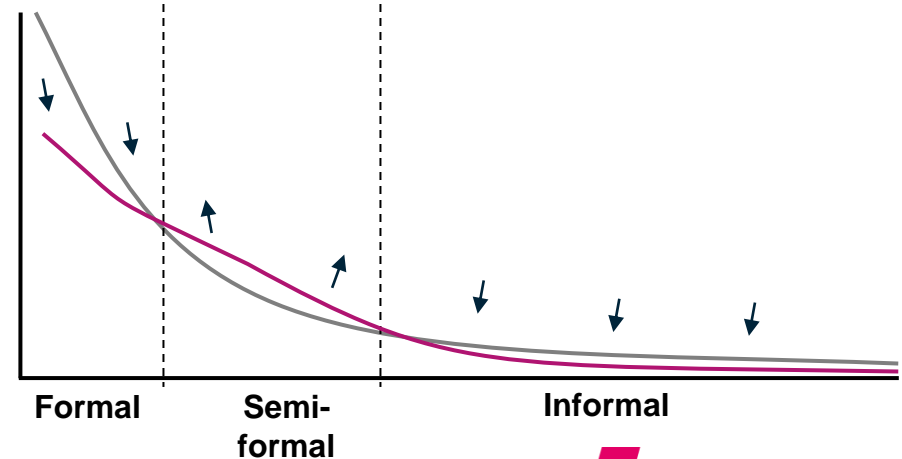
Execution

Planning

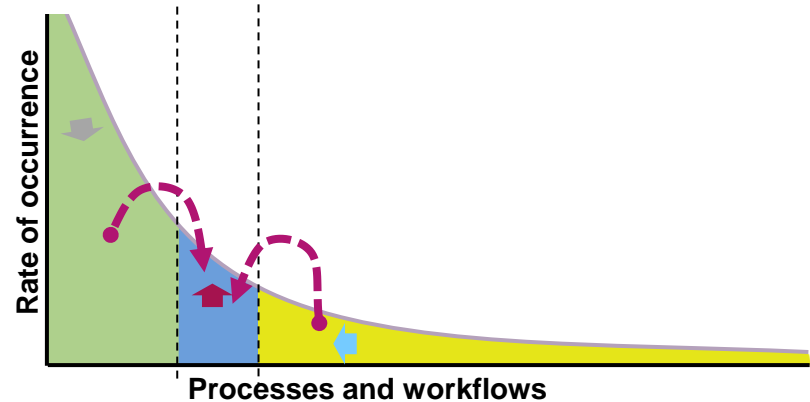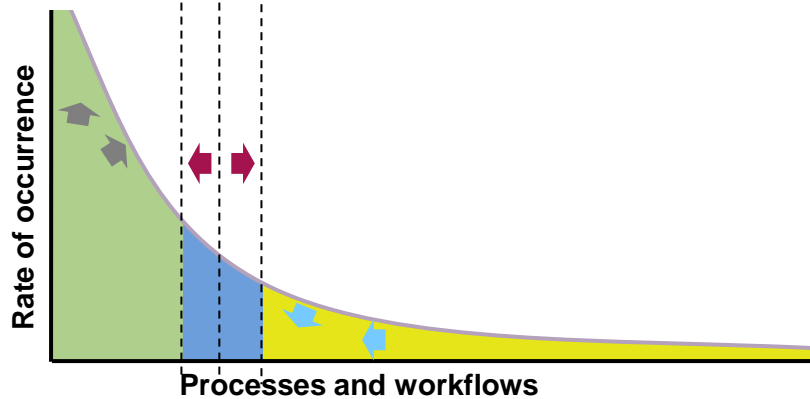Decision

Formal Business
- High repetition rate
- Standardized or fully automated
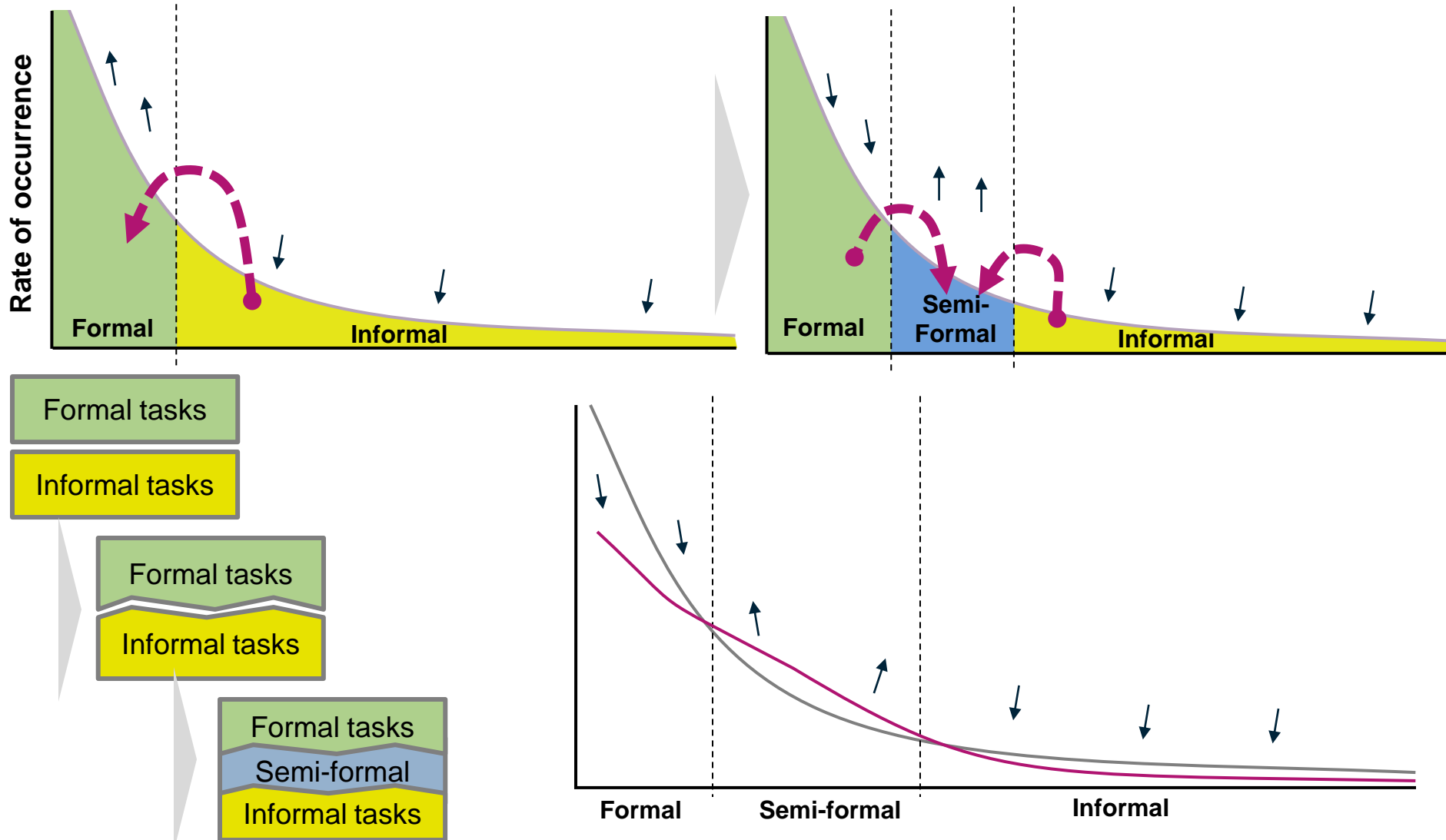- Defined roles and skills

Semi-formal
- Scope of user or small teams
- Repetition rate is low
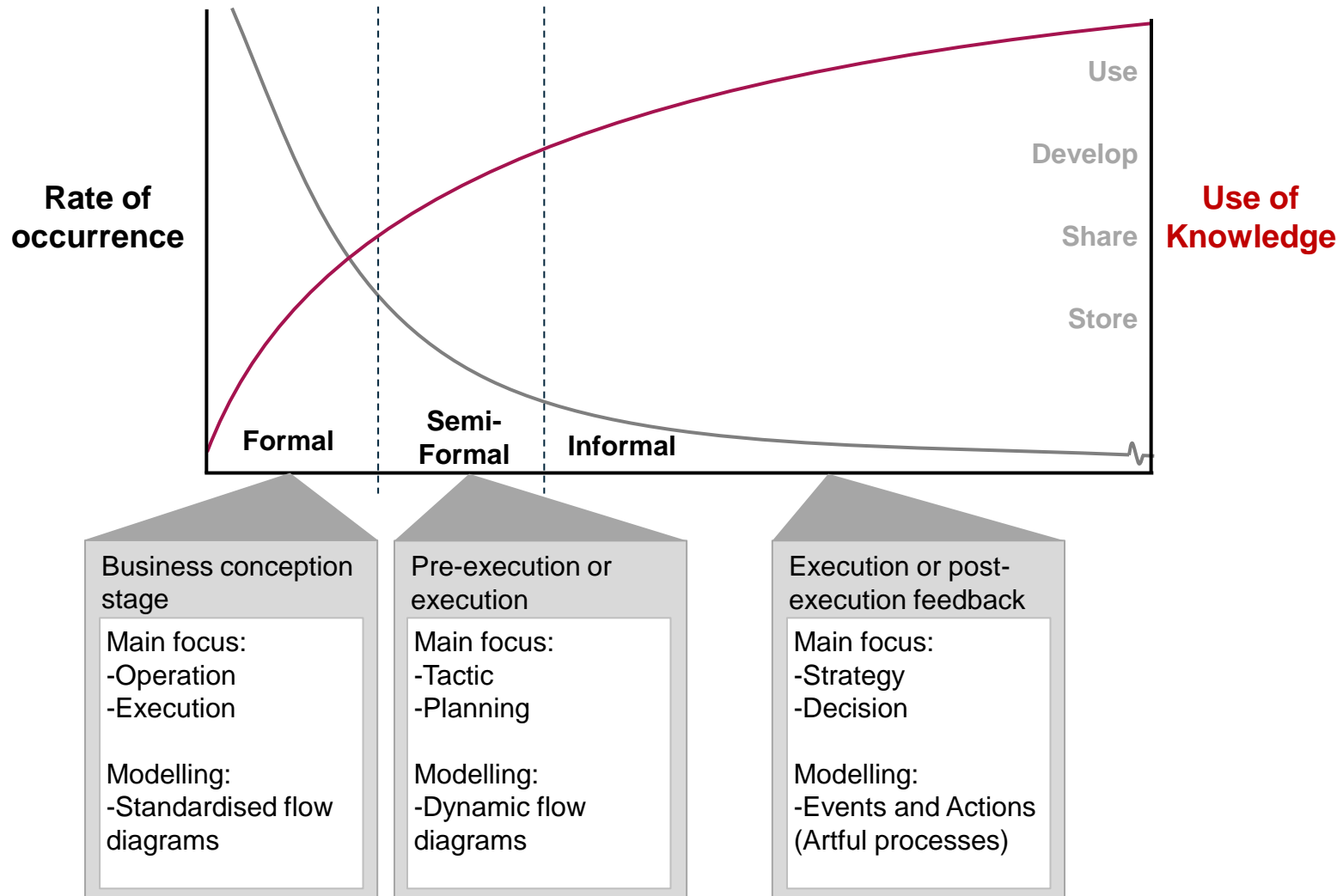- Depend on skill, experience, and judgment of the knowledge worker

Informal
- Scope of user
- Repetition rate is low
- Depend on skill, experience, and judgment of the knowledge worker
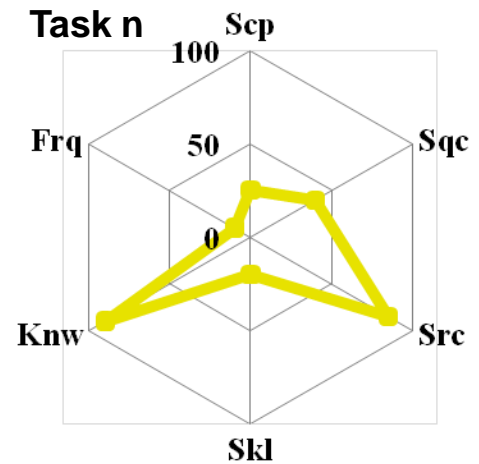
Process: consolidated overview

Rate of occurrence

Formal | Informal

Formal | Semi-Formal | Informal

Formal tasks
Informal tasks

Formal tasks
Informal tasks

Formal tasks
Semi-formal
Informal tasks

Formal | Semi-formal | Informal

Technology classification

Rate of occurrence

Use of Knowledge

Use
Develop
Share
Store

Formal | Semi-Formal | Informal

Business conception stage

Main focus:
-Operation
-Execution

Modelling:
-Standardised flow diagrams

Pre-execution or execution

Main focus:
-Tactic
-Planning

Modelling:
-Dynamic flow diagrams

Execution or post-execution feedback

Main focus:
-Strategy
-Decision

Modelling:
-Events and Actions (Artful processes)

Task Profiles

Task 1 — Scp, Sqc, Src, Skl, Knw, Frq (100 / 50 / 0)

Task 2 — Scp, Sqc, Src, Skl, Knw, Frq (100 / 50 / 0)

Task n — Scp, Sqc, Src, Skl, Knw, Frq (100 / 50 / 0)

Skl	Required Level of Skill		Scp	Scope of Task
Knw	Required Knowledge		Seq	Sequence of Activities
Frq	Frequency of Execution		Src	Need for Knowledge Sources

Aggregate   **Breakdown**

Process Profiles

- 10% ← Informal Task
- 30% ← Semi-Formal Task
- 60% Formal Task
- 100% of a Process
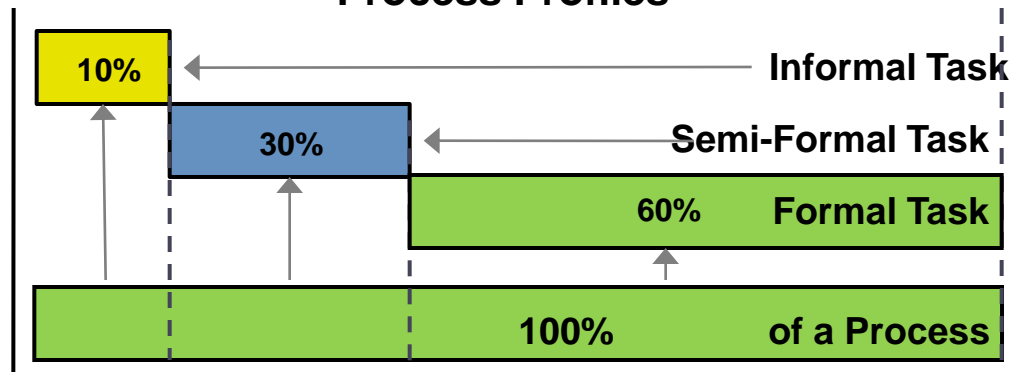
Breakdown and aggregate

Processes/Task level
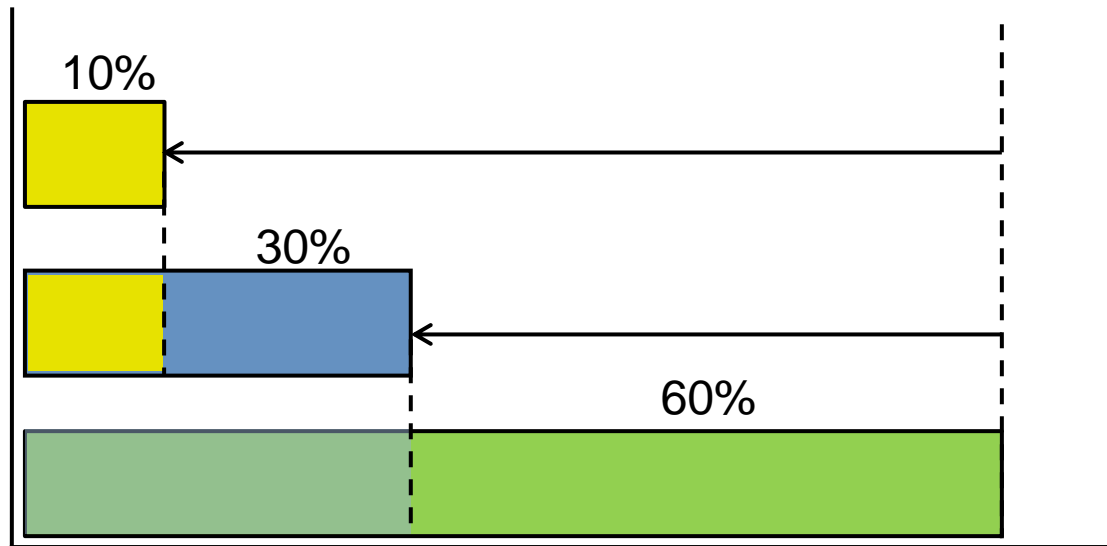
10%

30%

60%

100% of a processes

Aggregate   Breakdown

Business level

Service

Production

Project task scenarios

Scenario 1 / Scenario 2 / Scenario 3

Set and declared timeline

Expected/planned timeline

Cut-off point

Legend:
- Formal task
- Semi-formal task
- Informal task
- Task duration
- Transitional border

Research proposal FSI

Identifying calls   Setting up Teams   Sketching ideas   Writing proposal   Submitting proposal

Value estimation
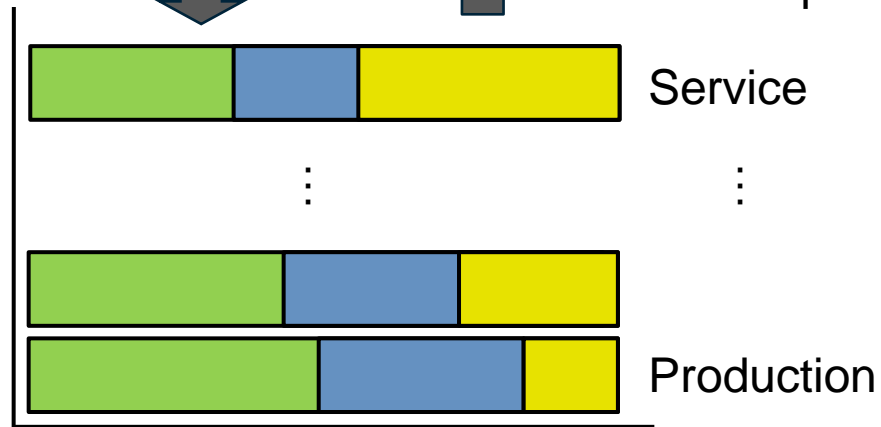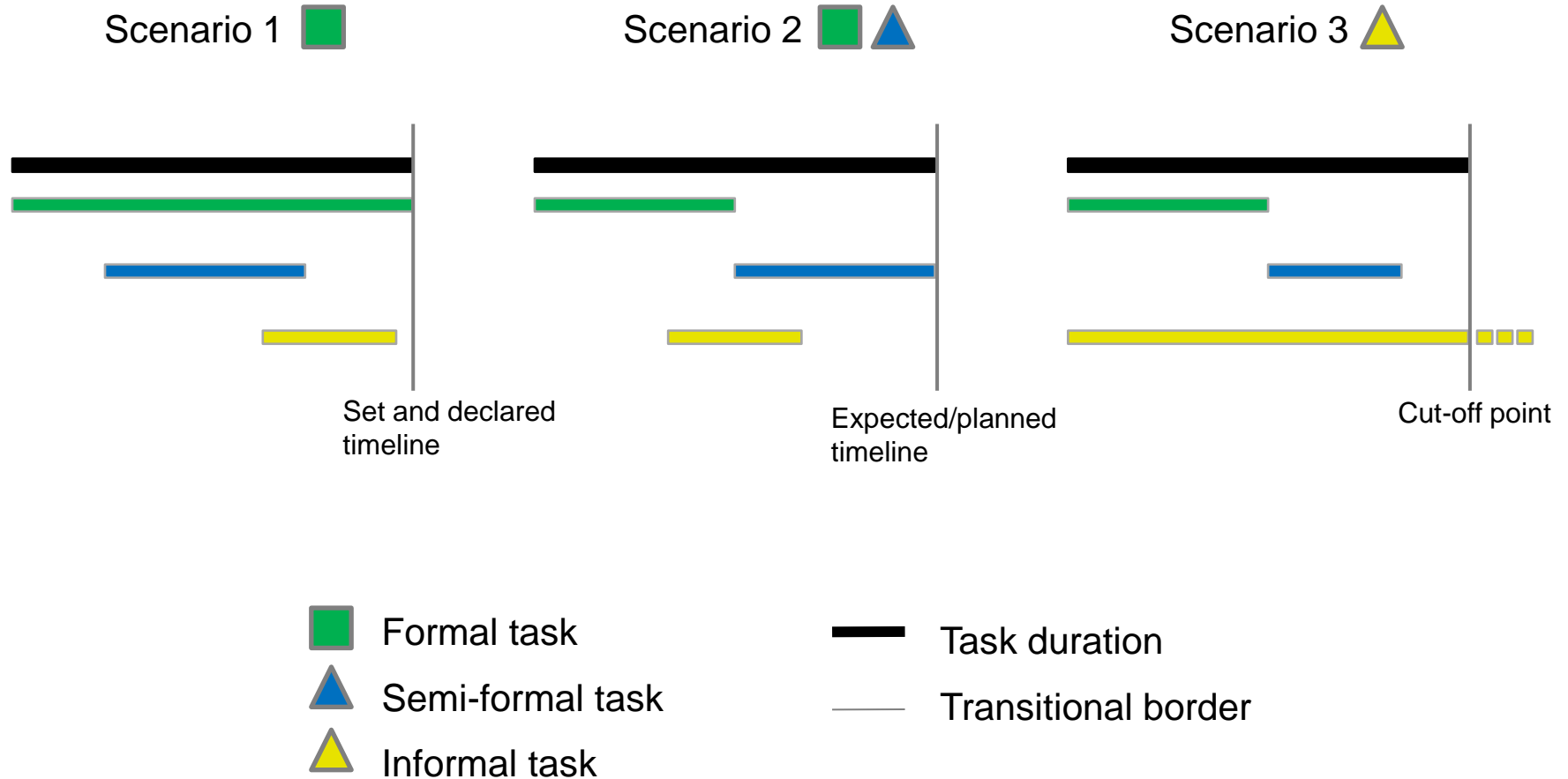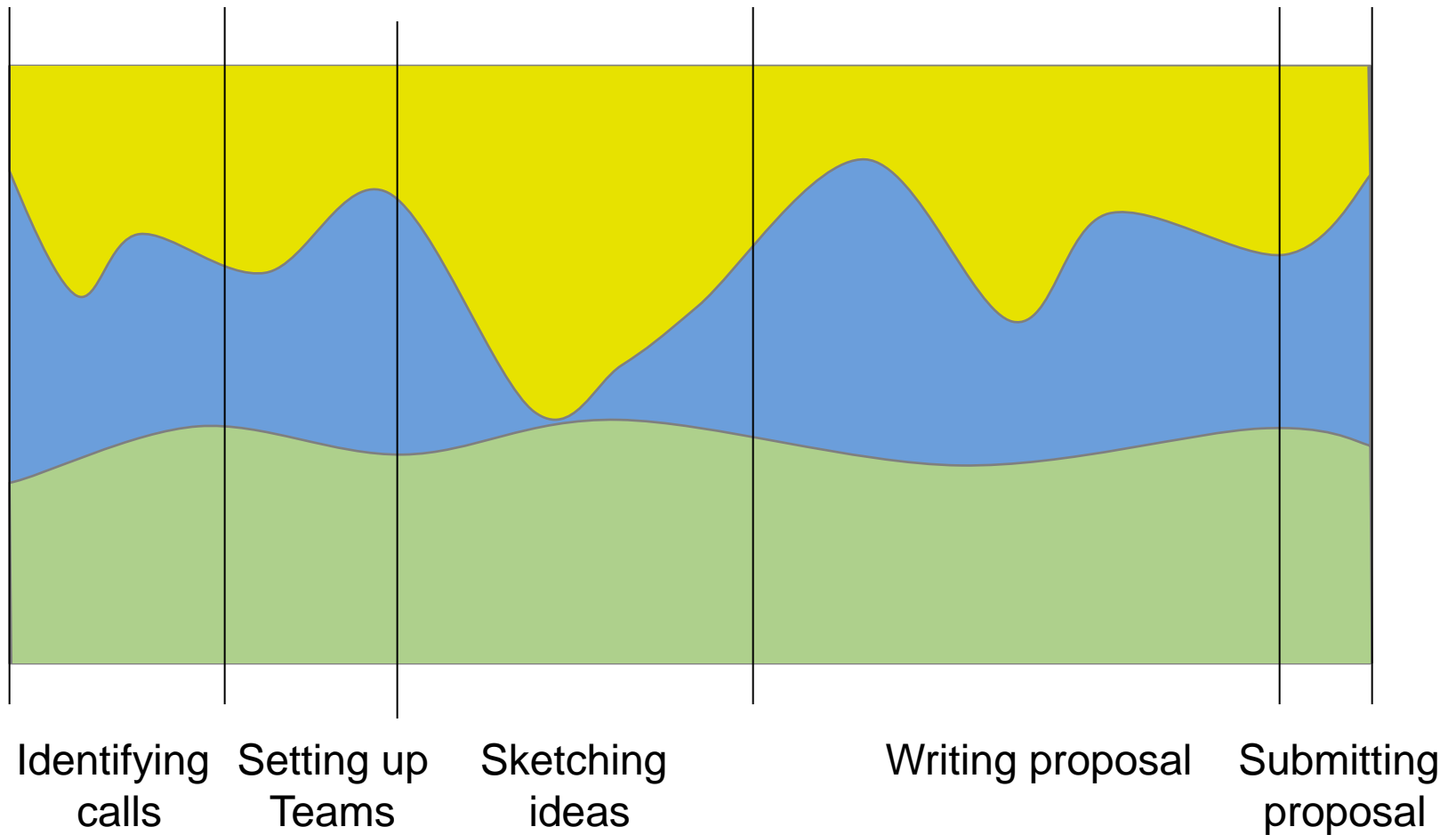
Develop estimates of cost and benefit for the different categories in the framework

- **Quantitative (Cost and Benefits meta-measures)**
  - Capital assets based direct and indirect costs and benefits (RoI)
  - Time based cost and benefit factors (booking time)
  - Productivity based costs and benefit measures* (output threshold)

- **Qualitative (Benefits)**
  - Participation and involvement'
  - Satisfaction
  - Adoption (Take-up)'
  - Innovation rate (Success rate*)
  - Privacy
  - Autonomy
  - …

Quantitative aspect:
Cost= Investment*
Benefits = savings

Qualitative aspect:
Cost= Negative impact
Benefits = Positive impact

Value based on end user and economic measure for organization

Cost and benefits

| Private	Wider economic	Wider community	Wider social
Private costs are the resource costs	Non-appropriable private	Educated citizens	Pseudo externalities
Private benefits include:	Externality	Informed democracy and freedom of expression	Asset price changes (if already captured under private cost-benefit)
(i) Saving time doing what one would do anyway	Security and Policy	Cultural understanding	
	Network effect		Employment effects "Competitiveness"
(ii) Doing more of existing things	Competition in domain	Belonging to a community and inclusion	
(iii) New things and transformations	Resilience, adaptability and policy options	Privacy	
	Excess burden of options	Social capital, resilience and trust	

Two thoughts

"Visionary leaders run the risk of overriding the ideas of the brilliant people around them."
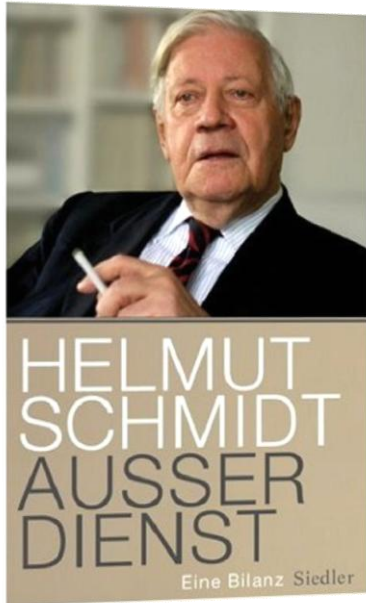
Changing the culture by facilitating the use and adoption of the technology.

"People who have a vision should go see a doctor."

"At any Cost!"

Organizational consideration
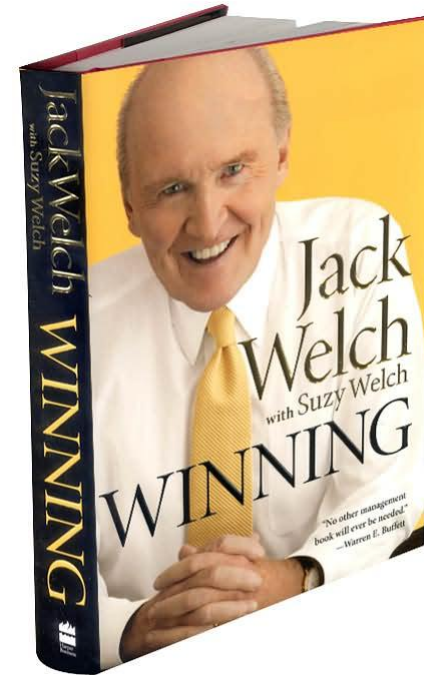
"All perspectives considered"

- Complex business structures
- Size of the companies
- Age of the company
- Different leadership styles
- Average knowledge worker's age and education level (gender)
- Density ratio of the knowledge worker per completed transaction
- Deadline driven workflows and teams
- Adaption of current and future IT infrastructure
- Collaboration opportunities and channels

System consideration

- Provide content at the launch of the community
- Stage the roll-out of the incentive mechanism and plan ahead for revisions
- Moderate and governance through management
- Monitor and evaluate over time
- Encourage users to tailor their functionality
- Take account of the domain and context of use
- The role of empathy and trust and its relationship with motivation

"All perspectives considered"

Some Statistics

Increases Work Performance

- Incentive programs increase work performance an average of 22%.
- Team-based incentives are credited with improving performance by 45%. - Source: The Incentive Research Foundation, 2002.

Recognition is a Strong Motivator

- A survey of over 2,000 workers has found that 80% of employees said that praise and recognition motivates them to do a better job. - Source: Gallup, 2006
- 74% of employees say that being recognized by their managers for doing good work is very or extremely important. Source: Nelson, 2006

Rewarding Employees

- The use of rewards was the single highest predictor of "organizational climate," which in turn had a direct correlation with financial results. - Source: Harvard Business Review 2000
- Companies that reward their employees for being innovative increase their revenues by 2.5% and their profit margins by 2%. Source: IBM Global Business Consulting CEO Survey, 2006
- 50% of companies reward their employees with gifts for prizes at their farewell party with only 27% reward and recognise a job well done during their employ. - Source: Red Balloon Day, Australian Pleasure Survey, 2004

'Engaged' Employees

- Active reward and recognition programs and strong communication channels are seen to be of greater benefit to employees than increases in salary, additional training, and bonuses. - Source: Yahoo Finance, 2005
- A survey of 1,500 Australian workers revealed that 20% of employees are 'actively disengaged' at work with an estimated cost to business of A$31.5 billion.
- Less than 30 per cent of actively disengaged employees are planning to stay with their current employer over the next 12 months. In contrast, only 18 percent of Australian workers are 'engaged' – working with passion and feeling connected to their employer – and delivering high levels of productivity, profitability and customer service. - Source, Gallup Organisation, 2005
- 85% of employees say their morale declines significantly after spending six months on the job. - Source: Sirota Survey Intelligence, 2007

Best organizational incentive

- A good running system!

Don't be…

Best individual's incentive

- A good running system!

Don't be…

Meda ase!

fir at **RWTH AACHEN**

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Ali Imtiaz

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