

# Project Management Research in SINTEF



A brief introduction to our research initiatives  
- past, present and future

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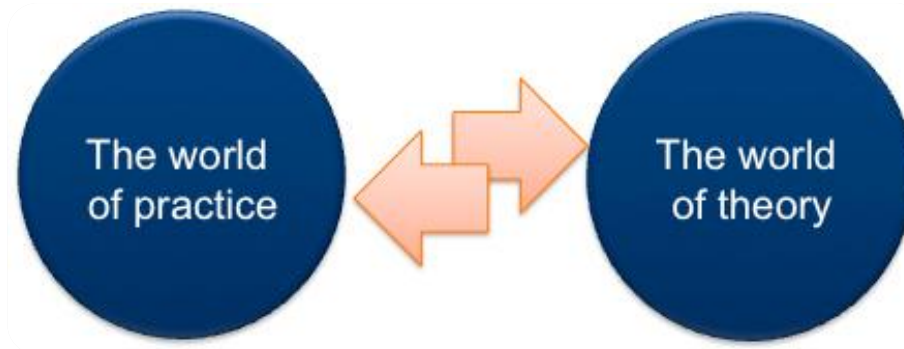
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# Roadmap

- Our main strengths
- Some snapshots of Project Management Research
  - What we currently are doing
  - What we have done
  - What we want to do
- Our ambitions
- Large, complex investment and construction projects
  - Research examples

# Why doing research on Project Management?

- Relatively young profession
- Popular work method in knowledge based industry
- The preferred work method for large and complex investment undertakings
- Increasing number of organisations are embracing the principles of "Managing Business by Projects"
- Examples of challenges:
  - Cost and time overruns
  - Interorganisational communication and collaboration
  - Knowledge management and learning organisations



Our main strengths

# Competence and Diversity

Completed PhD studies:

- The choreography of knowledge: Methods and their influence in knowledge-based firms (Eva)
- An agent-based approach to support the formation of virtual enterprises (Sobah)
- Project Flexibility in Large Engineering Projects (Nils)
- Improving punctuality in railway maintenance – Developing of a punctuality improvement process (Mads)
- Process analysis and monitoring in complex perioperative environments – Health operation management (Andreas S)
- The role of knowledge transfer in reducing "reinvention of the wheel" in project organizations (Siva)
- Benchmarking results and a benchmarking process model (Bjørn)

Our main strengths (cont.)

# Competence and Diversity

PhD studies in progress:

- Knowledge dimension of manufacturing strategy (Bjørnar)
- Requirements Engineering for Adaptive Manufacturing Systems (Catrine)
- Where is the knowledge we have lost in information? A study on communication and information quality in interorganisational project processes (Alexander)
- Effects of up-front assessment and quality assurance of major investment projects (Ole M)
- Uncertainty management seen from the perspective of project owner – focusing on managing the delivered functionality (Hans Petter)
- Technology for project management of research - A study of cooperation arenas in international R&D projects (Linda)

# The Research Projects

## - A snapshot of what we are doing

- Norwegian Center of Project Management (NSP)
  - New ISO standard in PM
  - Agile project management methods
  - Practical uncertainty management viewed from the perspective of project owners (PUS project)
  - PM Terminology on web (ProjectWiki)
- Early warning signs in complex projects
  - PMI
- CONCEPT
  - Front end quality assurance of large investment projects in Norwegian Public Sector
- Independent improvement efforts and support activities related to the Quality Assurance regime

What is

# Norwegian Center of Project Management?

- Joint collaboration between Norwegian industry and public sector for advancement and development of knowledge within Project Management
- Funded by the member organisations
- Main purpose: Knowledge creation and knowledge distribution activities:
  - Research initiatives
  - Networking
  - Seminars for research dissemination and sharing experience

■ More information:

**[www.nsp.ntnu.no](http://www.nsp.ntnu.no)**

# The Research Projects

## - A snapshot of what we have done

- Project 2000 Research Programme
- CoDisCo (Connecting Distributed Competencies)
- Theme: Management By Projects
  - Virtual Projects
  - Handling Project Stakeholders
  - Work environment and Burnout in Project organisations
  - Private Public Partnership
- Theme: Project Control
  - Efficient project start-up
  - Developing practical tools and methods to be used in projects
- Theme: Knowledge Management in Projects
  - KnowMaP



# The Research Projects

## - A snapshot of what we want to do

- Large and complex projects
- Learning and knowledge transfer in project enterprises
- Uncertainty management in projects
- Estimation, budgeting and cost control
- Agile project management methods
- Project enterprises in a complex and dynamic world
- Managing and organising project enterprises

# Our ambitions

- Establish a Centre for Research based innovation (SFI) within project management
- Develop and carry out international PM research initiatives
- Build international networks and establish durable relations
- Exchange of PhD students, master students and researchers

# Large, complex investment and construction projects

## Roadmap

- What makes projects complex?
- Examples of how we have addressed this issue through our research

# What makes projects complex?

# St. Olav Hospital and it's history

- The hospital has existed for more than 100 years. Opened in 1902.
- Became a regional hospital in 1974, and named RiT (Regional hospital in Trondheim)
- A new university hospital was planned in 1991, and then approved by the Parliament in 1993.
- The final concept is decided in August 1995, and detailed development planning starts
- Development plan is completed in 1996 and approved by the Parliament in 1997
- The challenge: to construct a new hospital on the same premises as the old, while the old maintained operation as normal
- Resituation debated just as construction was about to commence
- Phase 1 completed in 2006
- Phase 2 to be completed in 2013



# St.Olav Hospital



# Melkøya

## - From concept...



After early phase engineering studies

# ...to operation



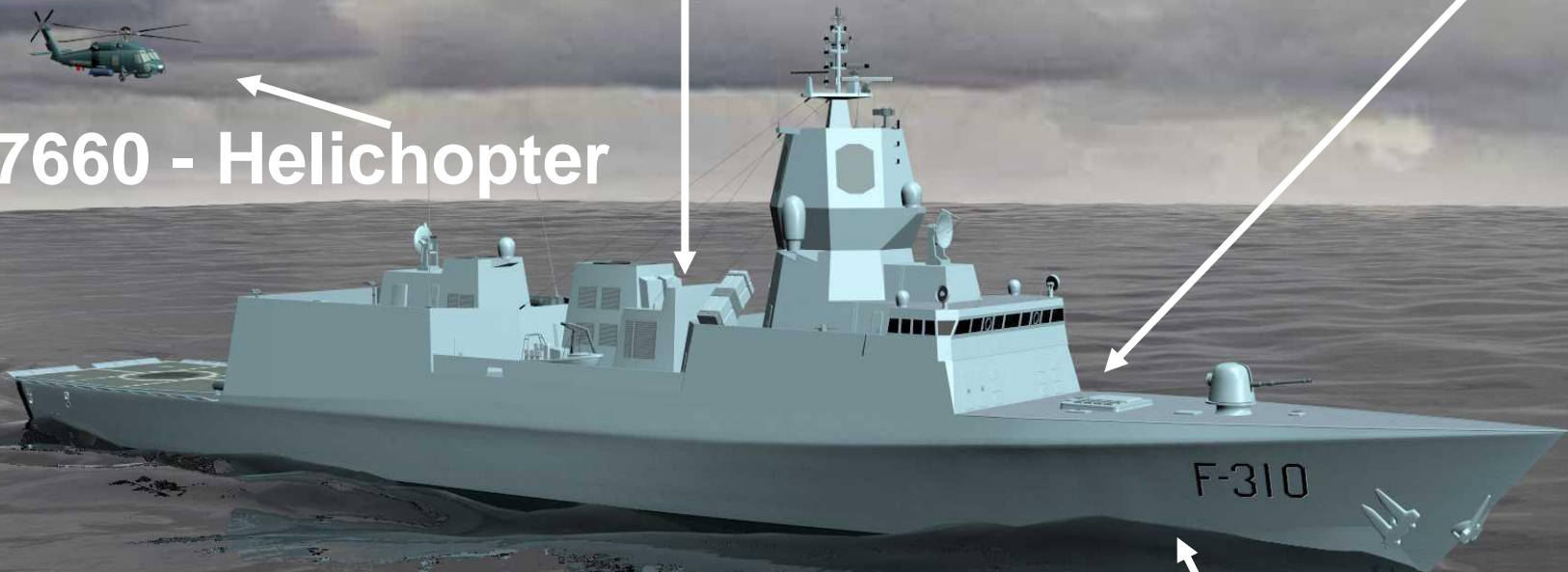


# Project New Frigates

P 6026 – New Seamissiles (NSM)

P 6191 - ESSM

P 7660 - Helicopter



+ Onshore  
infrastructure

P 6088 - New Frigates

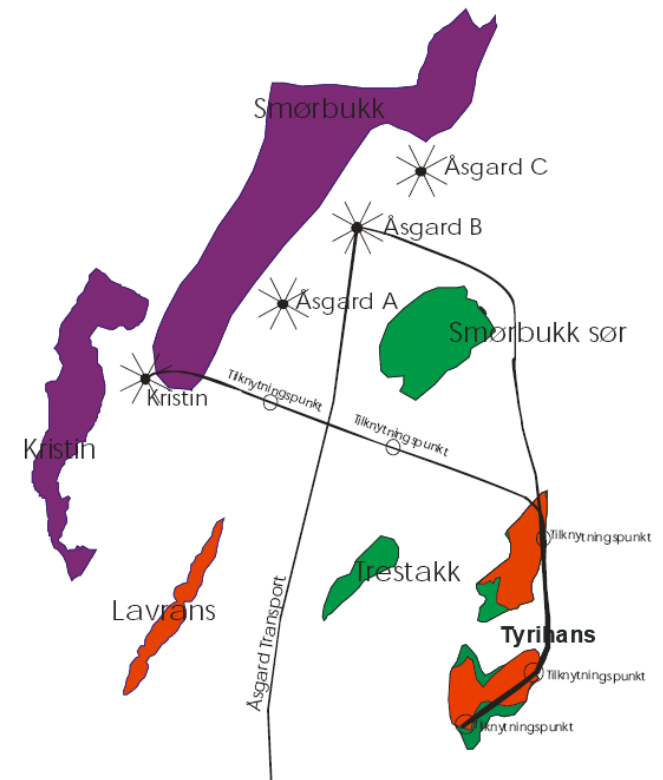
# Tyrihans

## ■ Technological solution

- Subsea production using subsea templates
- Operated from Kristin
- Gas injection from Åsgard B to maintain pressure

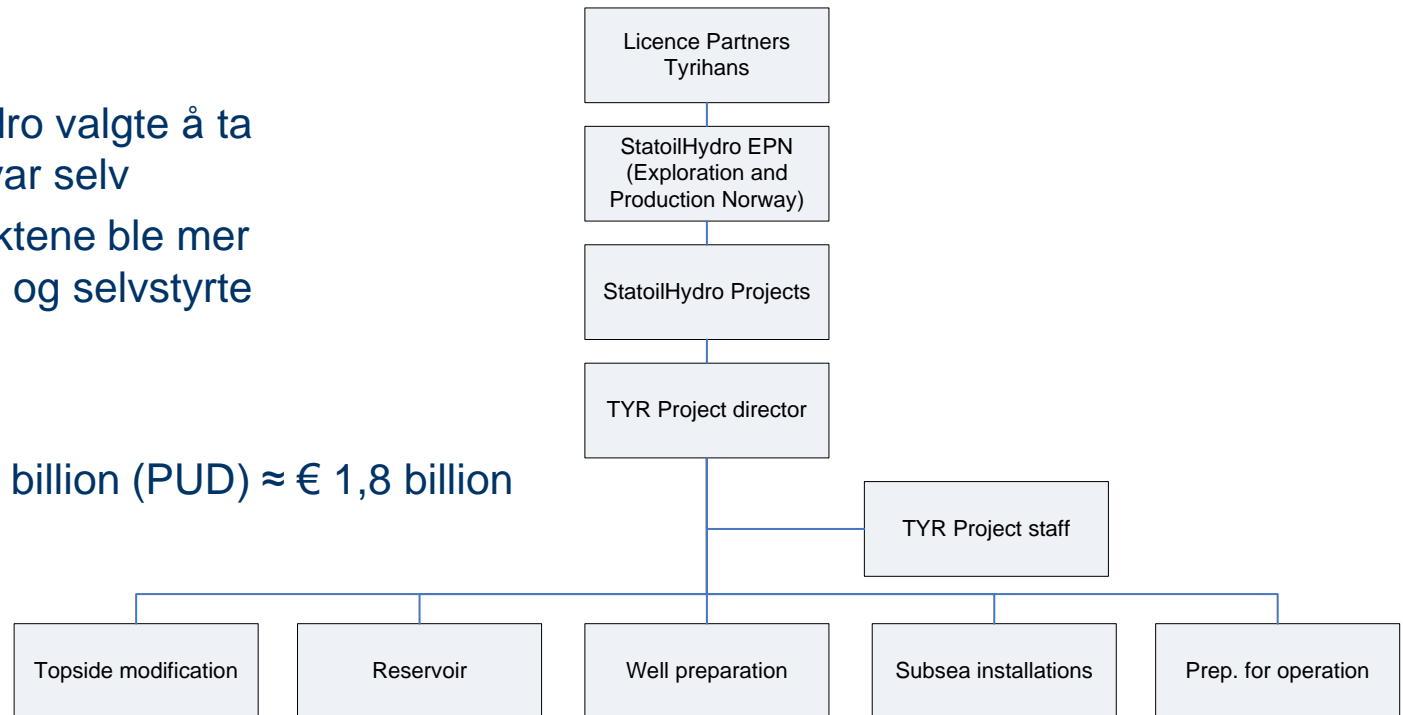
## ■ Facts

- Oil, gas og condensate (29,3 mrd Sm<sup>3</sup> gas, 29,0 mill Sm<sup>3</sup> oil og 5,3 mill tonne condensate)
- Depth: 285 m

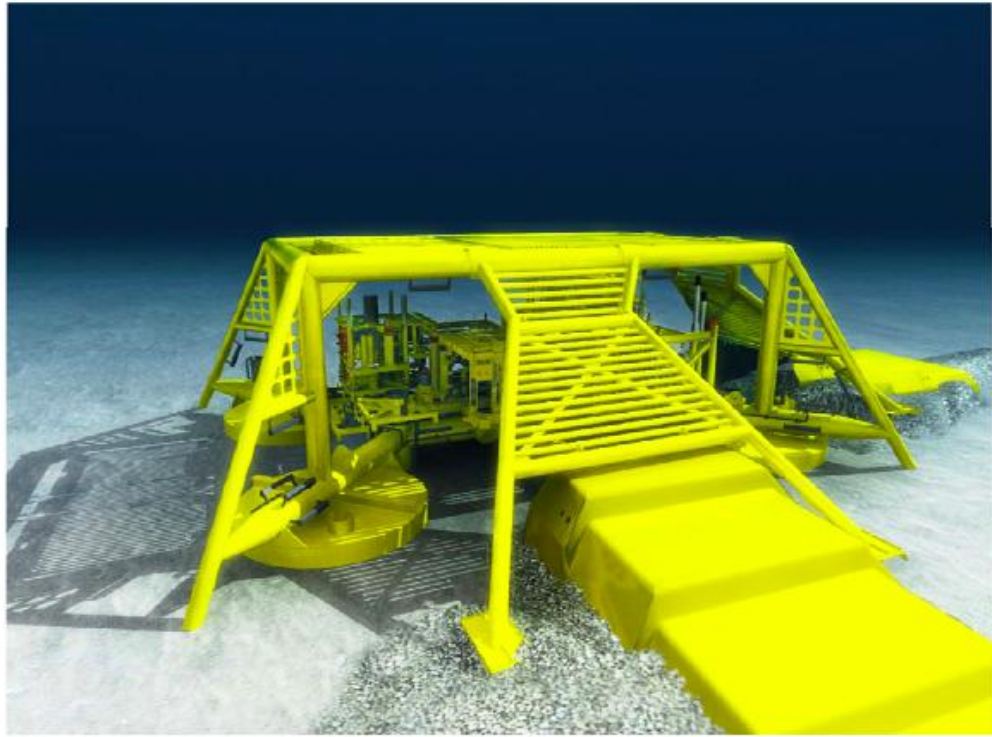
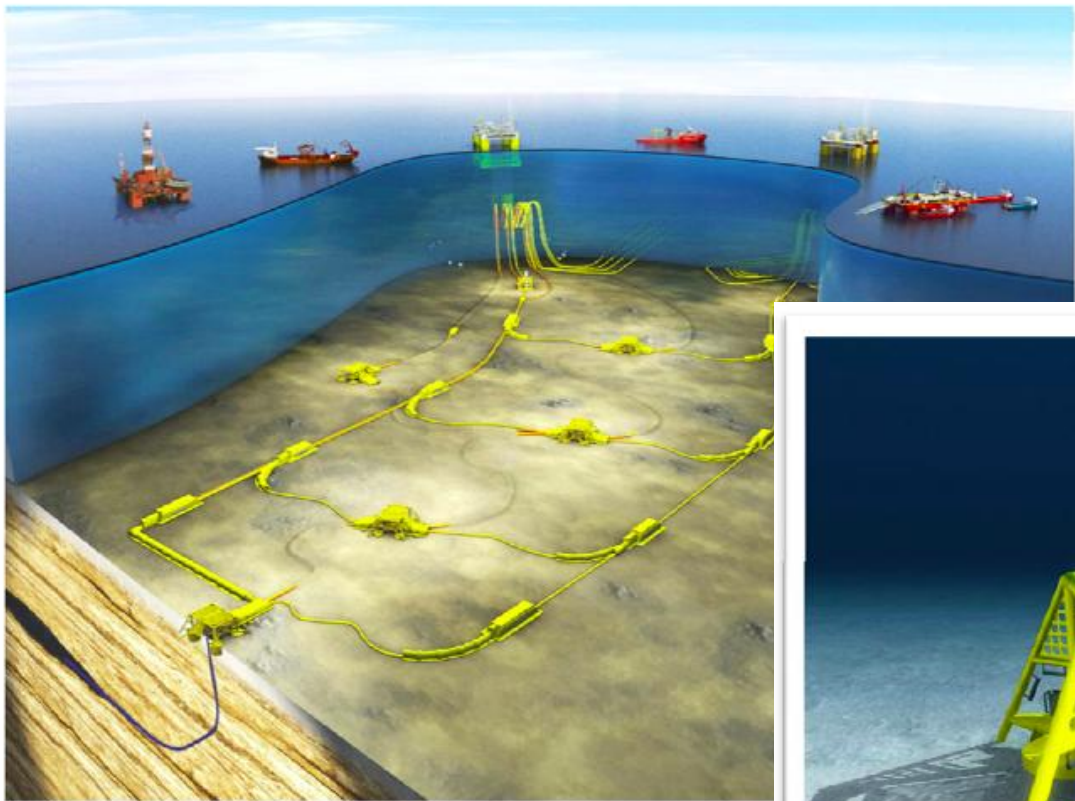


## Characteristics

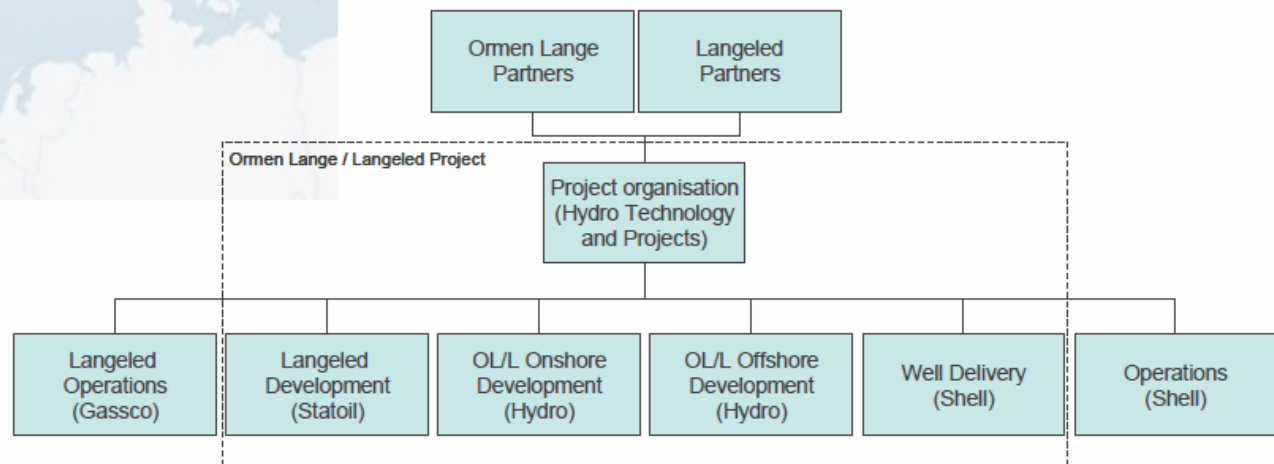
- Involved organisations
  - App. 100 organisations
  - App. 5 000 employees
- Organisering
  - StatoilHydro valgte å ta EPC-ansvar selv
  - Delprosjektene ble mer autonome og selvstyrte
- Cost:
  - NOK 14,5 billion (PUD)  $\approx$  € 1,8 billion



# Tyrihans



# Ormen Lange / Langeled



# What makes projects complex?

- Complexity of scale
- Complexity of organisation
- Complexity of innovation and technological solution

# Why focusing on complex projects?

- Contribute to the development of project management practice of the future
  - From research on the lifecycle model of projects and project management to theories of **complexity of project management**
  - From projects as instrumental processes to project as **social processes**
  - From product creation as the prime focus to **value creation** as the prime focus
  - From narrow conceptualization to **broader conceptualization** of the projects
  - From practitioners as trained technicians to practitioners as **reflective practitioners**

Ref: The research network on Rethinking Project Management funded by the UK government's funding agency Engineering and Physical Sciences Research Council (EPSRC) highlights the need for future research in project management in the following directions (Guest editorial, International Journal of Project Management, 2008, page 466):

- Capture and visualise good practice that has not been documented yet.

# We have already addressed elements of complex projects

Some examples:

- PUS – Uncertainty management in a project owner's perspective
- Collaboration and interaction in offshore value chains



# Where is the knowledge lost in information?

- A study on information quality and communication in interorganisational project processes
- Background and motivation
  - The offshore industry express their frustration of ineffective collaboration and reduced efficiency due to communication problems
  - Extensive investments have been made in information technology
  - Overwhelming amounts of information is gathered for each project
- What if we take a closer look at the role of information and communication in interorganisational processes?

Why is communication important for organisations?

# COMMUNICATION



# Characteristics of Successful Projects

- Executives show passionate support
- Dedicated teams
- Alignment behind common vision
- Impacts of change clearly established
- Accountability/Responsibility
- View change as an on-going process
- Use metrics and incentives to drive desired behaviours
- Undersell, over-deliver
- Tendency toward common ground

Kilde: PRINCE2

# Characteristics of Unsuccessful Projects

- Lack of sustained leadership commitment
- Constant competition for resources
- No clear goals, vision or strategy
- Unclear how project will alter jobs, processes, etc.
- No consequences
- See change as an event
- No alignment of measurement and reward system with target outcomes
- Lots of "transformation talk"
- Clear winners and losers

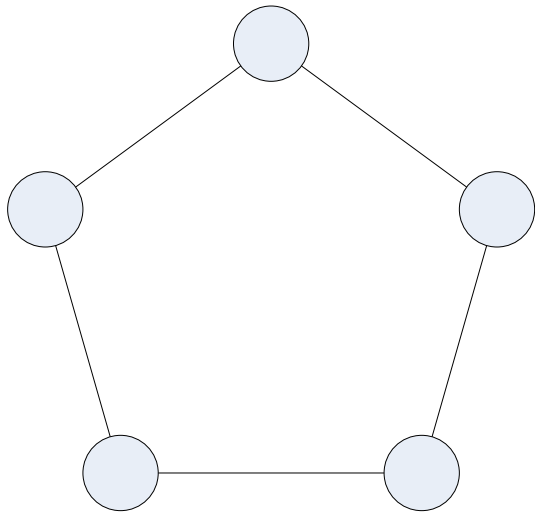
Kilde: PRINCE2

# Why communication is important for organisations

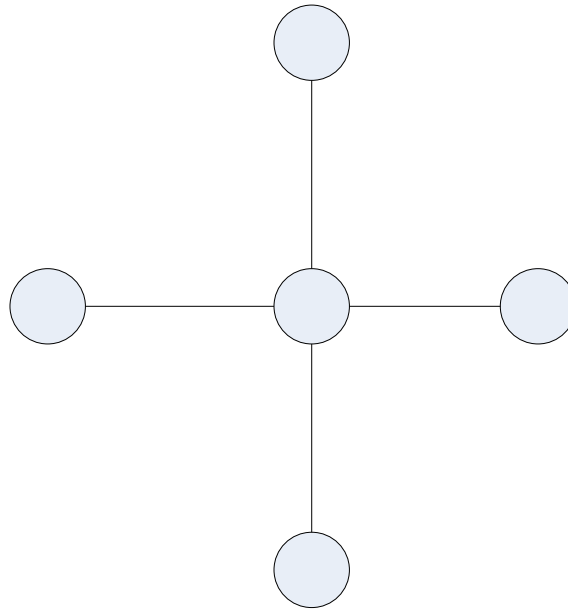
Organisations use communication to:

- Motivate employees
- Create and maintain transparency
- Knowledge creation, knowledge distribution and education
- Carry out their assignments (communicate decisions, coordinate activities, inform partners)
- Develop and reinforce organisational cultures

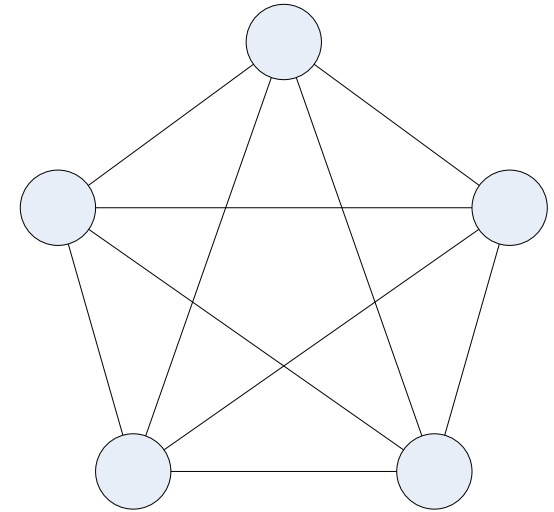
# Communication structures



"The Circle"



"The Wheel"



"All channels"

# Communicator roles

- "Gatekeeper"
  - Controls all messages passing through a communication channel
- "Liason"
  - Connects different units and groups together without being a part of either parties
- "Cosmopolitan"
  - Communicates with the external environment and distributes this information internally
- "Opinion maker"
  - Influence the attitude and perceptions of the employees

# Multiple simultaneous trends

- Increasing focus on core competencies and increasing use of outsourcing
- Increasing focus on knowledge based organisations and knowledge economy
- Escalating innovation within information technology



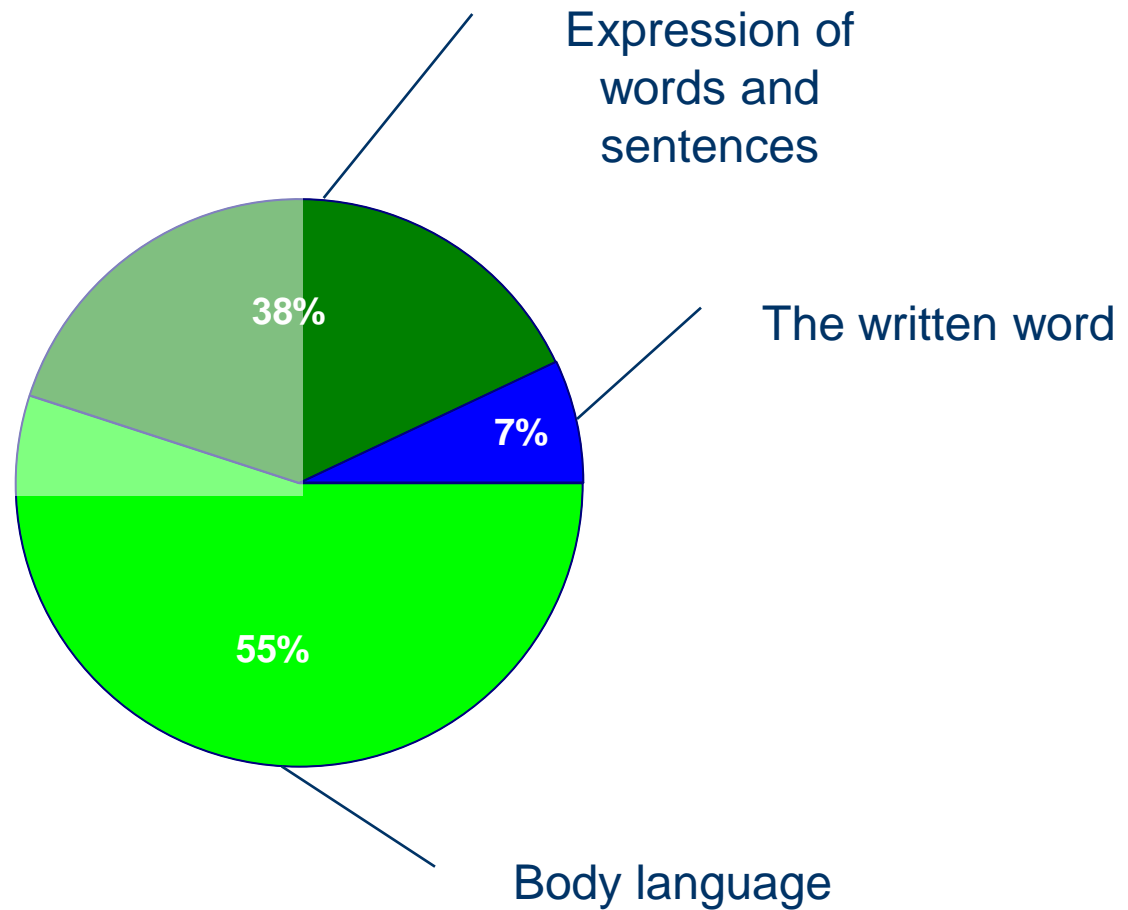


# The information society

- We are headed for the information society where we all become **information producers**
- Which consequences will occur as we increasingly base our existence on written electronic information?



# How is meaning conveyed?



Jacobsen & Thorsvik (2002)

An essential clarification

# Data, information og knowledge

## ■ Data

- specific, objective facts or observations
- Has no intrinsic meaning

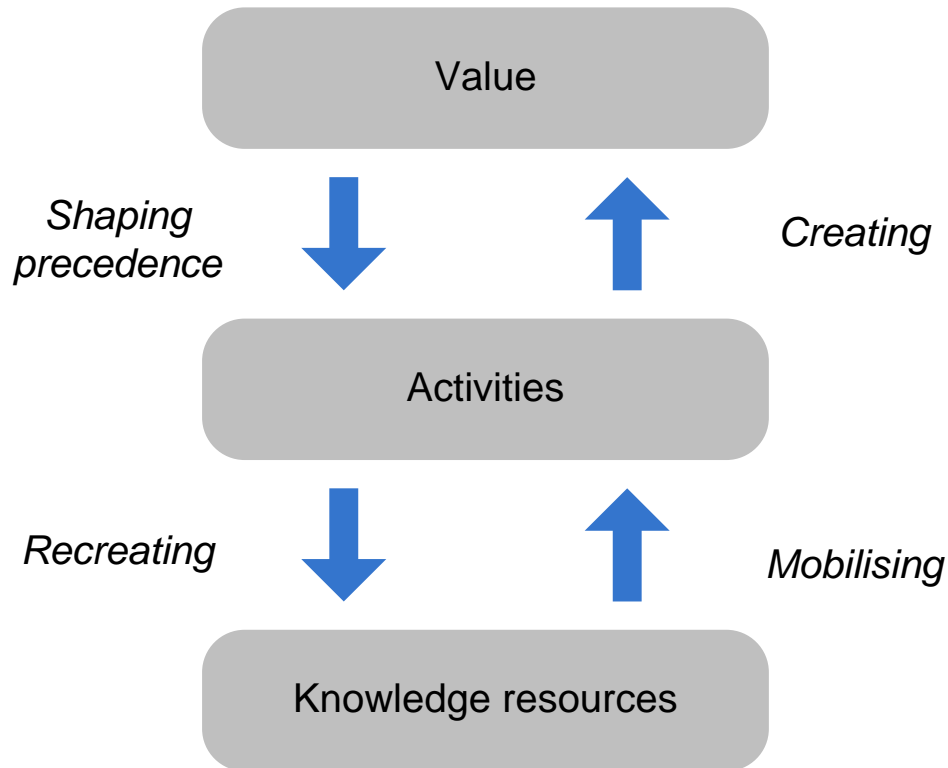
## ■ Information

- A collection of data that is combined to provide a deeper meaning or meet a certain purpose

## ■ Knowledge

- A mixture of contextual information, experiences, rules, guidelines and values

# Knowledge is all about activation...



Carlsen et al (2004)

# The trends are reinforced in projects

- Temporary organisation
- Large fluctuations in manning over time
- Complex organisation
- Considerable investments in ICT
- Large amounts of information are produced and distributed in a short time span

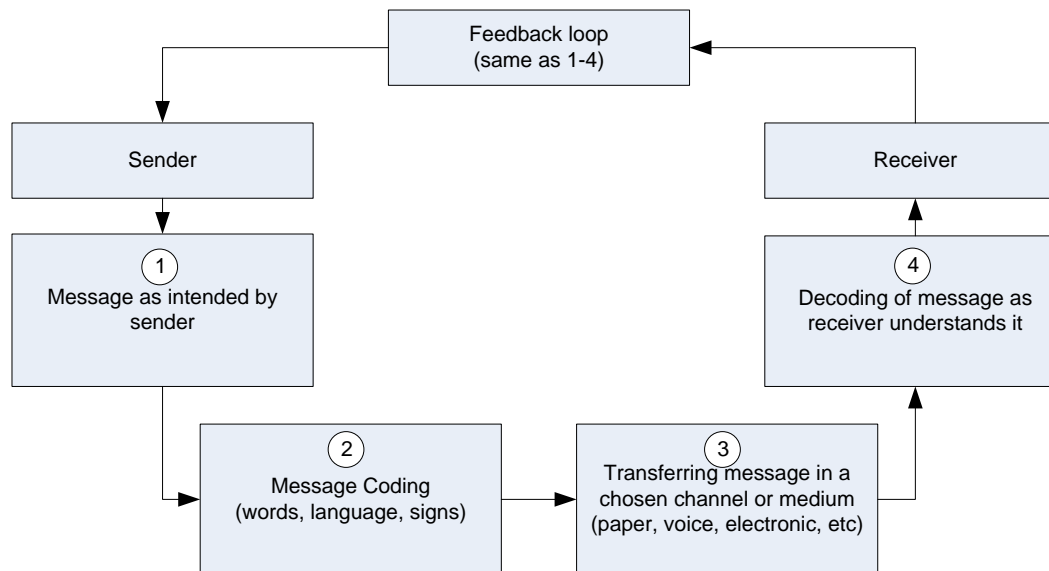


# Why is information important?

It is an important element of:

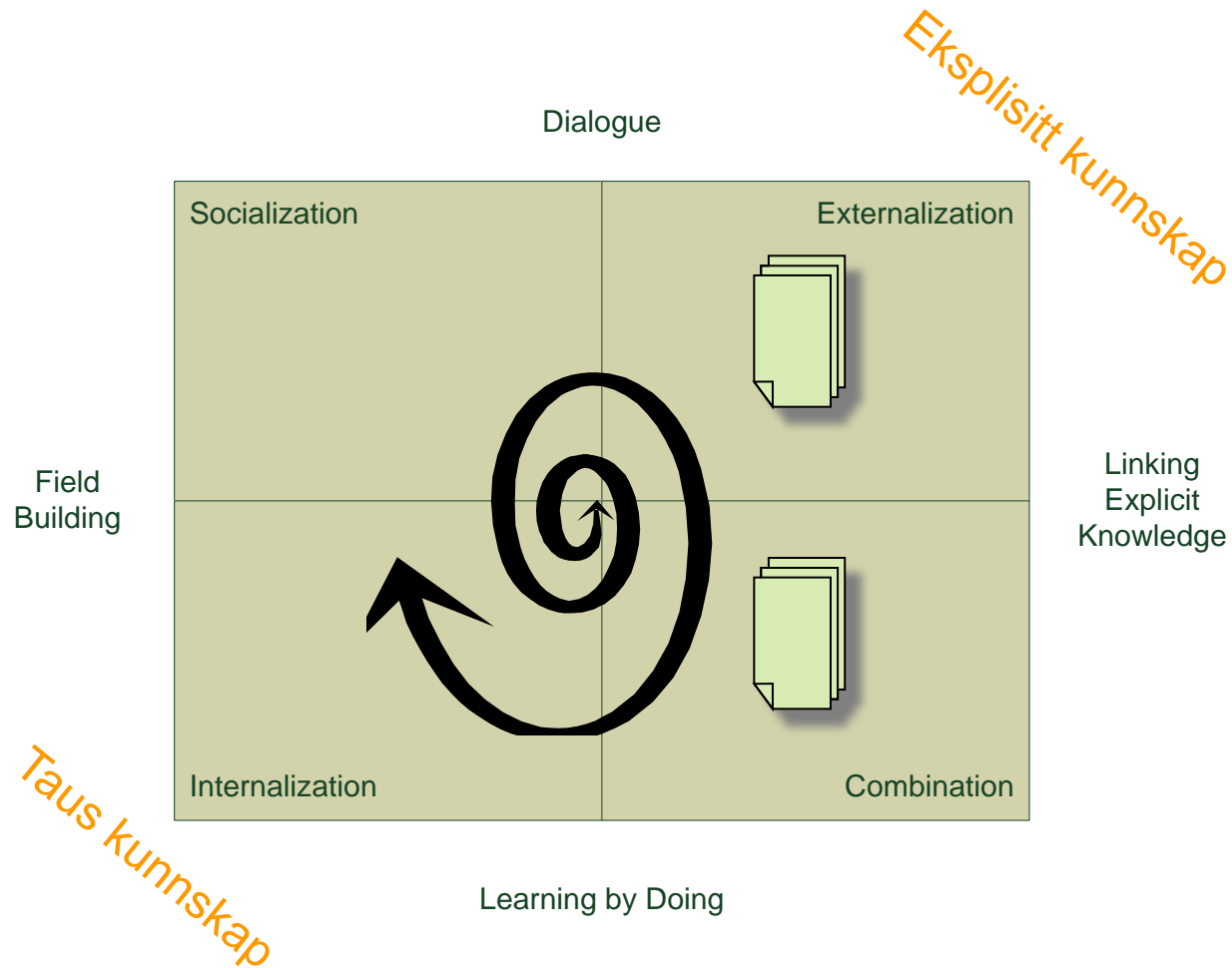
- Communication
- Knowledge creation
- Decision making processes
- Uncertainty management

# A simplified communication model



Jacobsen & Thorsvik (2002)

# The importance of information Knowledge creation



Nonaka & Takeuchi (1995)

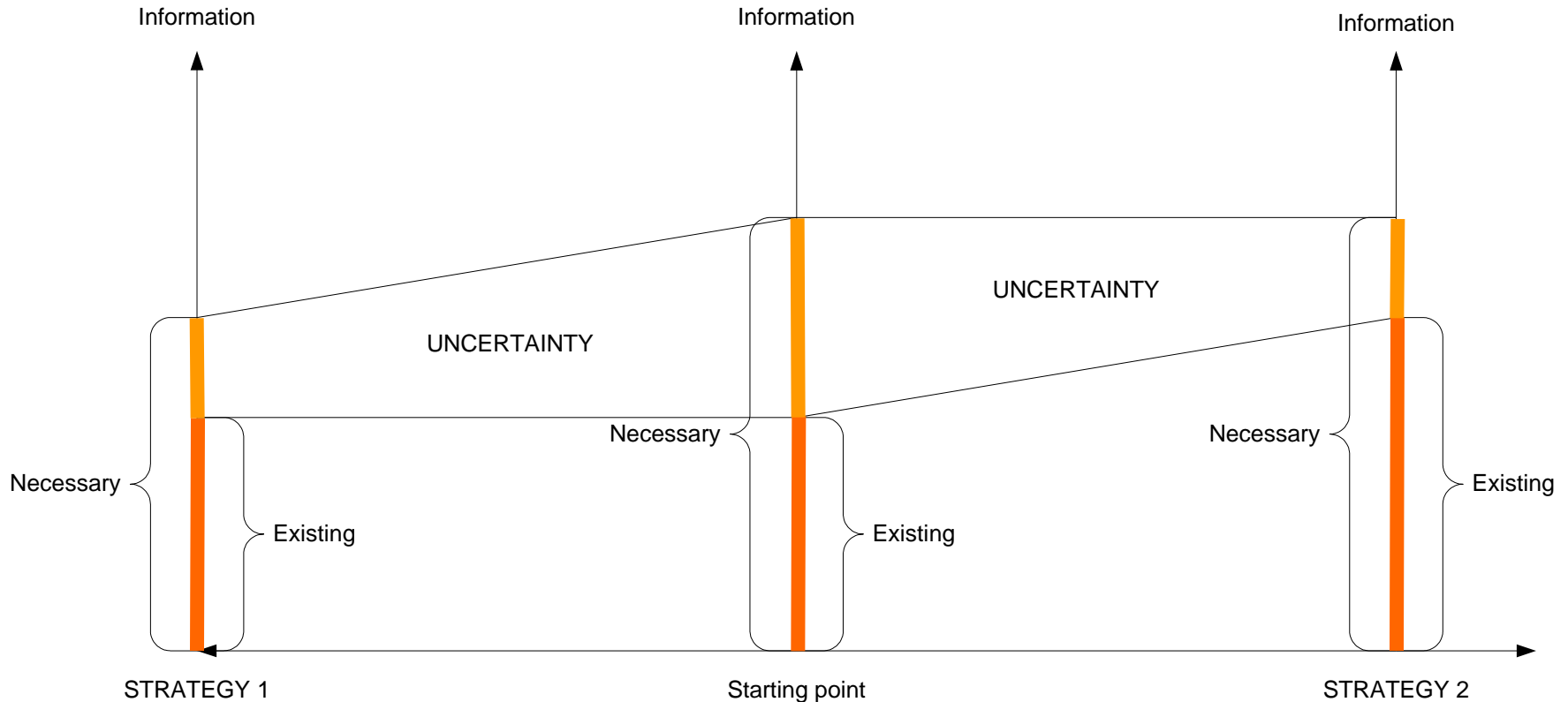




# The importance of information

## Uncertainty management

### Strategies for uncertainty reduction



Christensen og Kreiner (1991)

# Characteristics of ICT



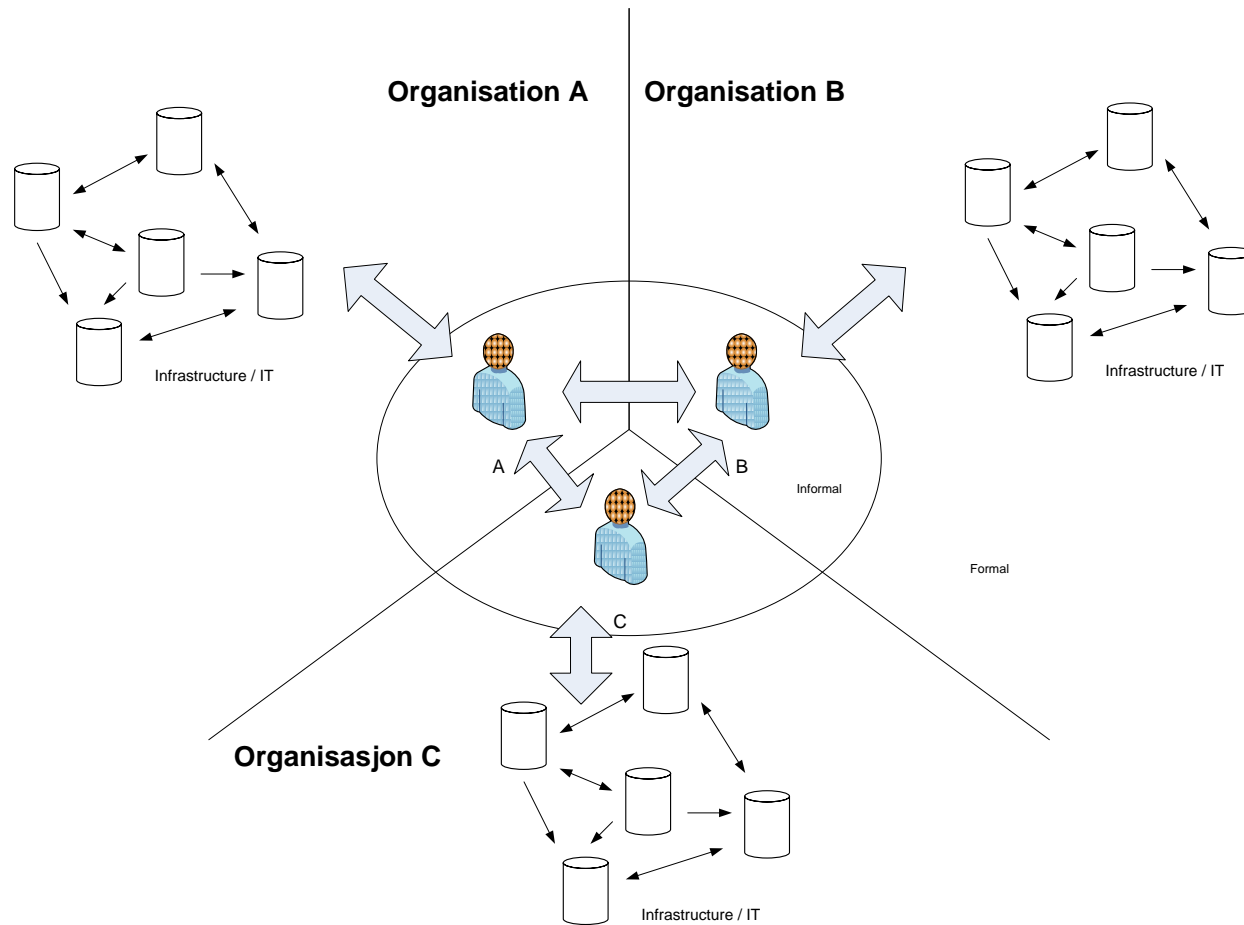
1. ICT **manipulates** information
2. ICT **stores** information
3. ICT **distributes** information

# Why organisations invest in ICT?

1. New ways of manipulating and manage information, and new ways of making decisions
2. Increased automation of advanced tasks
3. Increased flexibility and usability
4. Reduce the importance of physical co-location
5. Potential for new control mechanisms
6. Increased potential for coordination of activities



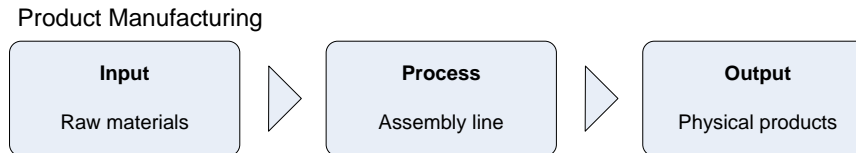
# Inoperability



# The motivation and aim for my PhD

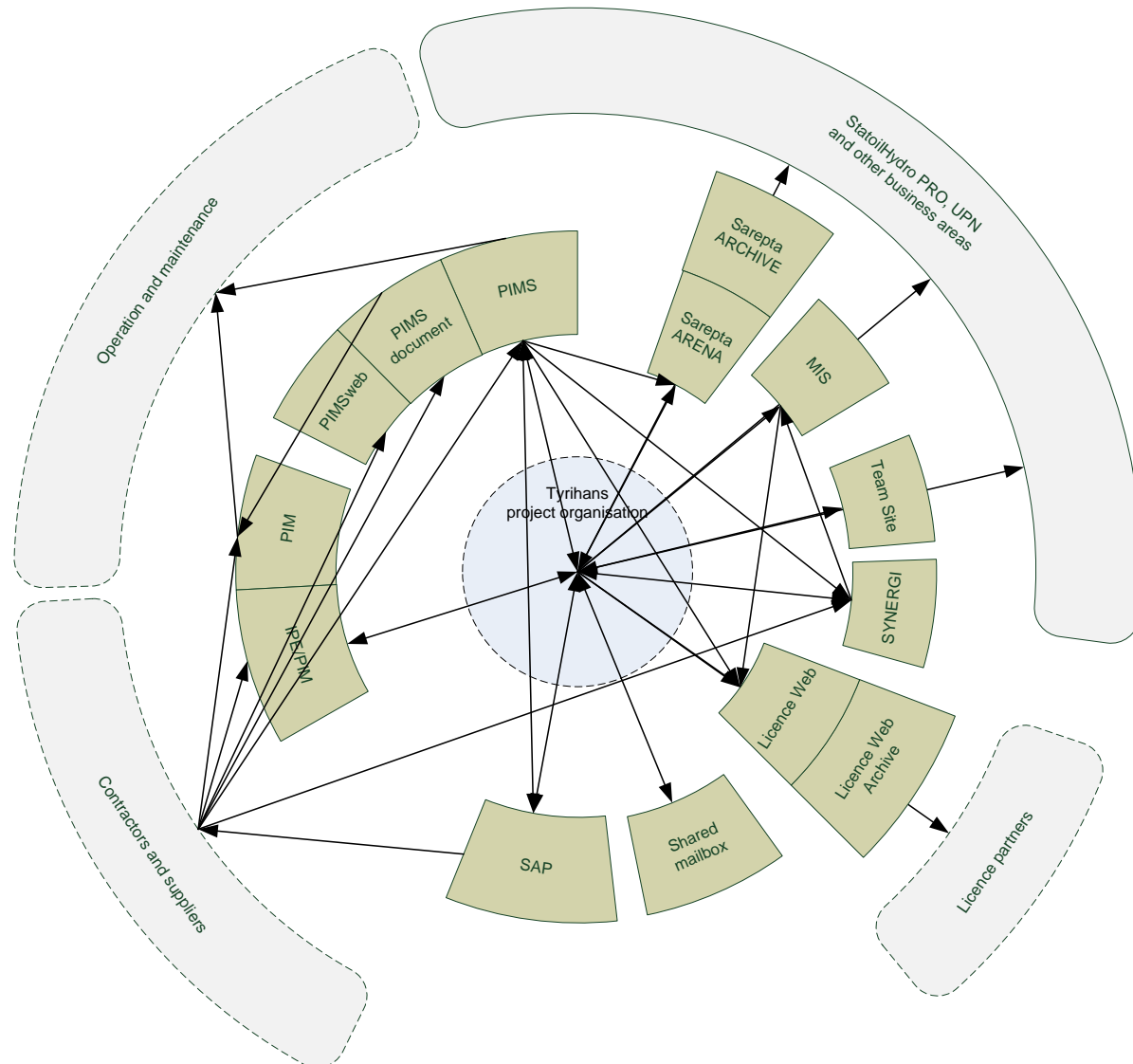
- There is little or no attention towards how information is produced
- Information quality is normally an assessment of an existing information product and considers its impact and usefulness on subsequent processes
- Information quality is taken for granted
  - Practitioners
  - Most academics
- Information systems are not any better than the information they store or distribute

# Information is a product, not a by-product



	Information viewed as a product	Information viewed as a by-product
What is managed?	<ul style="list-style-type: none"> <li>Information</li> <li>Information product life cycle</li> </ul>	<ul style="list-style-type: none"> <li>Hardware and software</li> <li><del>Systems life cycle</del></li> </ul>
How is information managed?	<ul style="list-style-type: none"> <li>Integrated, cross functional approach</li> <li>Encompass information suppliers, manufacturers, and consumers</li> </ul>	<ul style="list-style-type: none"> <li>Integrate stovepipe systems</li> <li>Control of individual components</li> <li>Cost control</li> </ul>
Quality focus	<ul style="list-style-type: none"> <li>Deliver quality information products to consumers</li> </ul>	<ul style="list-style-type: none"> <li>Implement quality hardware and software systems</li> </ul>
What is success?	<ul style="list-style-type: none"> <li>Quality information product continuously delivered over the product life cycle</li> <li>No garbage-in, garbage-out (GIGO)</li> </ul>	<ul style="list-style-type: none"> <li>The system works</li> <li>No bugs</li> <li>Short term perspective</li> </ul>
Who manages the information?	<ul style="list-style-type: none"> <li>CIO (Chief Information Officer)</li> <li>Information product manager</li> </ul>	<ul style="list-style-type: none"> <li>CIO</li> <li>IT director and database administrators</li> </ul>

# Information systems in use in TYR



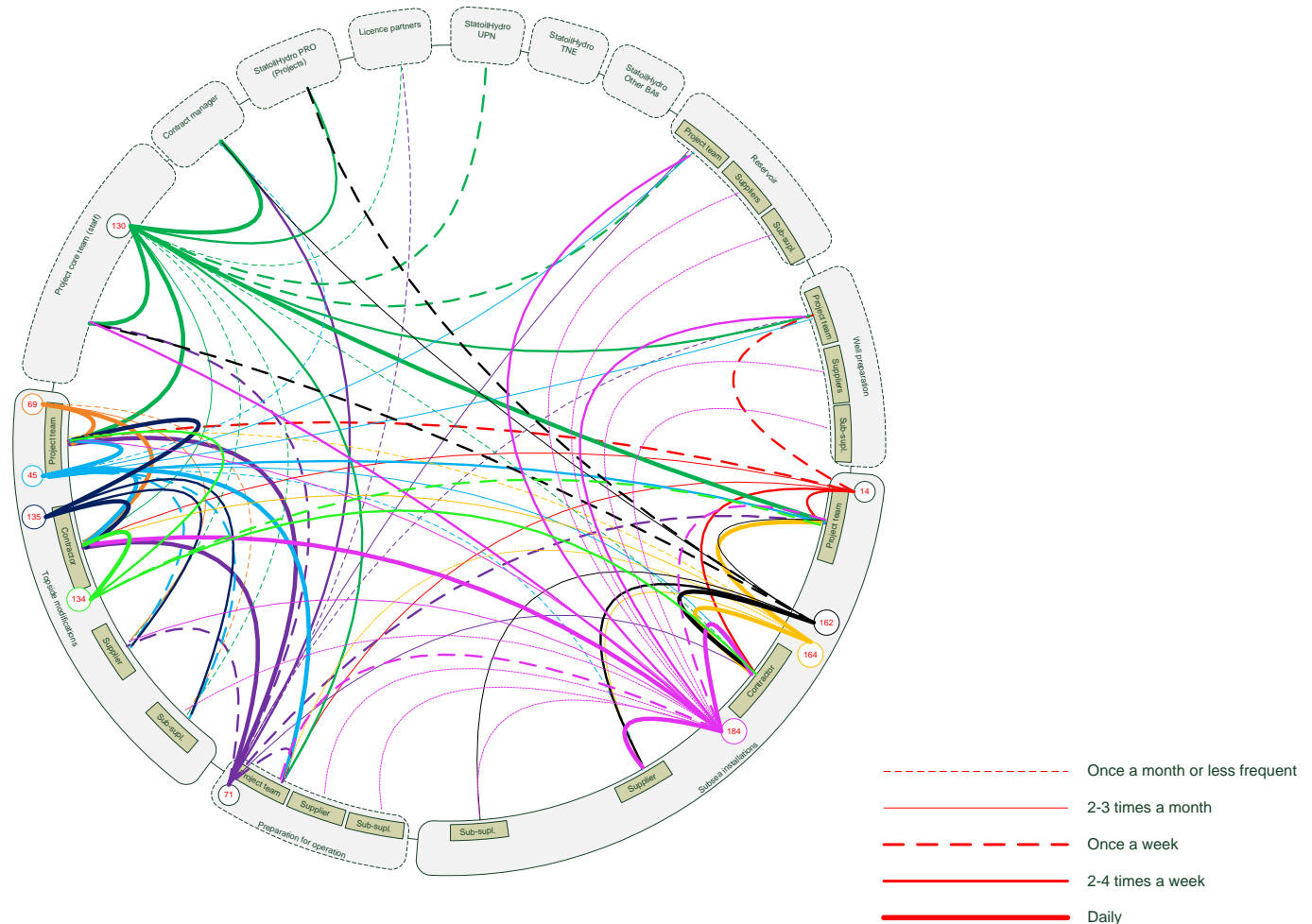






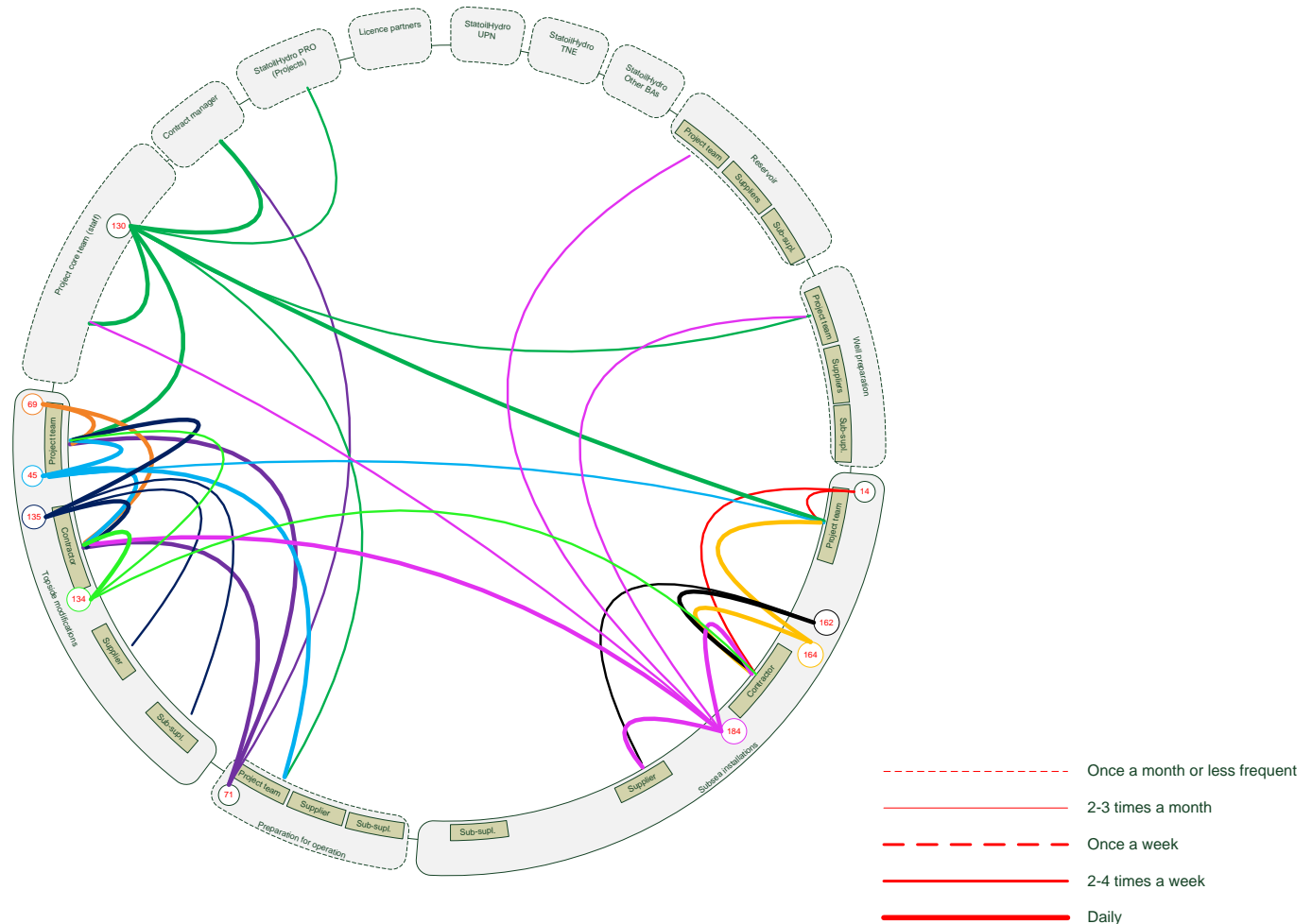
# Visualisation of communication patterns

## Communication Maps

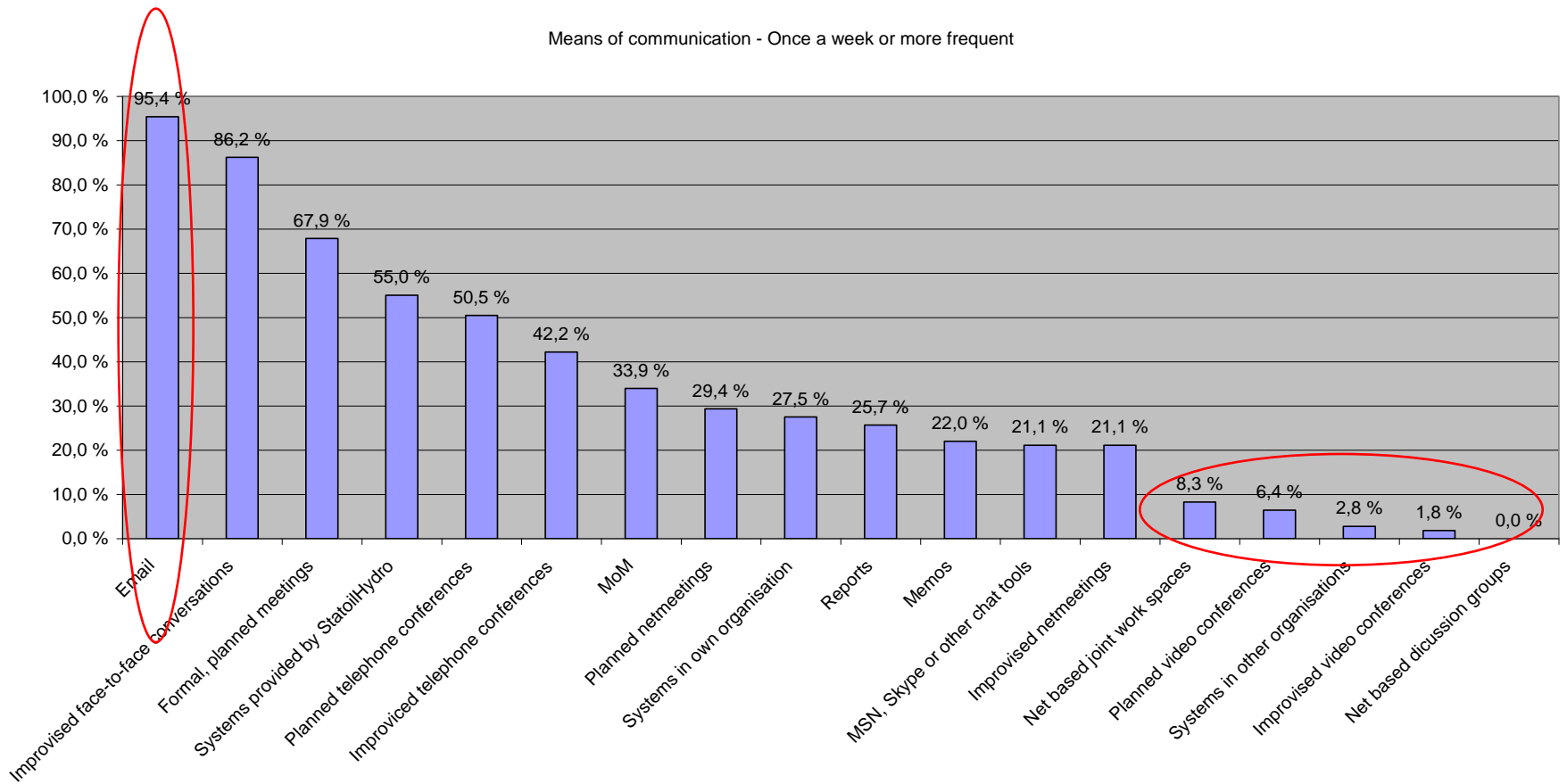


# Visualisation of communication patterns

## Communication Maps



# Means of communication in use



# A summary of my findings

- Information is mainly treated as a by-product
- Organisational measures
  - Role oriented information production
- Individual measures
  - Increase individual writing skills

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**THANK YOU FOR YOUR  
ATTENTION!**



**ANY QUESTIONS?**