Global Network Leiden Meeting: Conceptual STS for Work(ing) and Digital Technology

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STS RT
SOCIOTECHNICAL SYSTEMS ROUNDTABLE INC.

ULBO DE SITTER
kennisinstituut

Introduction

by Mark

What are the possibilities and constraints of new digital technologies and how might these be effectively incorporated in the (process of) organization and ecosystem design?

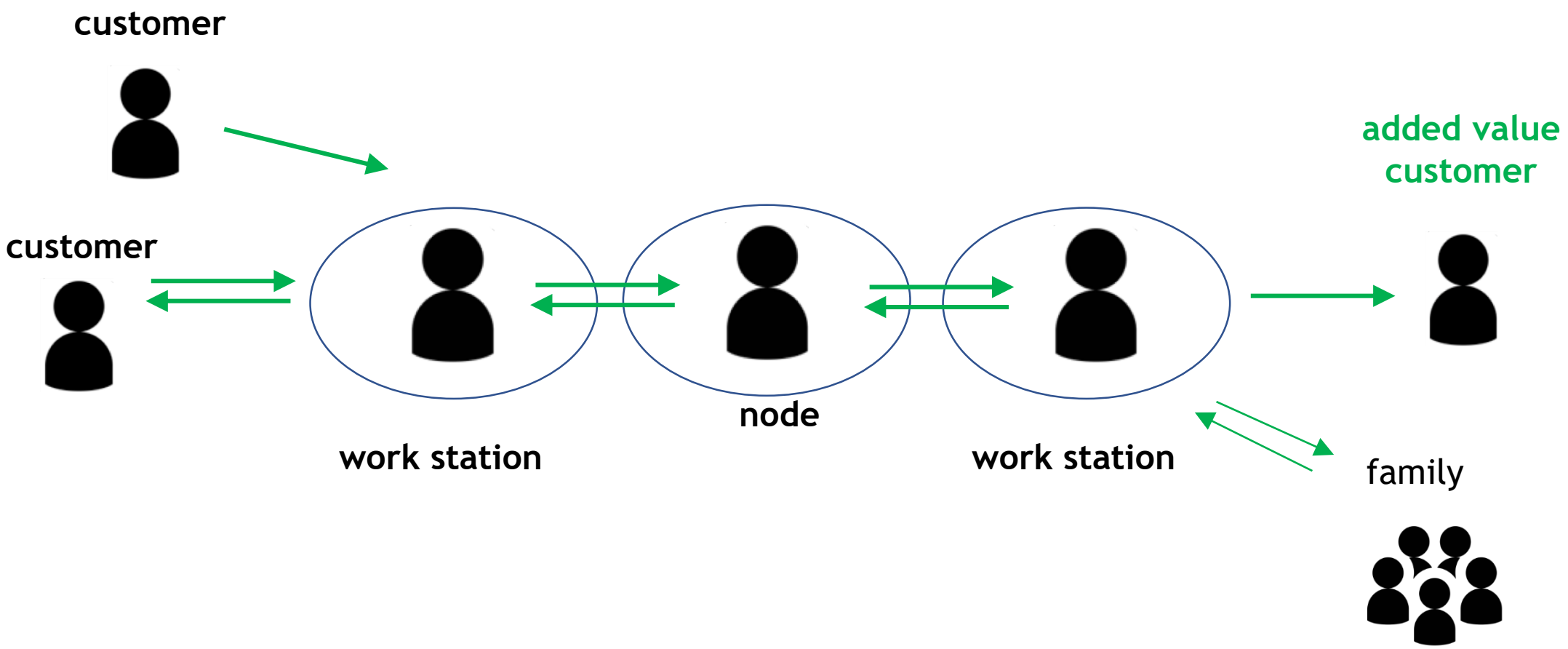
What is work

and working

from a division of labor perspective

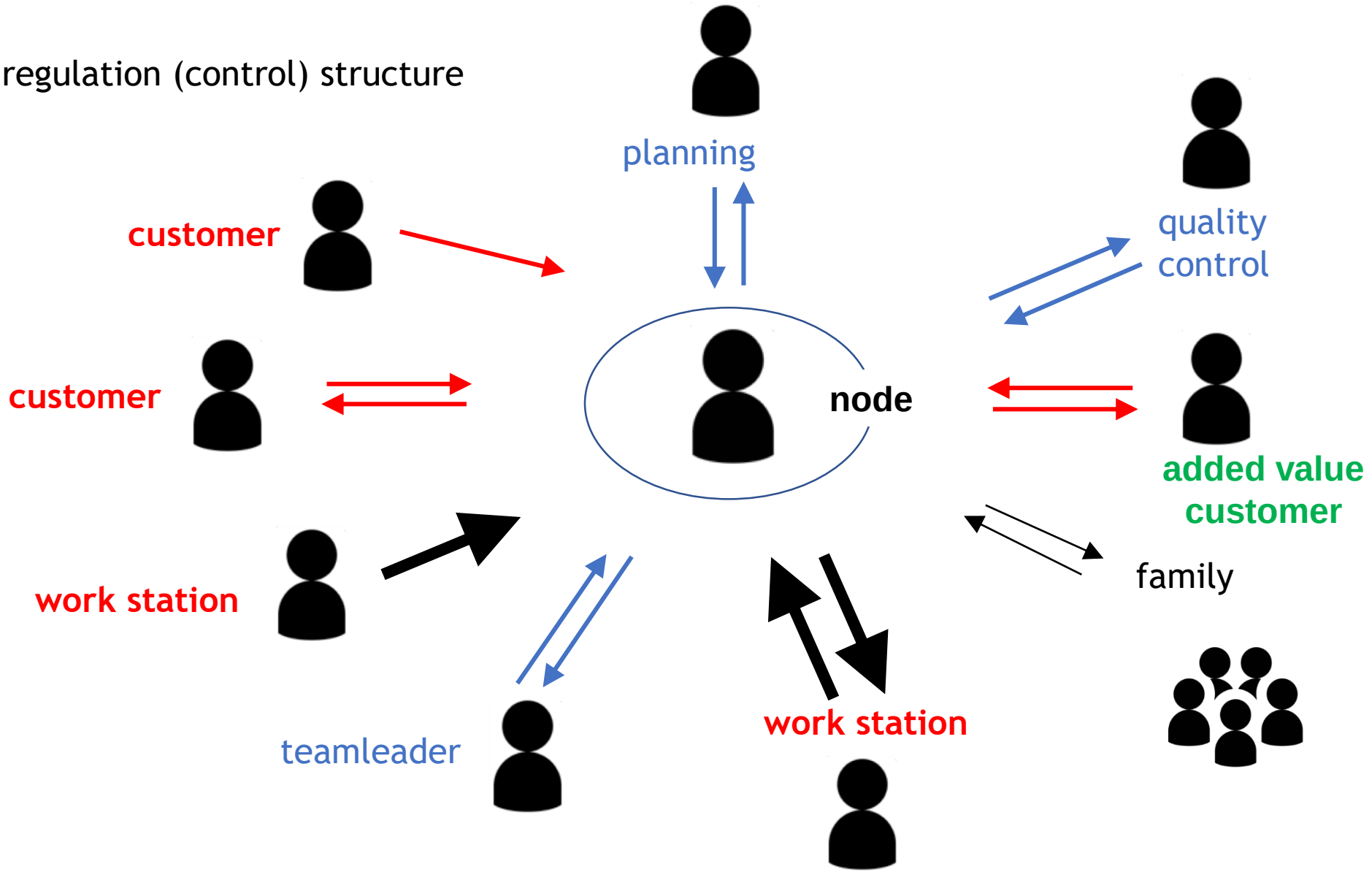
by Pierre

Division of work in the core work processes: added value by a network of nodes



Division of work in the core work processes: added value by a network of nodes

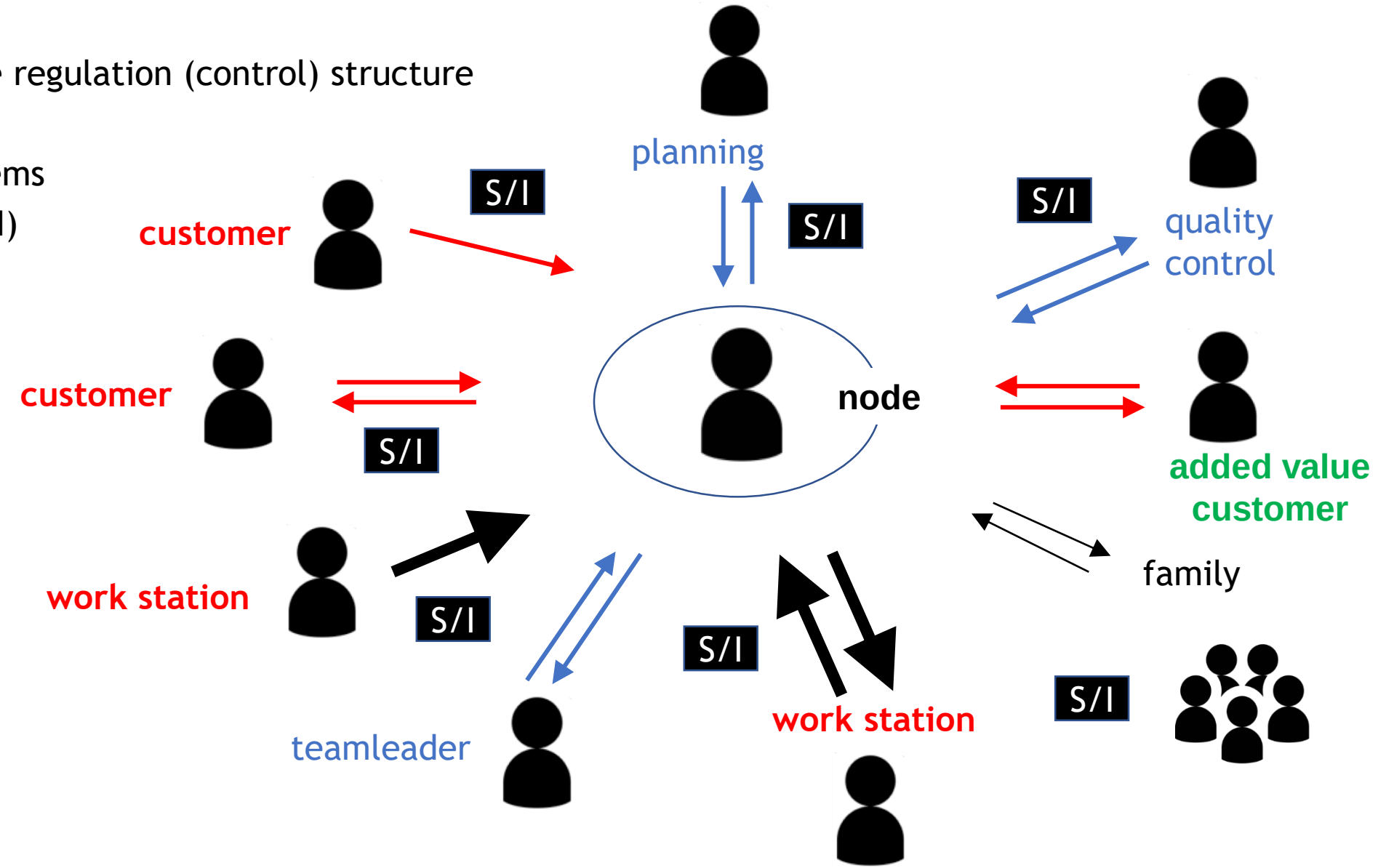
Division of work in the regulation (control) structure



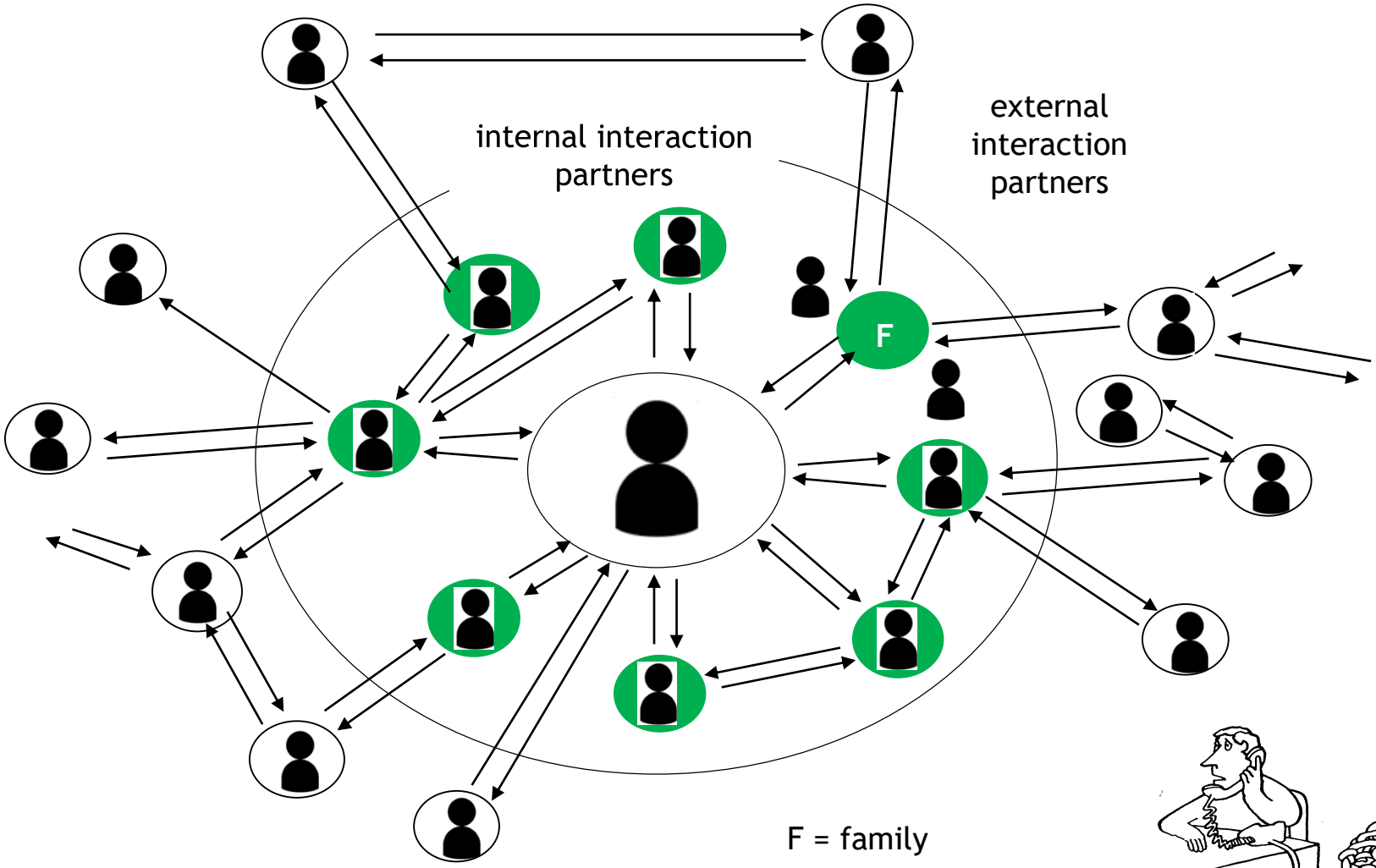
Division of work in the core work processes: added value by a network of nodes

Division of work in the regulation (control) structure

Adding technical systems and infrastructure (S/I)



Working as an Interaction Network (De Sitter)



Result of task division

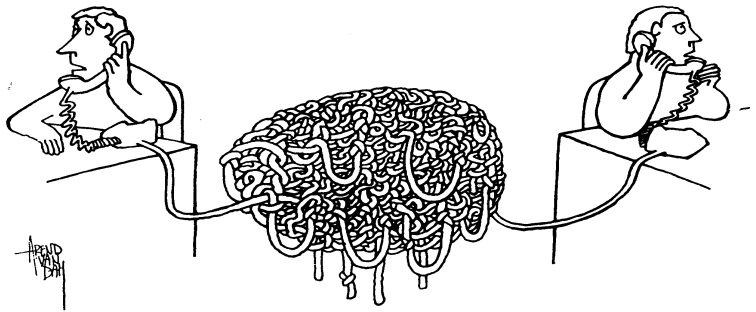
Ideal situation: perfect balance (incl. work-life balance) and no waste

- All material, information and means on the right place, quality and time
- Match demand and limited means
- No disturbance

Only one ‘minor’ problem:

Ideal situation doesn’t exist:

Complexity > Interference



Digital Technology by Mark

Digital Technology by Mark

presented by barchart OnDemand

FinTech Glossary

APIs
Application Programming Interface. Software that allows two different sources to communicate with each other instantly.

ANALYTICS
The tool used to measure patterns or trends in data.

AWS Amazon Web Services. A division of Amazon that provides cloud-based infrastructure for businesses.

BENCHMARK
A point at which activity and performance are measured and compared.

BITCOIN
A new form of independent currency that is held completely virtually.

BOOTSTRAP
An individual or group starting a new business venture with a minimal amount of seed investment or capital.

CLOUD
A virtual infrastructure that holds an unlimited amount of data and information.

BIG DATA
An enormous supply of data, and often the analysis of such data.

CRYPTOCURRENCY
Virtual currency that is thoroughly protected from hackers.

COGNITIVE COMPUTING
Self-learning computer systems that attempt to mimic human thinking using data mining, pattern recognition and natural language processing.

BLOCKCHAIN
A record of all public bitcoin transactions updated in real-time.

CROWDFUNDING
Projects that are funded by the public.

DATA
Information used to analyze or evaluate a possible outcome or trend.

DISRUPTIVE INNOVATION
The establishment of a new market, product or service that disturbs a pre-existing market or status quo.

DATABASE
A program that allows you to organize your information in an efficient manner on one platform.

DIGITAL NATIVE
Young people who have grown up with the availability and use of digital technology.

FINTECH
A buzzword referring to financial technology.

FINNOVATION
A buzzword referring to financial innovation.

HOSTING A company that provides physical infrastructure for a website, application or software.

HIGH-SPEED NETWORKS
Networks that transfer data in milliseconds.

INNOVATION
When technology leads to new ideas, products or services that improve upon the status quo.

ONLINE BANKING
Having the ability to complete transactions, withdrawls or money transfers on your web or mobile device.

HACKATHON
An event for developers that consists of uninterrupted coding. Winners are usually determined by a panel, the public or their peers.

ONLINE LENDING
Peer-to-peer money transfers online that don't require a bank.

INCUBATOR
When a firm mentors a business, usually a startup, through developmental stages.

INTERNET OF THINGS
A proposed development of the Internet in which everyday objects have network connectivity, allowing them to send and receive data.

PAYMENT GATEWAY
A service provider that facilitates credit card transactions for online businesses.

SAAS
Software As A Service. On-demand delivery of software to a user (such as by subscription).

MOBILE TECHNOLOGIES
Technology that you can access on your mobile device.

IT MANAGEMENT
Managing a firm's information technology resources.

SOCIAL MEDIA
Online websites or mobile applications that allow users to interract with one another through digital networking.

MARKET DATA
Prices, values and reference information for financial instruments like stocks, bonds, currencies, futures and commodities.

STARTUP
A newly established firm, usually under 50 employees, that has not yet achieved massive market share or growth.

STORAGE
The amount of memory and information a system can hold. With the cloud, storage is considered unlimited.

ROBO-ADVISOR
Financial advisement provided by a computer-based system.

Digital Technology – types of …

Artificial Intelligence
Machine Learning
Internet of Things
Robotics
Wearables
Data lakes
Virtual reality
Smart, mobile devices
…

Digital Technology as …

4th Industrial Revolution

Digital Technology as 4th Industrial Revolution, meaning …

Schumpeter's

CREATIVE DESTRUCTION

of existing social, economic, cultural and political systems into new orders…

has effect on…

work

Digital Technology as Creative Destruction: Disruptive Effects on Work

Customer Experience: customers become part of processes (co-execution), and the look and feel important to remain / become a client (e.g., internet banking)

Operational Agility: work takes place 'in' digital platforms, and new processes can be designed quickly (e.g., a new web shop for specific customer groups)

Workforce Engagement: work floor empowerment; info can be provided almost real-time to workers (e.g., service desk worker can instantly see the history of a client, and come to decisions)

work

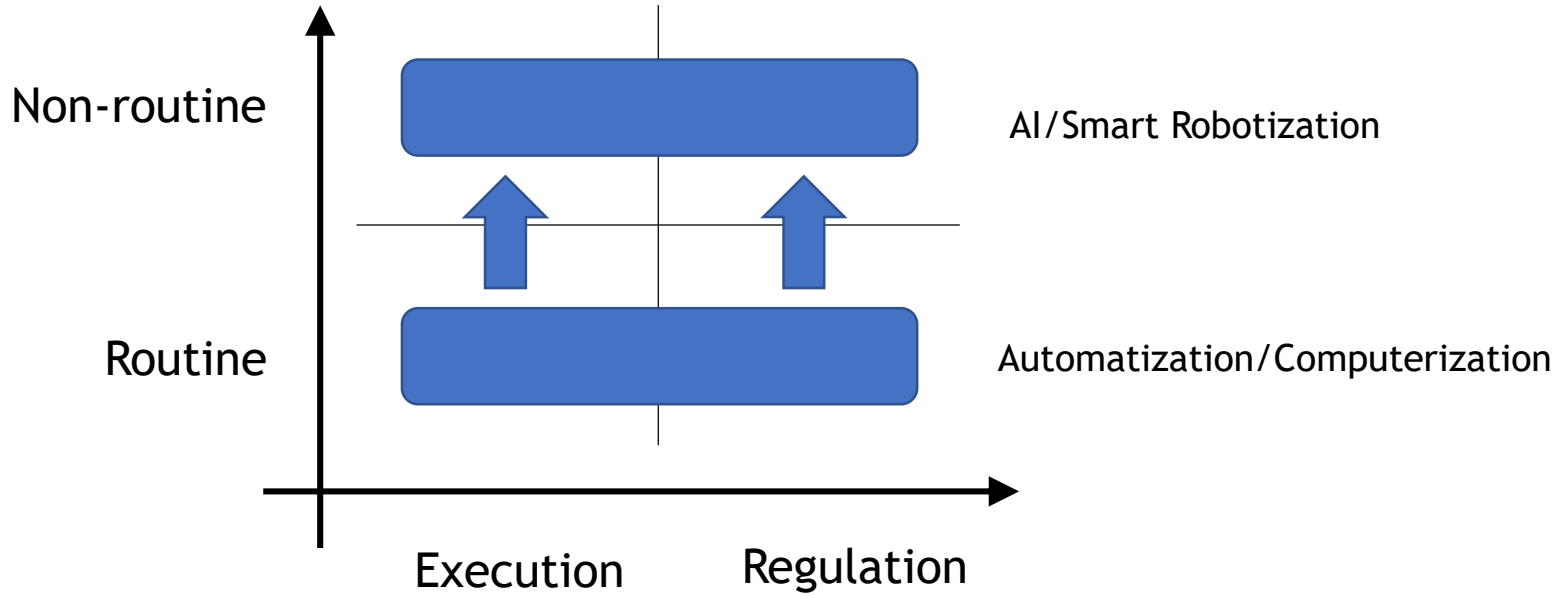
Digital Technology as Creative Destruction: Disruptive Effects on Work

IBM Watson

Hi, I am Watson

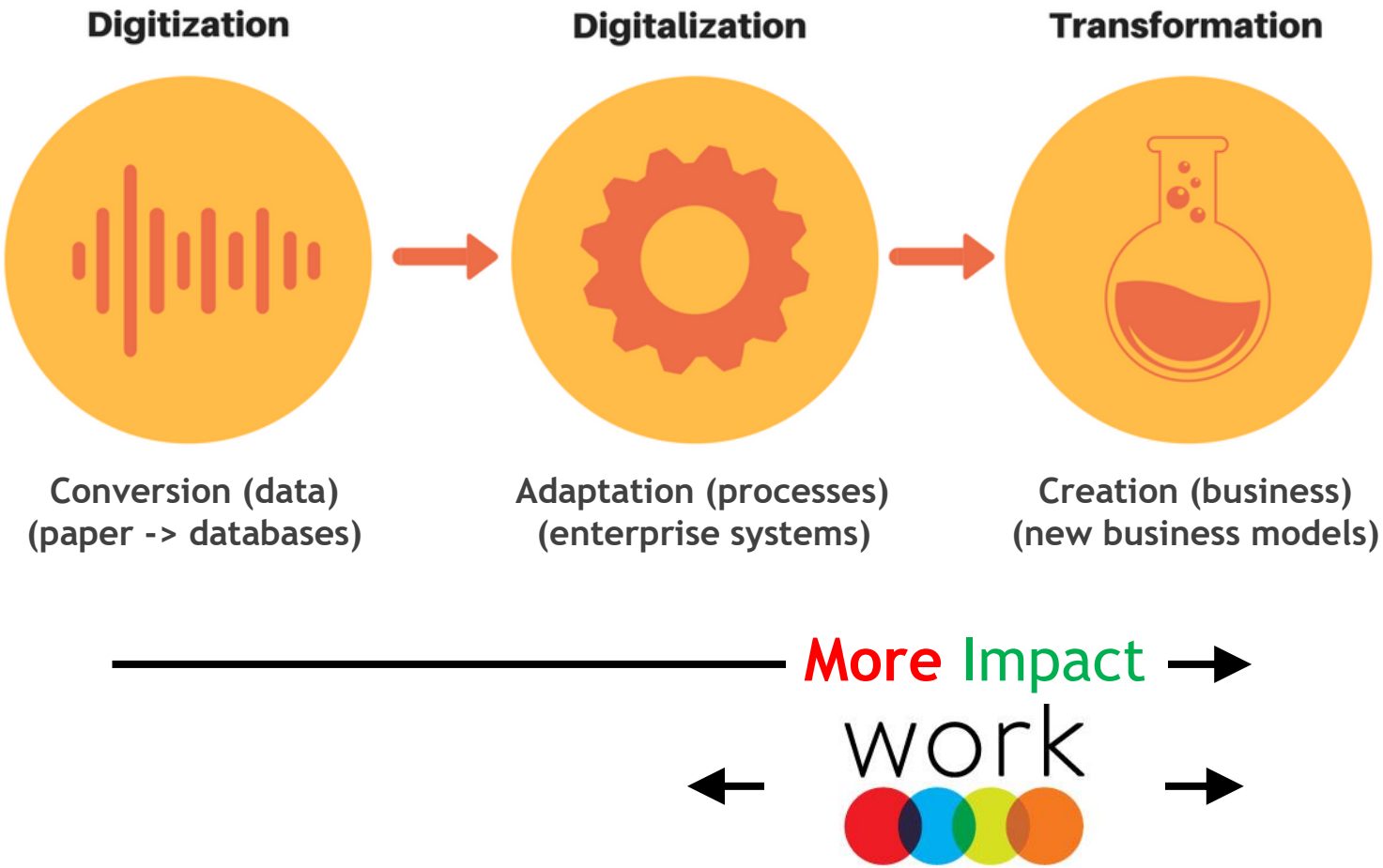
Boston Dynamics

Smart Robot



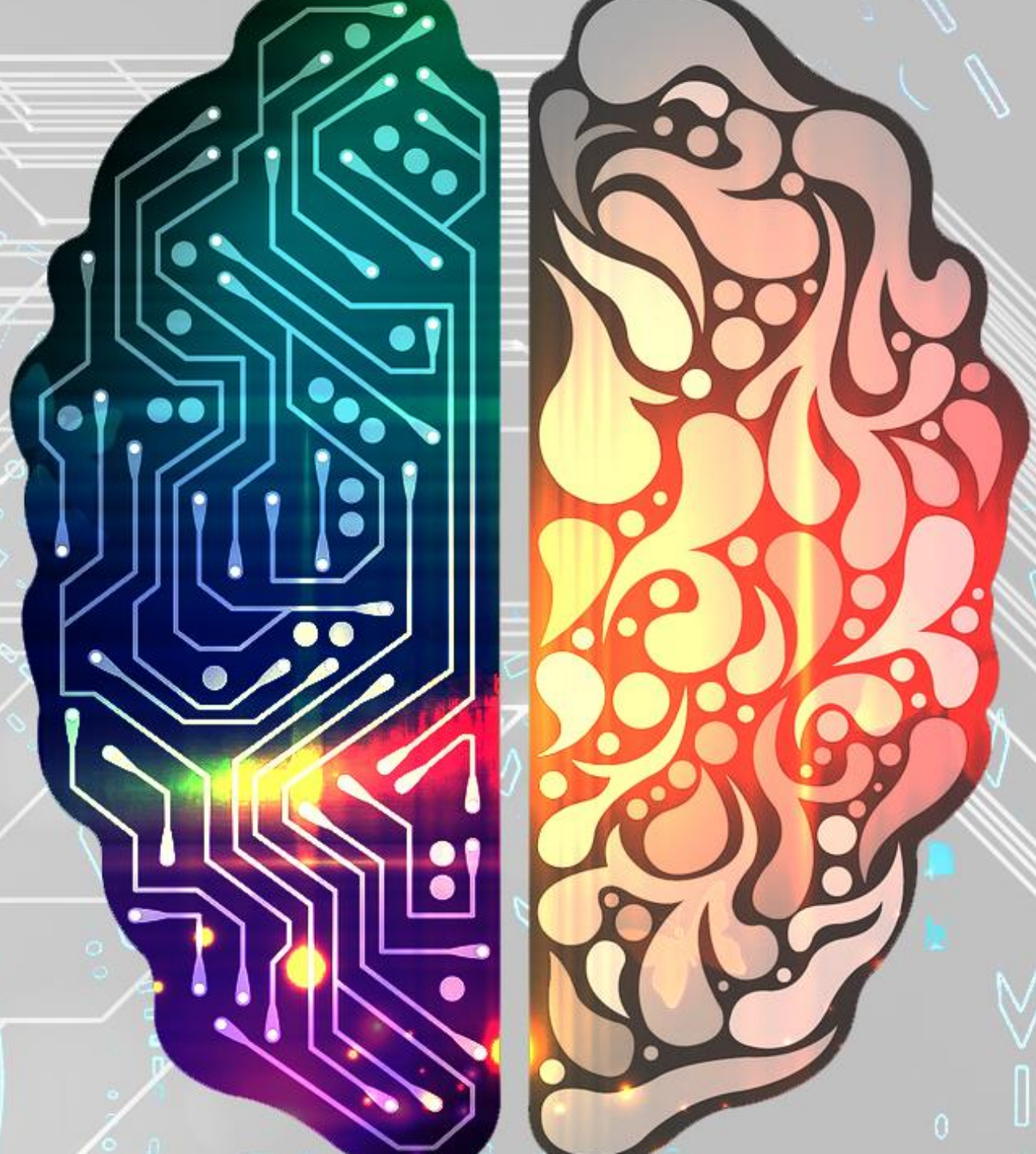
work

Digital Technology in relation to Phases of Digital Transformation



Unlearning Old Routines & Learning New Routines

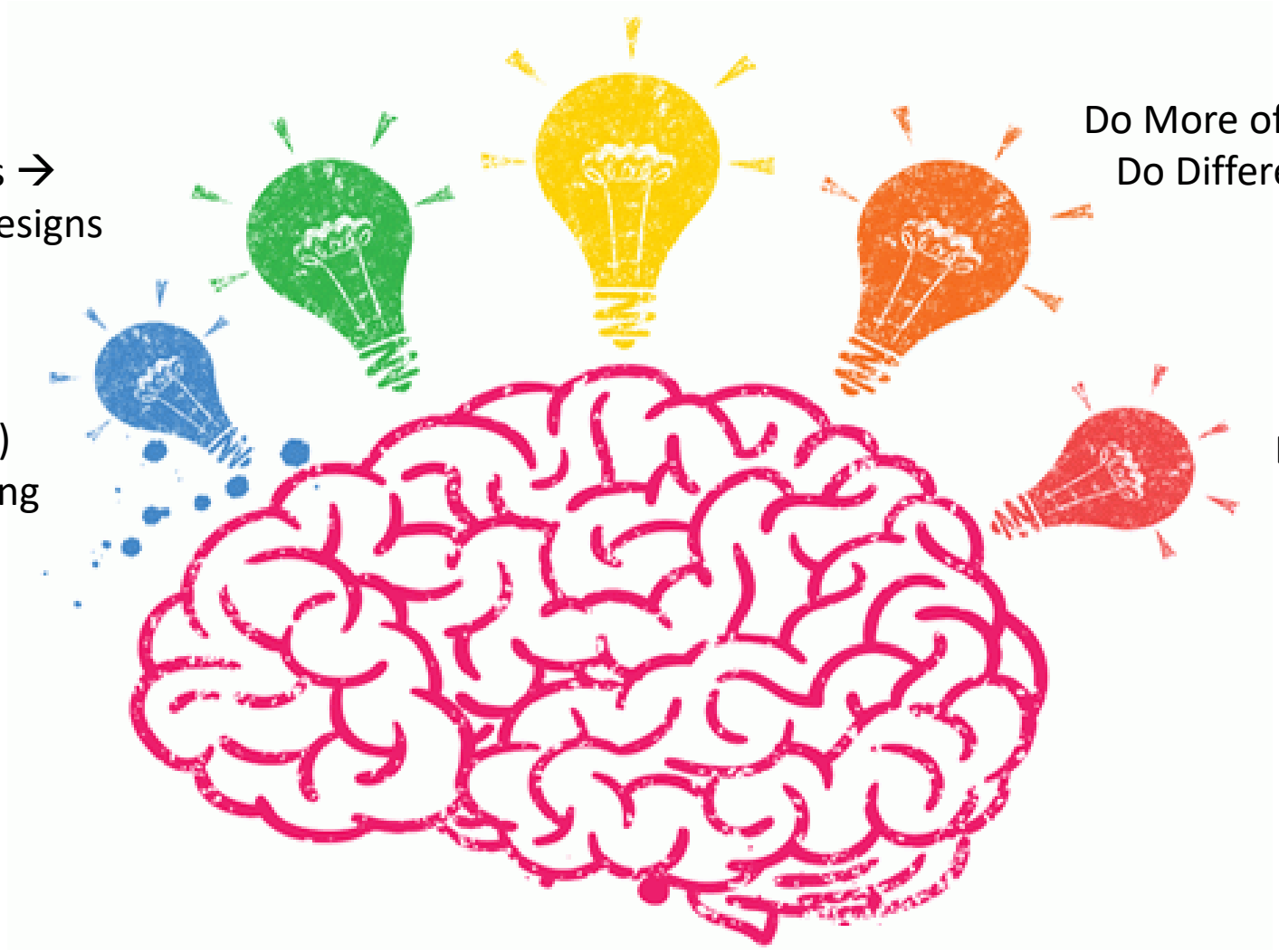
By Mark & Pierre



Expert, Top-down & Cascading →
Participative, Bottom-up & Scrum Approaches

1-Fits-All Designs →
1-Fits-1 (variety) Designs

Do More of the Same →
Do Different Thinking



Functional (Bureaucratic)
→ Flow/Network Organizing

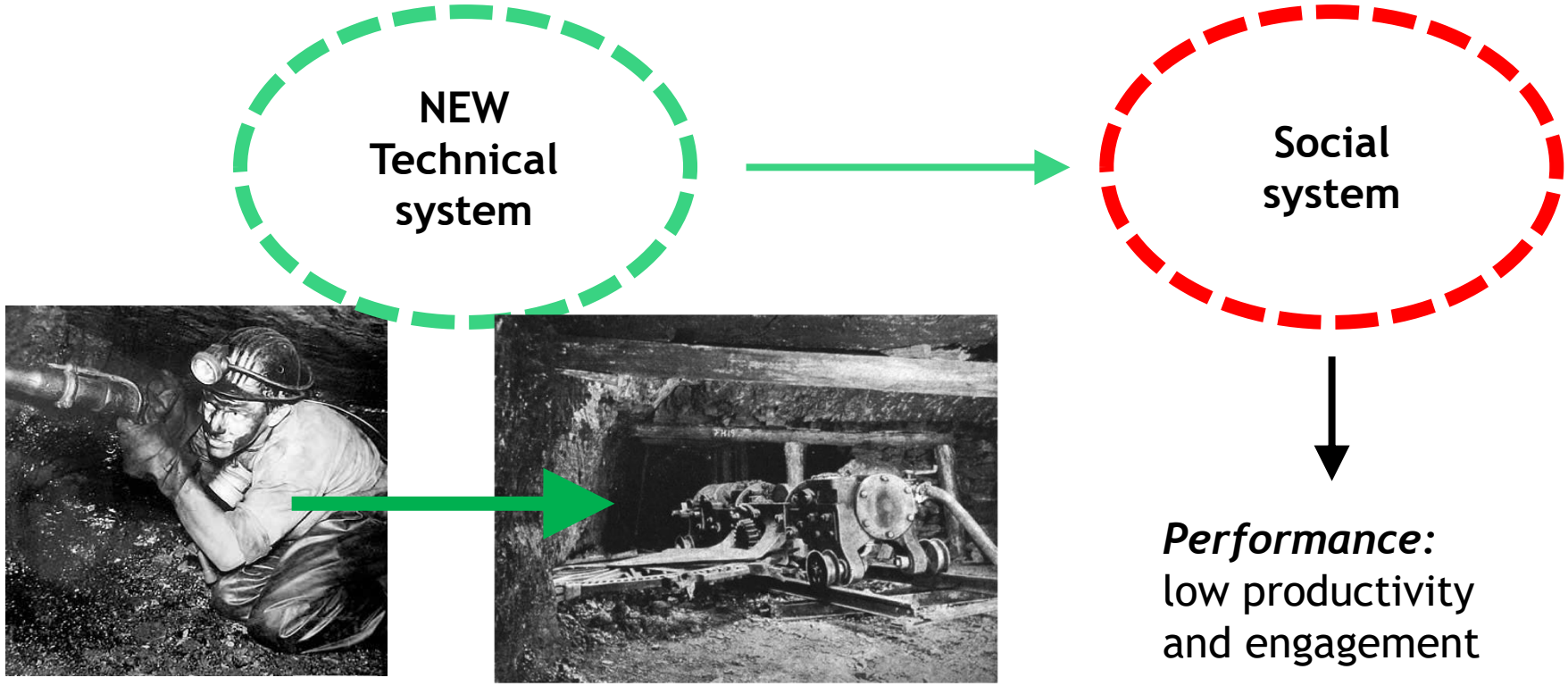
Focus on Exploitation →
Exploitation & Exploration

3 lenses of looking at digital technology & work

1st lens by Pierre

ORGANIZATIONAL

Organizational Choice Concept: lesson learned from Durham case



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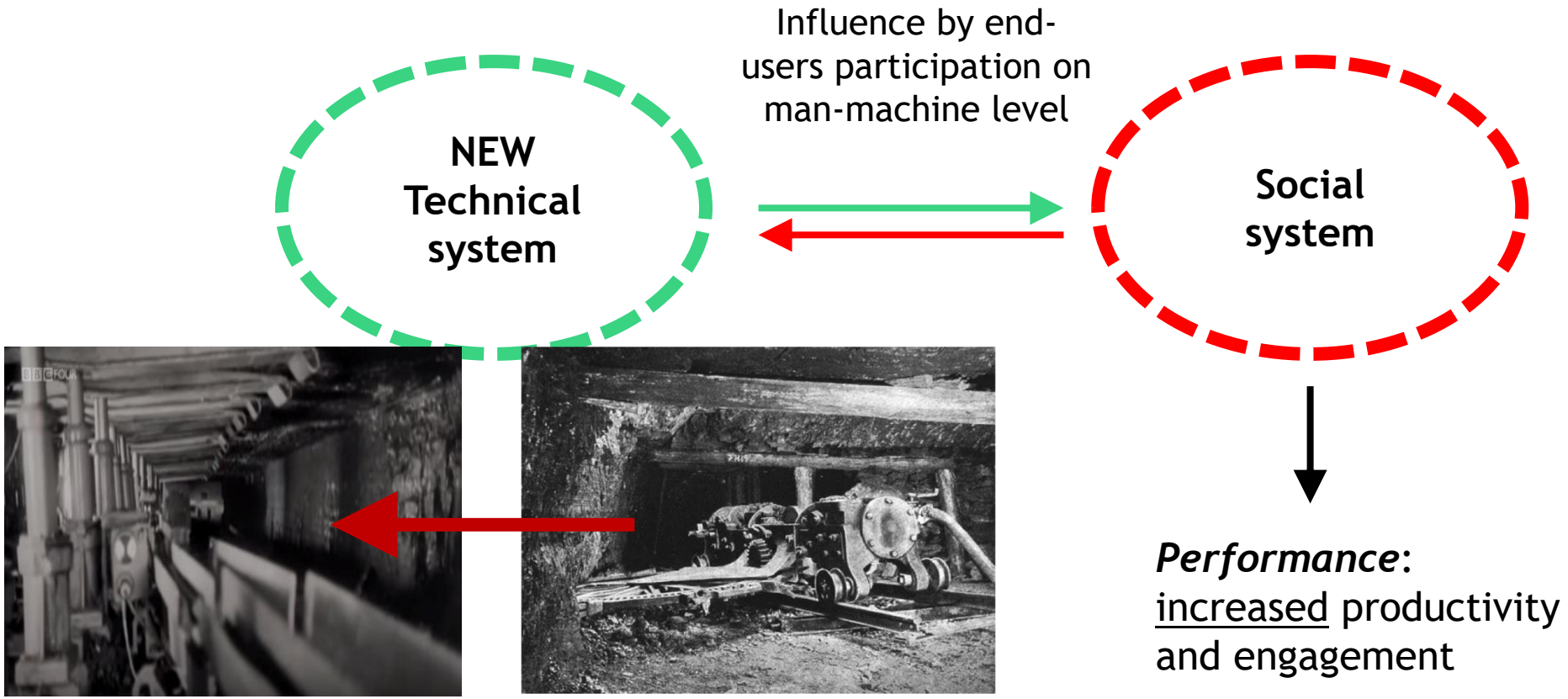
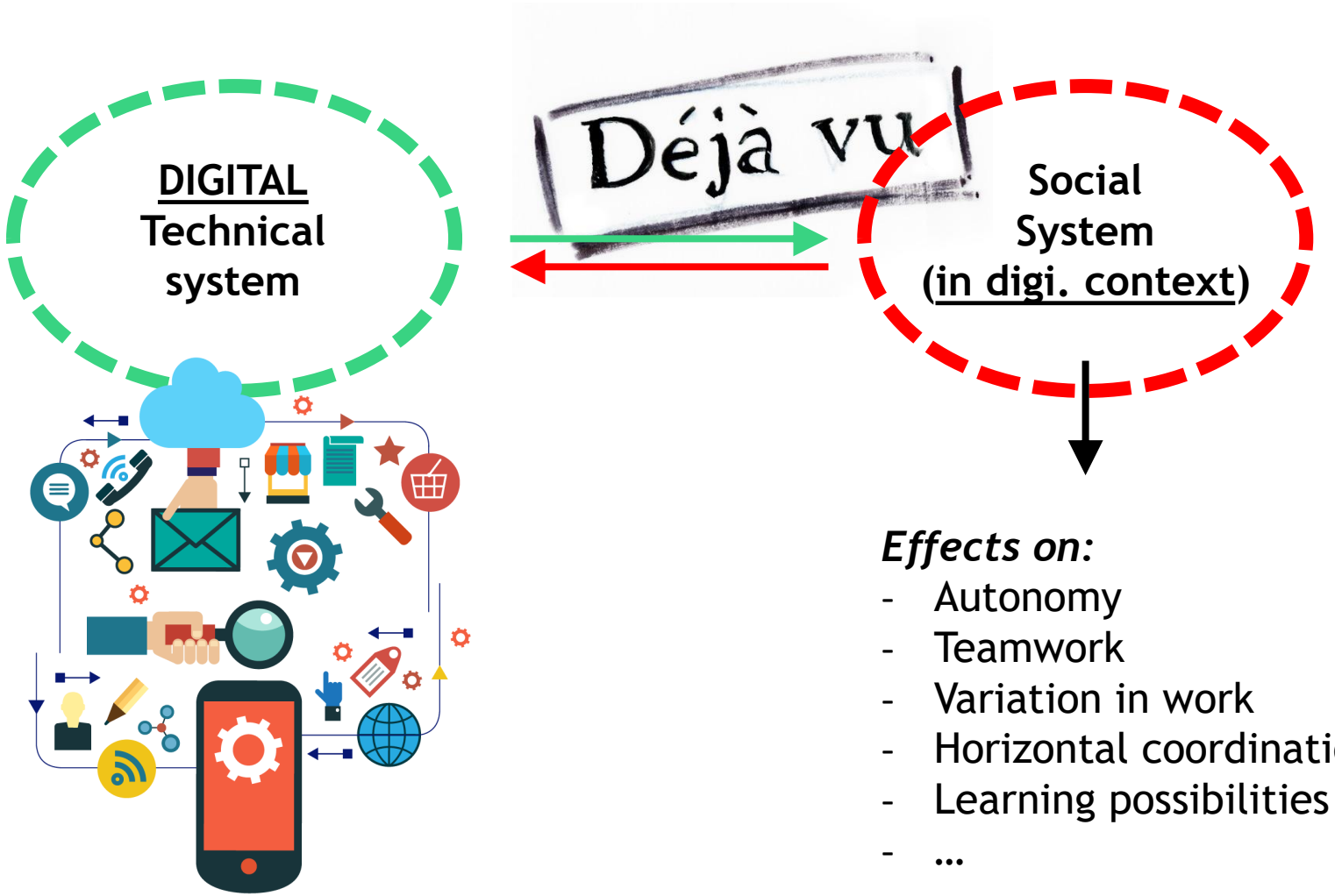


Organizational Choice and Digital Technology ?!



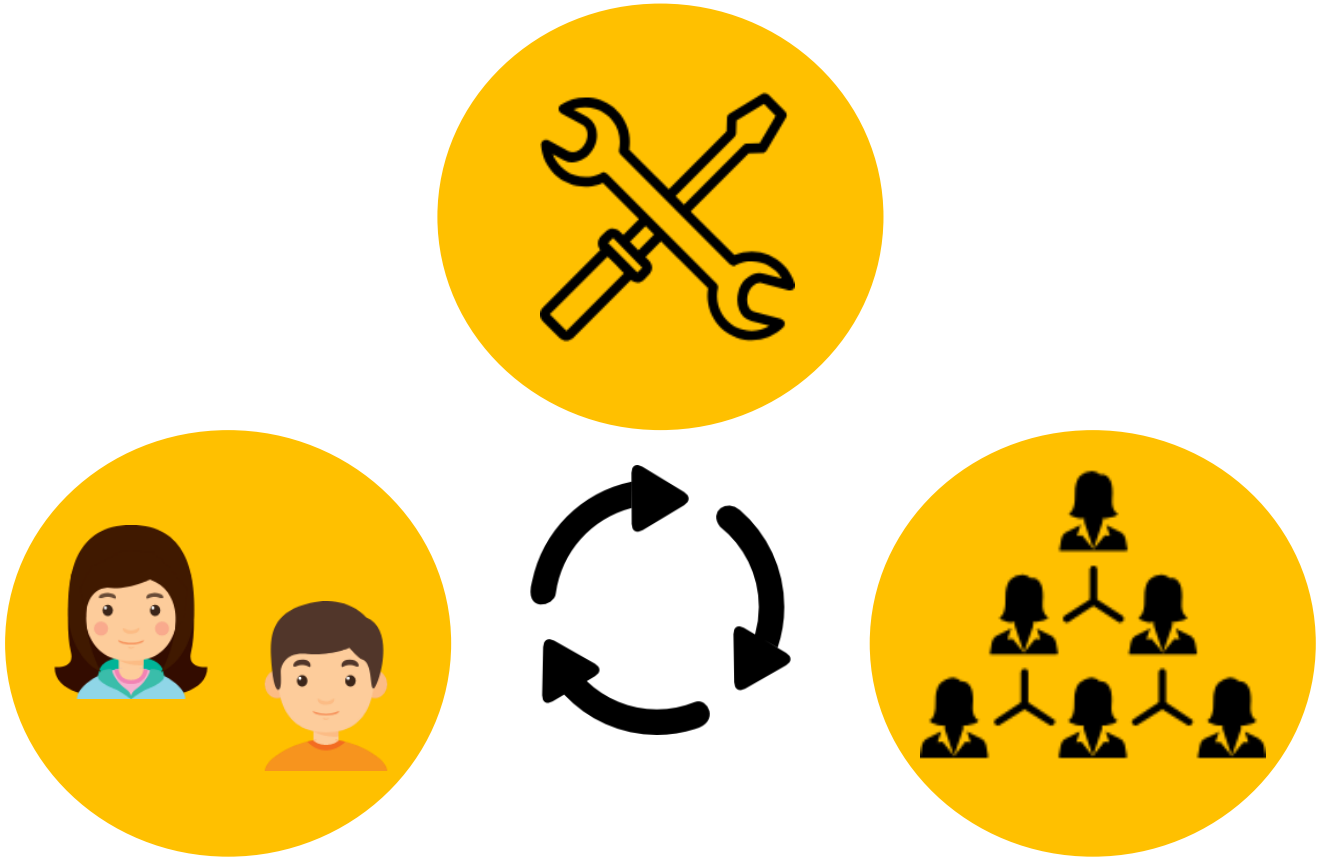
Effects on:

- Autonomy
- Teamwork
- Variation in work
- Horizontal coordination
- Learning possibilities
- …

2nd lens by Matthijs

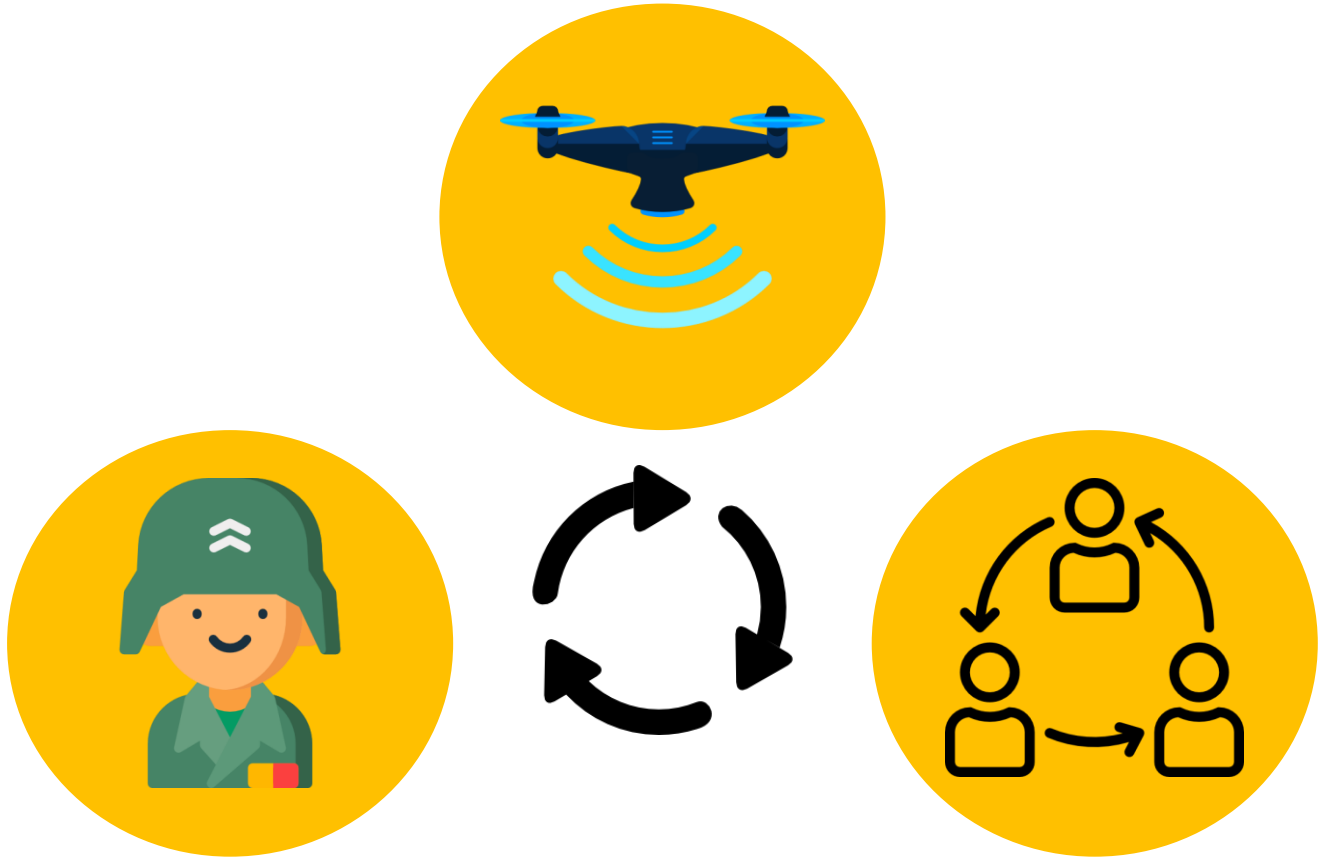
DUALITY of

enactment

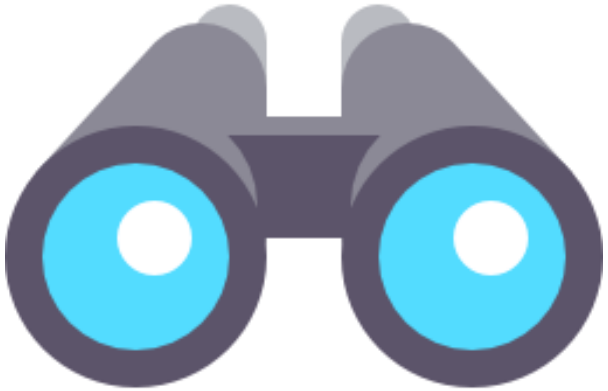


enactment

example



enactment



3rd lens by Bert

Action Potential & Limitations of Technology

(based on Technology Affordances and Constraints Theory)

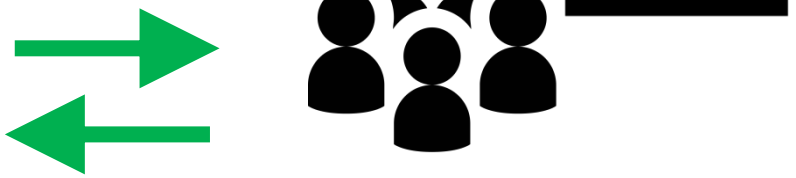
People/Organization

TECHNOLOGY

Particular

Features,

Functionalities



Specific
Purposes/Goals/
Use Setting

=

???
Uses /
Outcomes
???

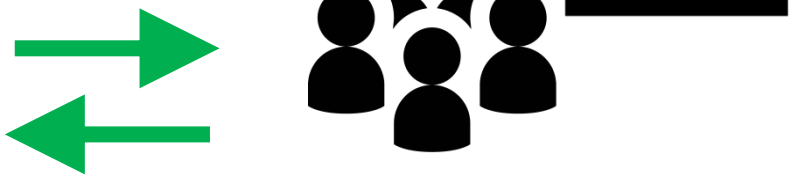
People/Organization

TECHNOLOGY

Particular

Features,

Functionalities



Specific
Purposes/Goals/
Use Setting

=

?
ACTION
POTENTIAL
?

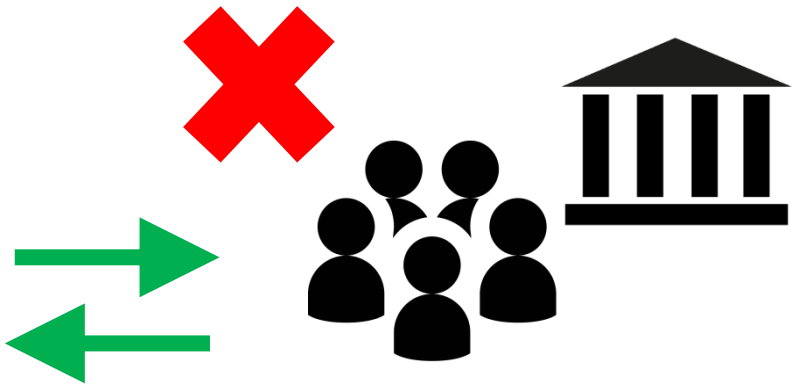
People/Organization

TECHNOLOGY

Particular

Features,

Functionalities

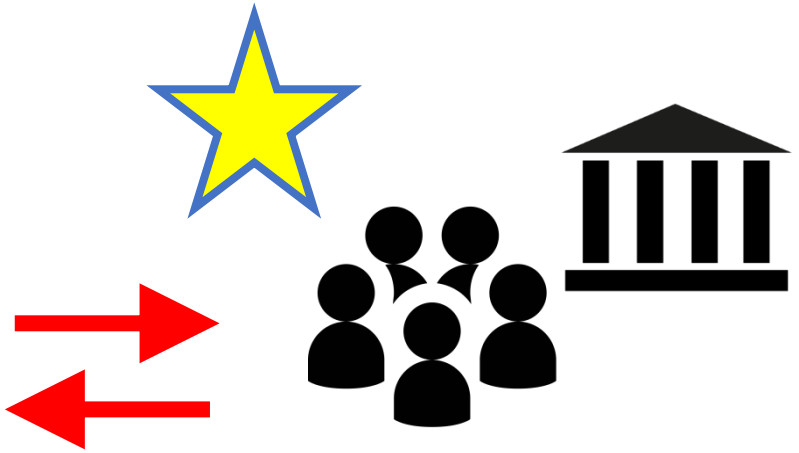


Specific
Purposes/Goals/
Use Setting

≠

ACTION POTENTIAL

People/Organization



TECHNOLOGY

Particular

Features,

Functionalities

Specific
Purposes/Goals/
Use Setting

=

ACTION POTENTIAL

CONTEXT
Changes in Use Setting:
Procedures, Roles

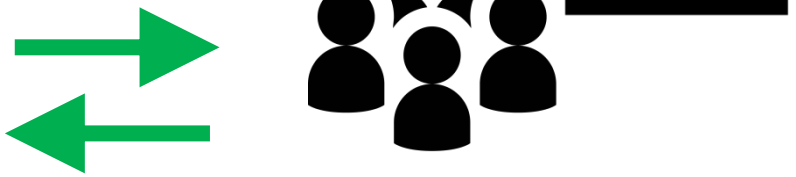
People/Organization

TECHNOLOGY

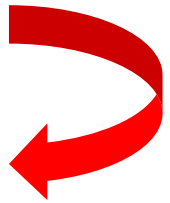
Particular

Features,

Functionalities



Specific
Purposes/Goals/
Use Setting



?
LIMITATIONS
?

CONTEXT
Changes in Use
Setting:
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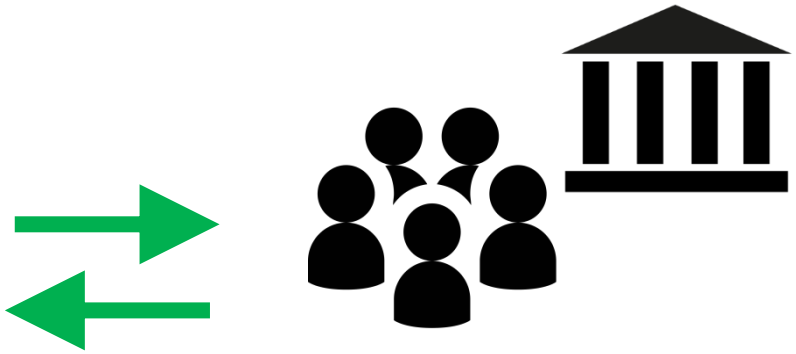
People/Organization

TECHNOLOGY

Particular

Features,

Functionalities



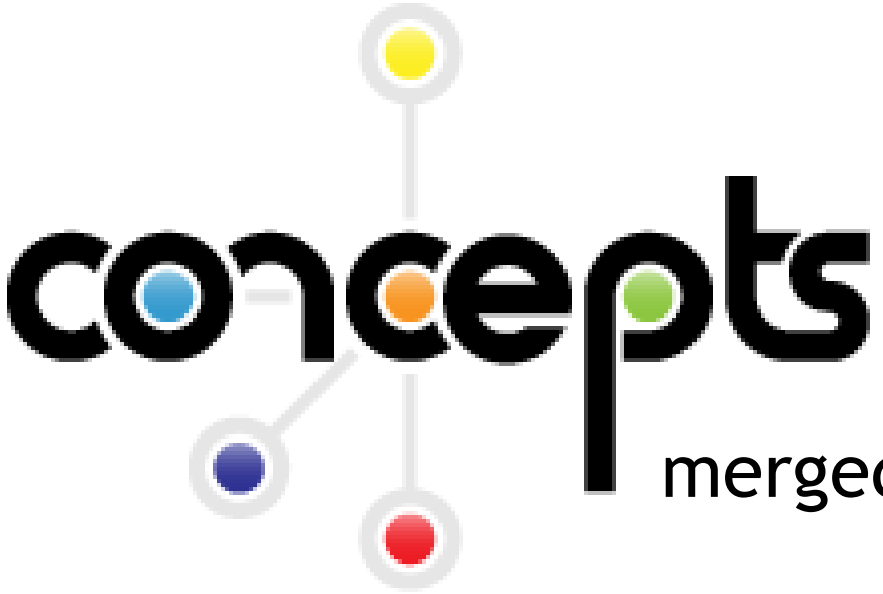
Specific

Purposes/Goals/

Use Setting

ACTION POTENTIAL

For better 'SYSTEM THINKERS' and 'BEST FIT' of People & Technology



merged together by Mark & Pierre

In other words, the concepts of ‘Organizational Choice’, ‘Enactment’, and ‘Action Potentials & Limitations’ can help us to be more effective in how we might incorporate Digital Technologies in our design of Work - and specifically, at different levels of Interaction in Work Organization.

Towards a Conceptual STS for Work(ing) and Digital Technology

A framework for the Leiden conference

Social Systems Level

1. Interactions

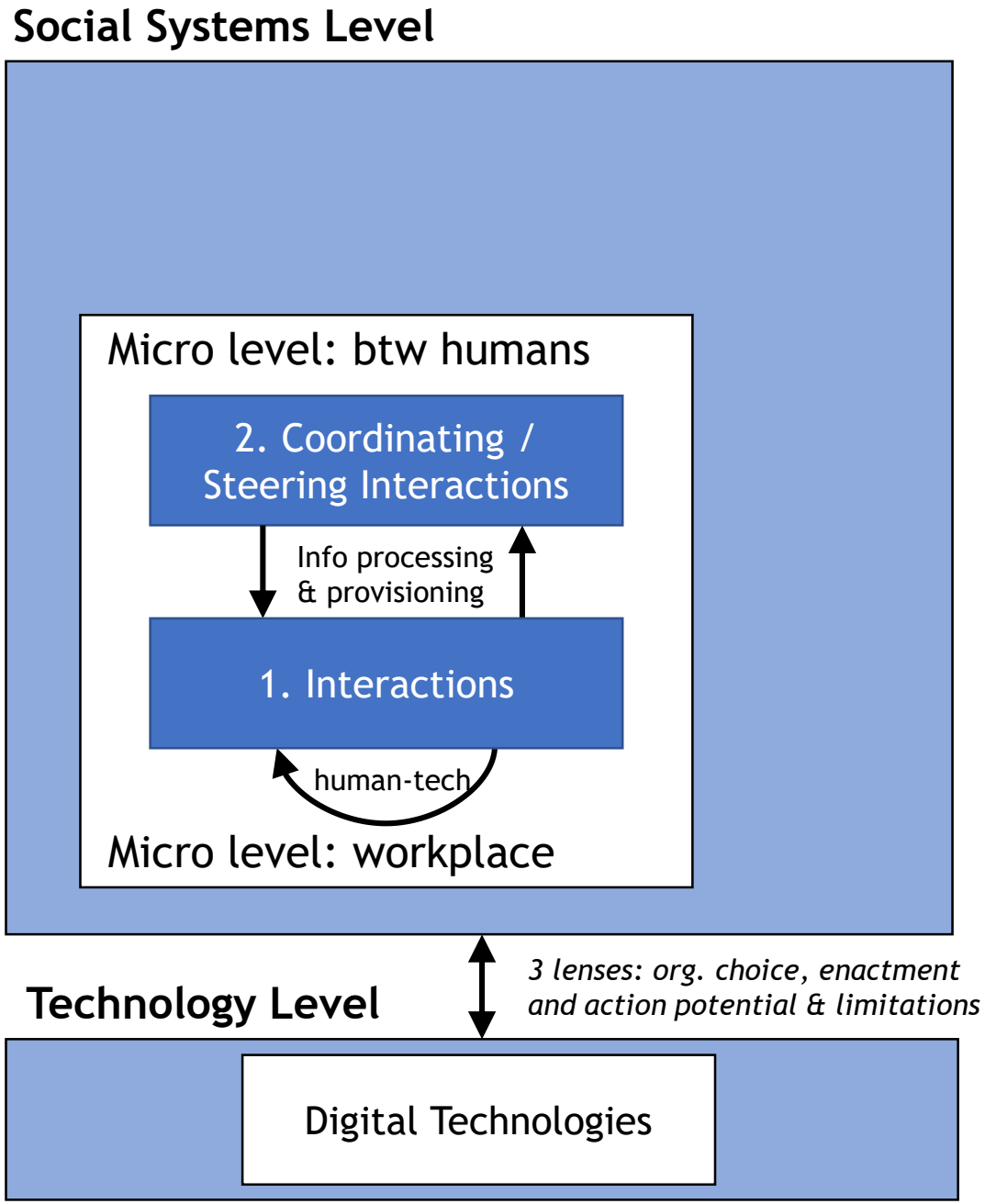
human-tech

Micro level: workplace

3 lenses: org. choice, enactment and action potential & limitations

Technology Level

Digital Technologies



Effects on:

- Autonomy
- Teamwork
- Variation in work
- Horizontal coordination
- Learning possibilities
- ???

Social Systems Level

Meso level: an organization

2. Coordinating / Steering Interactions

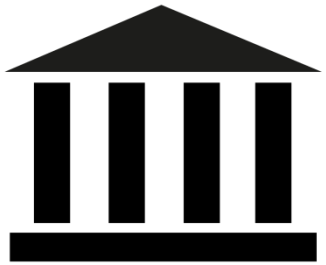
Info processing & provisioning

1. Interactions

3 lenses: org. choice, enactment and action potential & limitations

Technology Level

Digital Technologies



Effects on:

- Organizational complexity
- Homogeneous flows
- Horizontal coordination
- Collaboration
- Trust and openness
- ???

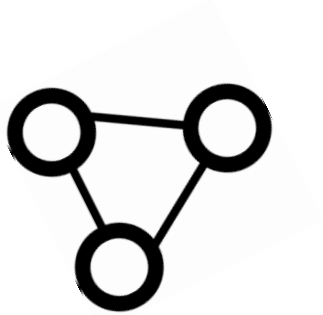
Social Systems Level

Macro level: coll. networks

2. Coordinating / Steering Interactions

Info processing & provisioning

1. Interactions



Effects on:

- Network collaboration
- Sustainability
- ???

3 lenses: org. choice, enactment and action potential & limitations

Technology Level

Digital Technologies

Social Systems Level

Macro level: coll. networks

Meso level: an organization

Micro level: btw humans

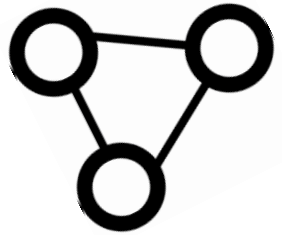
2. Coordinating / Steering Interactions

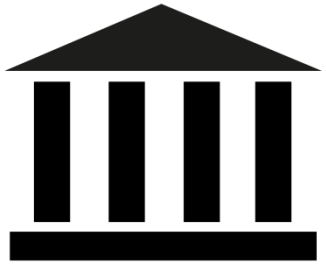
Info processing & provisioning

1. Interactions

human-tech

Micro level: workplace





3 lenses: org. choice, enactment and action potential & limitations

Technology Level

Digital Technologies

Let's
Explore

What are the possibilities and constraints of new digital technologies and how might these be effectively incorporated in the (process of) organization and ecosystem design?