# Doctoral Course Management, Organisation, ICT.

Meeting 2, April 20, 2022.

**Structur*ing*** (from noun to verb) - Coordination

Jan Lindvall

Department of Business Studies

Uppsala university

# Agenda

- Background – setting the scence
- Small –group discussions
- Q & A Main articles

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# Background - Setting the scene

# Common ground – common understanding

- Theory:(analytical) concepts and logics (deterministic/voluntaristic/**social mechanisms**).
- Structur **&** Actor. Structurat**ion**.
- Level of Analysis: Individual – Team – Company/Value Chain – Network/Value System/Ecology **(Multilevel approach).**
- Today: Organizational Structure/Design **- Coordination**

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# Some generic question **related to structuring**

- Intentions - Goal**s** – important (Purpose; ”Teleology”)
- Vertical (e.g line & staff) – Horisontal Dimension (e.g value chain).
- Consensus (”Harmony”/”alignment”) or Conflicts (e.g. Goal conflicts)?
- Competetion or Co-operation? (zero sum or win-win?)

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# …and more

- Intentions: **Efficiency** (improve the input/outpt relation; ”cost reduction”, calculation; **Logic of consequences**) & **Effectivenes** (Values/norms. **Logic of Appropriatness**, **Legitimiticity**).

- Either or, or ”both”? Centralisation/Decentralisation, Low Cost/Differentiation. **Ambidrexious organisations**. MODULARISATION.

# (Intellectual) History is always important!

- Market or Hierarchy? (Coase, 1937, Williamson , 1981). **Price as Signal/Information**; Transaction Cost.
- Managerialism (Chandler, 1962, 1977) ”The Visible Hand”, ”Strategy and Structure”. **Shareholder orientation**
- How to structure/”Design”?: Lawrence & Lorsch, 1977; Thompson, 1967; Gailbraith, 1973). Uncertainty; Differentiation & Integration. Technology/ work (Woodward, 1965): Contingency Theory – Practice Theory (Situated Practice)?
- Uncertainty reduced by **structuring** (centralisation/ decentralisation) and **information processing!** (input/search; store;process; distributed; output/use).

# Alfred Chandler important for our view of structuring

- Strategy – Structure- System (Purpose – Process – People).

- Efficiency – Growth! Volume driven. Perspective **inside- out *(Product* dominant logic)**.

- Functional (specialization) – Divisional, **M-form** (decentralisation with control),

Later: *Matrix – organisation (complexity, solve complexity: dual authority).
*Networks/Value systems, *Platforms (open).

- Value/Customer oriented. ”**Outside – in”**. **(*Service* Dominant Logic).**

# Important sources: Open systems: **Contingency Theory**

**Uncertainty** – Risk: causality (cause & effect). Ambiguity!

- Woodward (1965).Technology types: **small batch**(custom order); **large batch** (mass production); **process/continuos production**.
- Lawrence & Lorsch (1967). ”Open system”: **Differentiation & Integration.**
- Thompson (1967): **Pooled, Sequential, Reciprocal interdependece.**
- Gailbraith (1973): Design Complex Organizations: Reduce uncertainty by using information: reduce the need of information; improve the information capacity.

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# For structuring : Contingency important, but…cf Barley (1986).

Although contingency theory lost much of its potency in the 1980s and 1990s, interest in information processing continued to grow and became more sophisticated. Scholars in the field of organization and strategy sought to model more complex organizations, and agent-based computer modeling techniques led to research that could account for multiple design choices (Siggelkow, 2011). This literature re-discovered Simon's interest in individual information processing and the notion of nearly decomposable systems (Simon, 1964). These foundational ideas, when expressed with new modeling tools, made it possible to explore systematically the trade-offs involved with—and the decision-making implications of—interacting agents across a greater number and variety of information processing structures. Researchers adopted these methodologies, which led to a rebirth of organization design in strategy and organization theory.

# Aspirational level – intentions, goals. Goal alignment. **Incentives.**

"Individual motive is necessarily an internal, personal, subjective thing; common purpose is necessarily an external, impersonal, objective thing even though the individual interpretation of it is subjective".

Barnard *The Functions of the Executive* (1938/1968, p. 89)

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# Data architecture – a definition

”A company’s **data architecture** describes **how data is collected, stored**, **transformed, distributed, and consumed.** It includes the rules governing structured formats, such as databases and file systems, and the **systems for connecting data with the business processes** that consume it. Information architecture governs the processes and rules that **convert data into useful information.**

Dallemulle & Davenport, 2017, What´s your Data Strategy?

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# Data Warehouse Framework

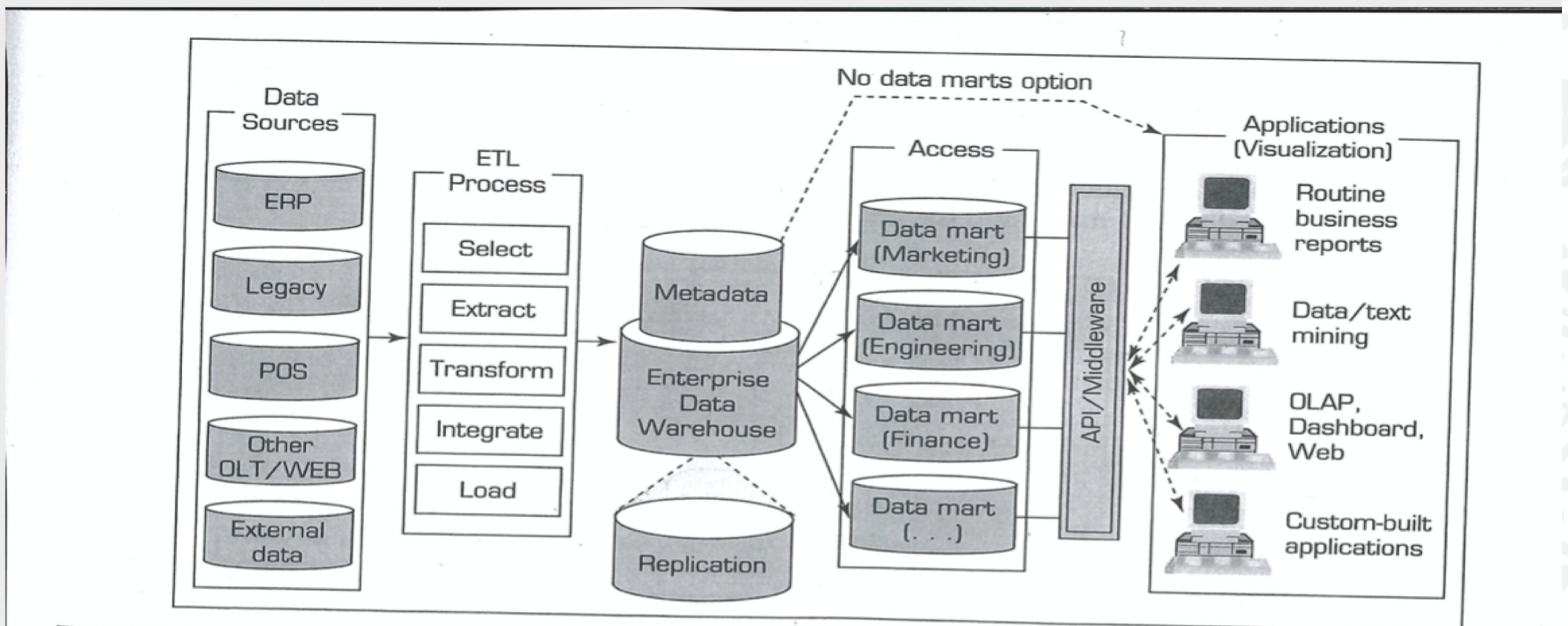


**FIGURE 2.1** A Data Warehouse Framework and Views.

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# The Map: Data Ecology: Small and Big-Data Architecture (Kelleher & Tierney)

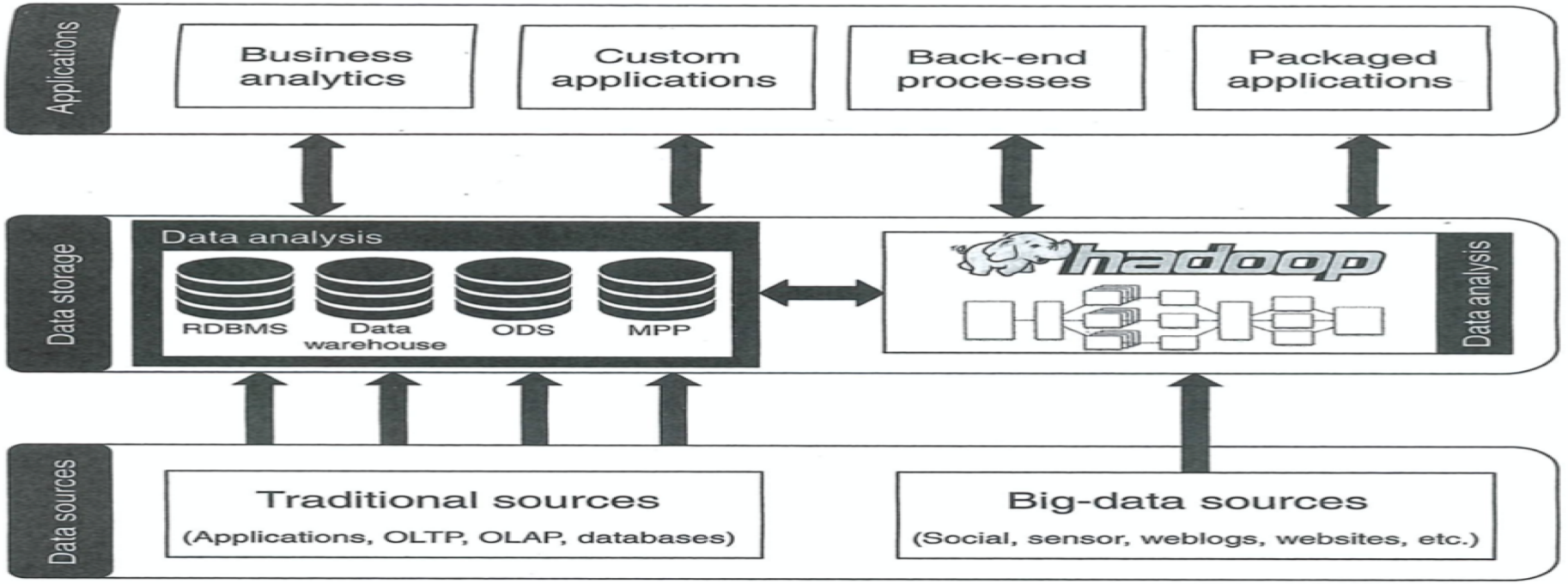


**Figure 6** A typical small-data and big-data architecture for data science (inspired by a figure from the Hortonworks newsletter, April 23, 2013, https://hortonworks.com/blog/hadoop-and-the-data-warehouse-when-to-use-which).

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# Cloud & Service

NIST SP 500-292

NIST Cloud Computing Reference Architecture

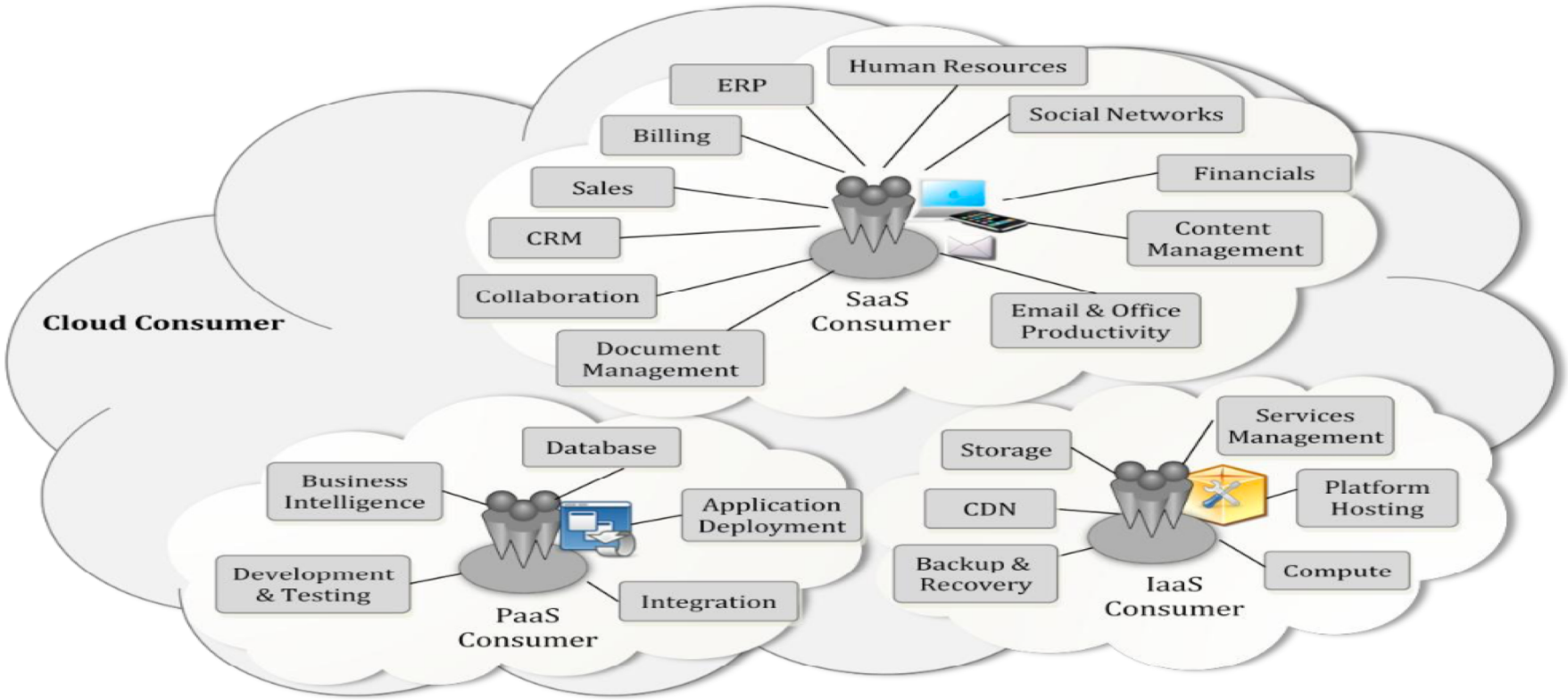


**Figure 6: Example Services Available to a Cloud Consumer**

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# Cloud Service Models- ”EA Stack”

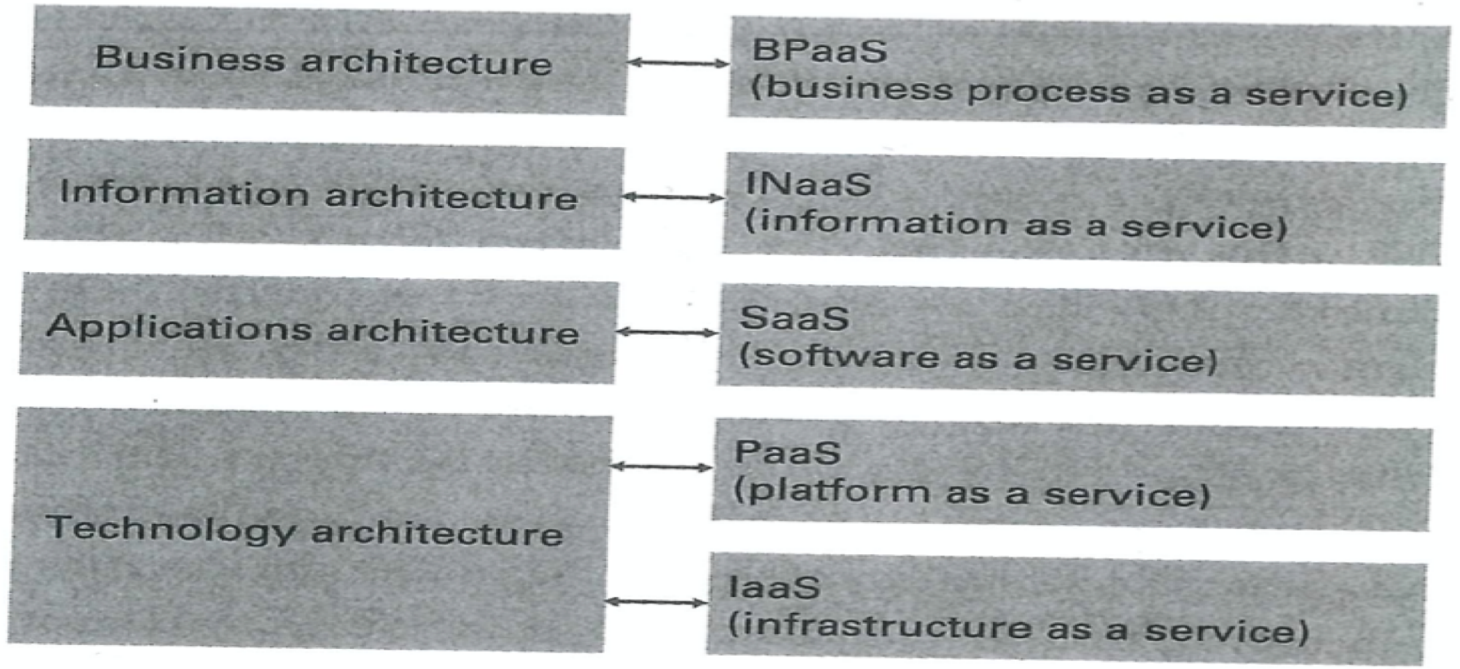


**Figure 2** Enterprise architecture stack and cloud service models

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# Discussion Main Articles

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# Article 1. **Structure** and Information.

**ORGANIZATIONAL STRUCTURE, INFORMATION PROCESSING, AND DECISION MAKING: A RETROSPECTIVE AND ROADMAP FOR RESEARCH**

John Joseph
University of California, Irvine
Paul Merage School of Business
Irvine, CA 92617
johnj2@uci.edu

Vibha Gaba
INSEAD
1 Ayer Rajah Avenue
Singapore 138676
vibha.gaba@insead.edu

Beginning with Simon (1947) — and motivated by an interest in the effect of **formal organizational structure** on **decision making**—a large body of research has examined **how organizations process information**. Yet, research in this area is extremely diverse and fragmented.

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# The goal

Therefore, the goal of this paper is to review the extant literature and summarize our collective knowledge, as well as identify and advance new concerns and questions about organizational structure and decision making. In this process, we revisit some of Simon's original ideas and assess how they are reflected in contemporary research. We analyze the different perspectives of how an organization's structure affects decision making and, in so doing, identify some of the literature's key issues. We then offer a roadmap for future research that addresses these issues and a point of view that could bring these perspectives closer together and expand research in new directions.

# Four major categories of research

- Problem-skill matching: organizatial economics; **efficient allocation** of tasks among members of multi-agent team.
- Screening. **Screening of information** by individuals situated in different structures. Decision Rules
- Adaption. Learning and adaption. Limited human cognition. Trial –and –errror, reinforcment learning. **Performance feedback**. Integration. **Modularity.**
- Cognition ”managers bring a set of simplified models to the problems they indetify, the feedback they receive, the solution they find, and the decisions they make”. (p 33). **Attention based view.**

# Three critical issues in the literature (p 5 & 6)

- **Dived** in the treatement of the role of structure in information processing.
- Overlooks the potential for **conflicts** in decision making.
- The treatement of the various stage of decision making **is uneven**: agenda setting, problem representation, **search** and *evaluation*.

# **Ambiguos (”tvetydig”)** information

”… a major problem for managers is **ambiguos** information, not lack of data. Ambiguity implies that there are **multiple interpretations** of an organizational situation. Ambiguity, unlike uncertainty, cannot be resolved – at least theoretically – with additional information”.

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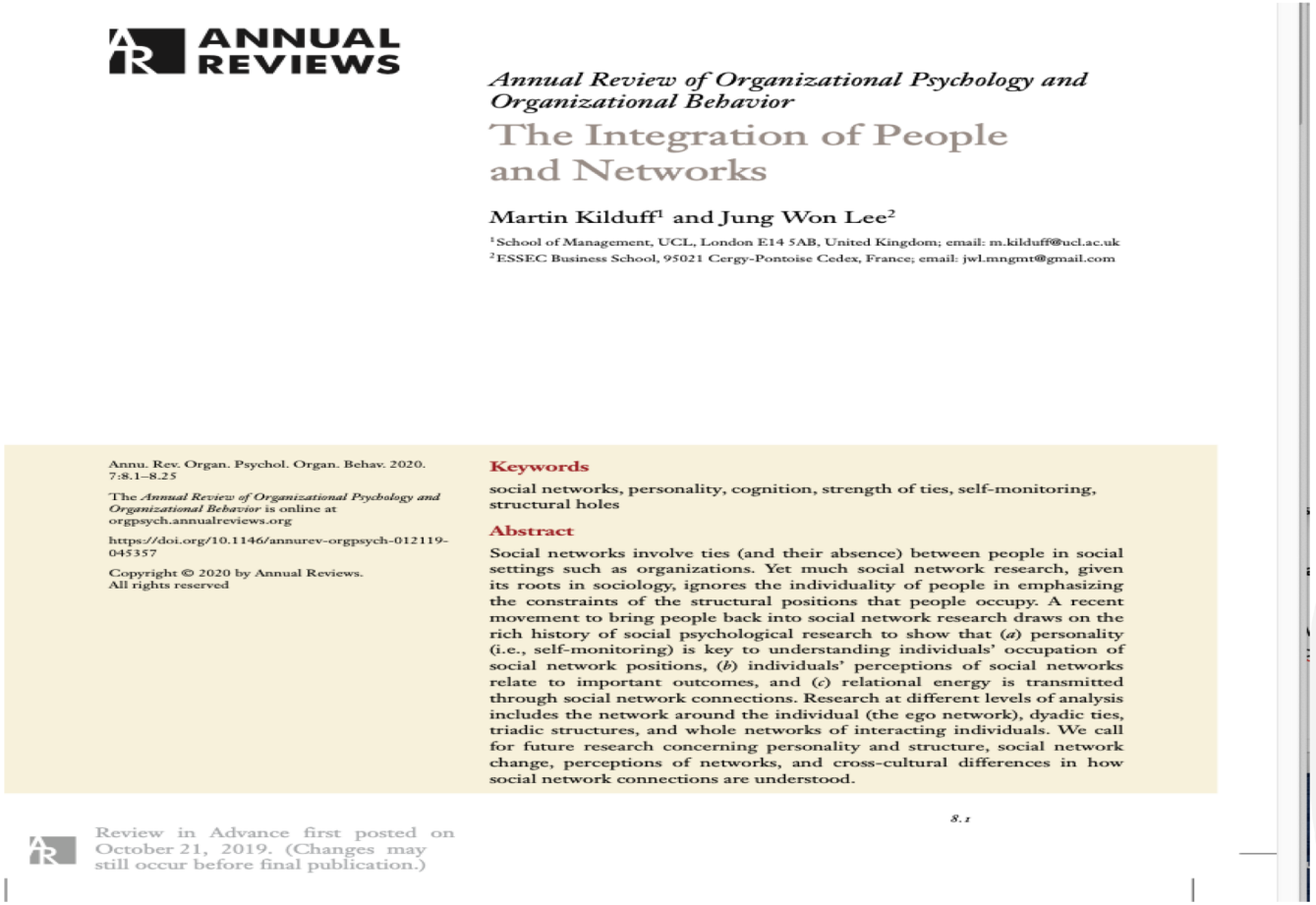
# Formal and Informal organisations – **social networks**



ANNUAL REVIEWS

*Annual Review of Organizational Psychology and Organizational Behavior*

## The Integration of People and Networks

Martin Kilduff[1] and Jung Won Lee[2]

[1]School of Management, UCL, London E14 5AB, United Kingdom; email: m.kilduff@ucl.ac.uk
[2]ESSEC Business School, 95021 Cergy-Pontoise Cedex, France; email: jwl.mngmt@gmail.com

Annu. Rev. Organ. Psychol. Organ. Behav. 2020. 7:8.1–8.25

The *Annual Review of Organizational Psychology and Organizational Behavior* is online at orgpsych.annualreviews.org

https://doi.org/10.1146/annurev-orgpsych-012119-045357



**Keywords**

social networks, personality, cognition, strength of ties, self-monitoring, structural holes

**Abstract**

Social networks involve ties (and their absence) between people in social settings such as organizations. Yet much social network research, given its roots in sociology, ignores the individuality of people in emphasizing the constraints of the structural positions that people occupy. A recent movement to bring people back into social network research draws on the rich history of social psychological research to show that (*a*) personality (i.e., self-monitoring) is key to understanding individuals' occupation of social network positions, (*b*) individuals' perceptions of social networks relate to important outcomes, and (*c*) relational energy is transmitted through social network connections. Research at different levels of analysis includes the network around the individual (the ego network), dyadic ties, triadic structures, and whole networks of interacting individuals. We call for future research concerning personality and structure, social network change, perceptions of networks, and cross-cultural differences in how social network connections are understood.

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# Intellectual history

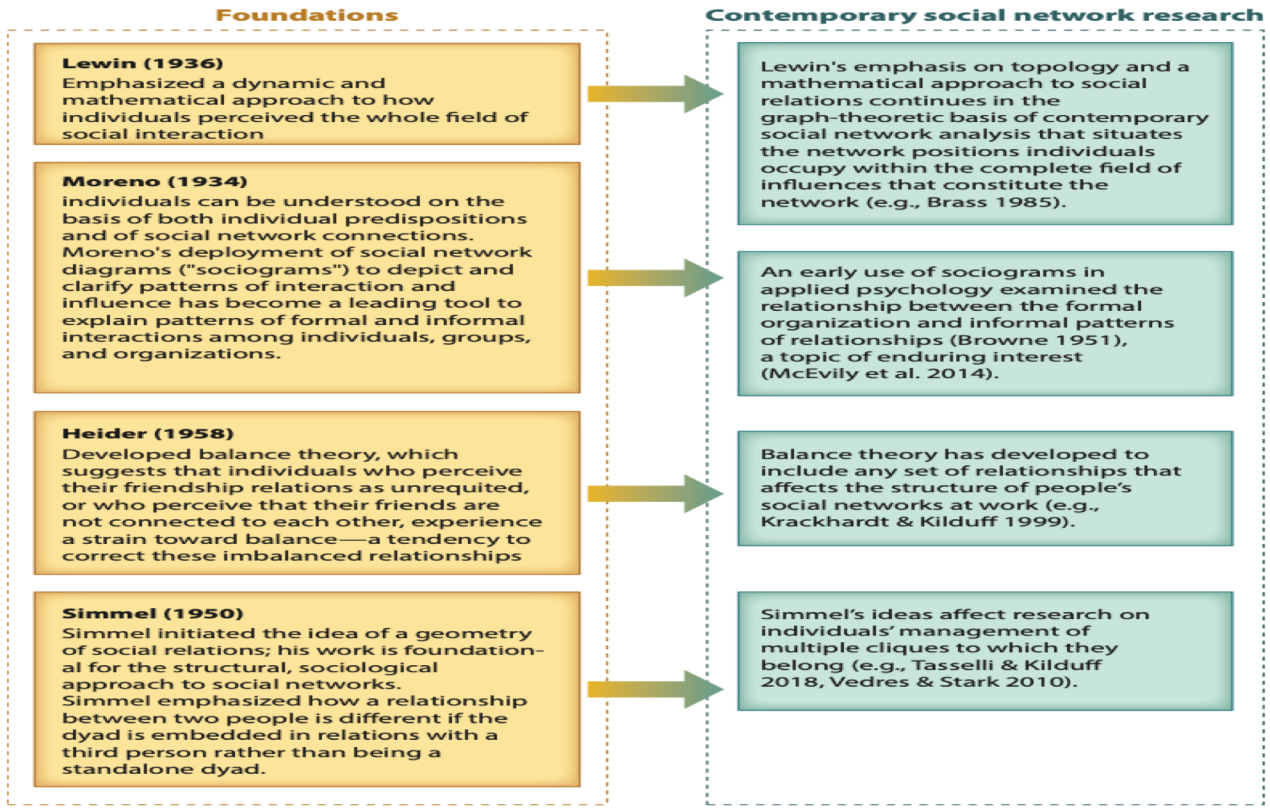


**Figure 1**

Social network research foundations in the work of Lewin, Moreno, Heider, and Simmel together with contemporary applications.

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# Structure dominates!

## Three lenses: Position, Embeddedness, Location

Much social network research emphasizes that **the structure** of networks affects and shapes peo- ple's identities and outcomes in ways that are beyond individuals' control. People are integrated into networks without the necessity of their volition. The effects of structure on individuals are captured through three different lenses: (*a*) network **positions** occupied, (*b*) **embeddedness** of ties, and (*c*) **location** in larger systems of connections.

## The importance of central **position!**

A fundamental axiom of network theory and research is that **individuals who occupy central positions in social network**s are likely to benefit from enhanced communication and timeliness of information and resource flow.

# Embeddedness: Burt (1992) Structural holes; Bridging and Bonding

## Enbeddedness

People are also integrated in social networks through a set of processes summarized by the term embeddedness, which represents a core principle of organizational social network research

## Visualisation

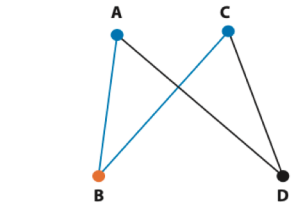
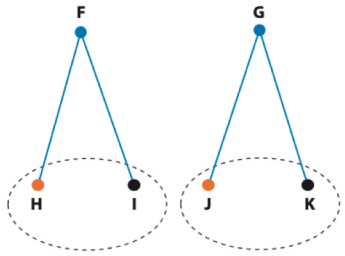
| Concept | Definition | Examples of outcomes |
|---|---|---|
| **Structural equivalence** | Persons **A** and **C** are connected to exactly the same other people (e.g., **B**) but not necessarily to each other.   | Structurally equivalent corporate officers made similar evaluations of nonprofit organizations (Galaskiewicz & Burt 1991). |
| **Role equivalence** | Persons **F** and **G** are connected to different people but these different people occupy equivalent roles.   | Role-equivalent workers tended to affect each other's turnover decisions (Krackhardt & Porter 1986). |

**Figure 2**

Structural equivalence, role equivalence, and organizational outcomes.

# Actor – People: Brininging People Back In

## People – Actor: Bringing People Back IN

- Social networks involve ties between interacting individuals. Yet it is this emphasis on individual people that the structuralist perspective, summarized above, **has sought to deny.**
- Research that incorporates attributes of individuals has long been **demonized** as a “dead end” (Mayhew 1980, p. 335) because network patterns are assumed to derive from social structure rather **than human agency.** Thus, structuralists “shun the ‘person’ construct as polluting” in their search for an individual-free science of networks

## Three aspects of actor/indivdual

- **Personality:** self-monotoring theory (low & high respons to situation).
- **Cognition.** Thus, individuals in organizations perceive their friendship ties **with others as more reciprocated than they actually are**. This bias helps individuals avoid feelings of unrequited affection among people they see daily, and individuals prefer to see their friends as friends of each other to avoid the cognitive tension that derives from **unbalanced relationships.**
- **Emotion:** Friendship important. Perhaps the most compelling recent approach to emotions and social networks examines the **relational energy that some people transmit to others in the workplace**. The more people an in- dividual energizes, the higher the individual’s job performance: The energized reward energizers with information, resources, and discretionary attention (p 89)

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# Different Levels of Analysis



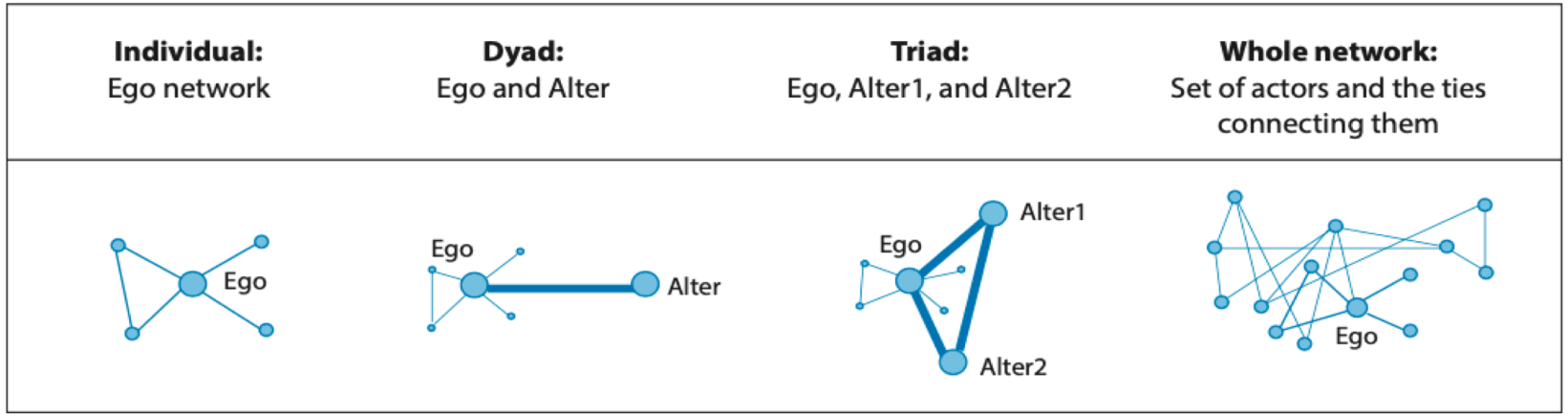


**Figure 3**

The individual, dyadic, triadic, and network levels of analysis.

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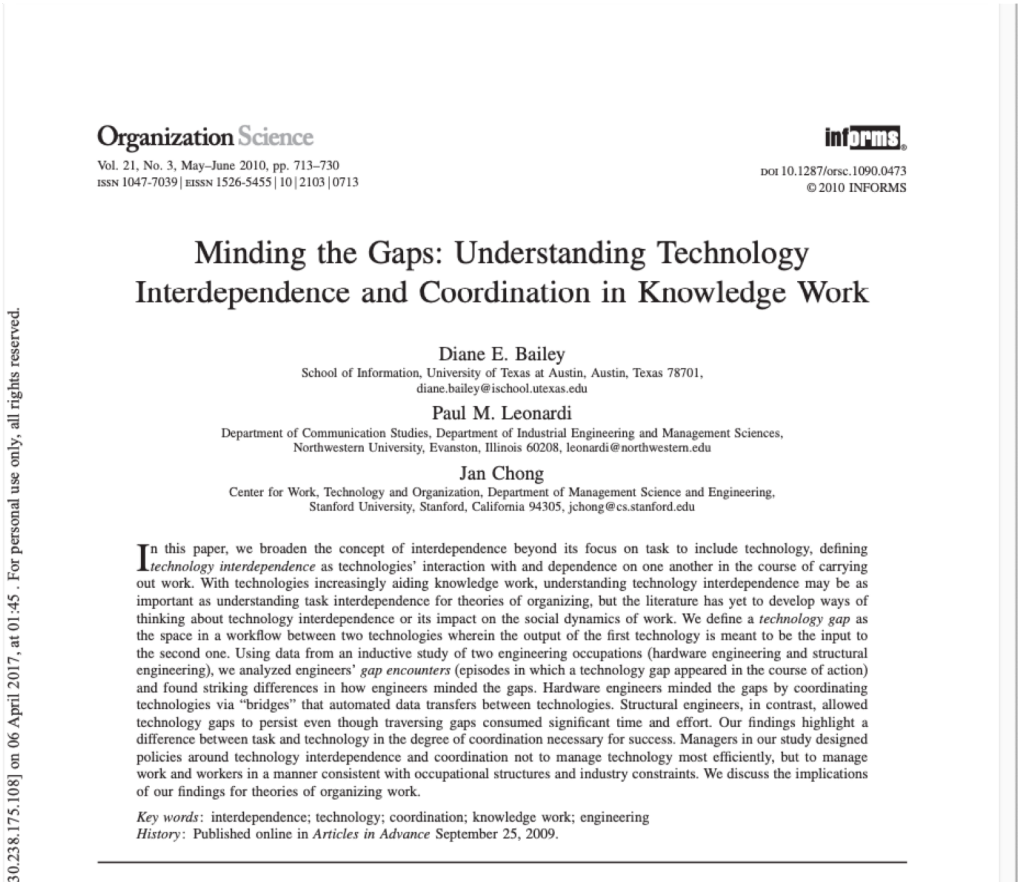
# Article 3. Work & Technology



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DOI 10.1287/orsc.1090.0473


Minding the Gaps: Understanding Technology Interdependence and Coordination in Knowledge Work

Diane E. Bailey
School of Information, University of Texas at Austin, Austin, Texas 78701,
diane.bailey@ischool.utexas.edu
Paul M. Leonardi
Department of Communication Studies, Department of Industrial Engineering and Management Sciences,
Northwestern University, Evanston, Illinois 60208, leonardi@northwestern.edu
Jan Chong
Center for Work, Technology and Organization, Department of Management Science and Engineering,
Stanford University, Stanford, California 94305, jchong@cs.stanford.edu

In this paper, we broaden the concept of interdependence beyond its focus on task to include technology, defining *technology interdependence* as technologies' interaction with and dependence on one another in the course of carrying out work. With technologies increasingly aiding knowledge work, understanding technology interdependence may be as important as understanding task interdependence for theories of organizing, but the literature has yet to develop ways of thinking about technology interdependence or its impact on the social dynamics of work. We define a *technology gap* as the space in a workflow between two technologies wherein the output of the first technology is meant to be the input to the second one. Using data from an inductive study of two engineering occupations (hardware engineering and structural engineering), we analyzed engineers' *gap encounters* (episodes in which a technology gap appeared in the course of action) and found striking differences in how engineers minded the gaps. Hardware engineers minded the gaps by coordinating technologies via "bridges" that automated data transfers between technologies. Structural engineers, in contrast, allowed technology gaps to persist even though traversing gaps consumed significant time and effort. Our findings highlight a difference between task and technology in the degree of coordination necessary for success. Managers in our study designed policies around technology interdependence and coordination not to manage technology most efficiently, but to manage work and workers in a manner consistent with occupational structures and industry constraints. We discuss the implications of our findings for theories of organizing work.

*Key words*: interdependence; technology; coordination; knowledge work; engineering
*History*: Published online in *Articles in Advance* September 25, 2009.



"We identify in our field notes **310 gap encounters, or episodes in** which an engineer, in the course of his work, came to the edge of a **technology gap** that he had to traverse."

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# Categorizations & definitions

**”** By examining the direction of **work-flow** across the gap **(forward or backward),** we find that technologies in both occupations exhibited, to use Thompson’s (1967) terms, ***considerable sequential and some reciprocal interdependence.*** We **categorize gaps by their “width,”** a measure of how difficult traversal of the gap was for the engineer, to reveal differences by occupation in the distribution of **wide and narrow gaps** in the **forward and backward directions. ”**

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# Cont.

”By examining how many substitutable technologies were available to the engineers for the completion of any task, we can speak to the ***prevalence of pooled technology*** interdependence as well.”

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# ”Minded” – cognition?!

We explore this possibility in our second question:

”How do knowledge workers experience and deal with technology interdependence? In particular, we focus on **how engineers minded technology gaps,** ultimately developing a typology of gap-traversal strategies used by the engineers we studied. These strategies included and standing still at gaps.”

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# Result: Variations! (Cf Bailey & Barley, 2020).

”We also show that **interdependence among technologies** in both settings was **largely distinct from task interdependence** among people. We find that although **both occupations** exhibited what we would call **high technology interdependence**, differences in how that interdependence was manifested across occupations suggest that the experience of **technology interdependence might vary considerably.”**

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# Comments other articles

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# Boundary work

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2019, Vol. 13, No. 2, 704–736.
https://doi.org/10.5465/annals.2017.0089

## BOUNDARY WORK AMONG GROUPS, OCCUPATIONS, AND ORGANIZATIONS: FROM CARTOGRAPHY TO PROCESS

ANN LANGLEY[1]
HEC Montréal

KAJSA LINDBERG
University of Gothenburg

BJØRN ERIK MØRK
BI Norwegian Business School and University of Warwick

DAVIDE NICOLINI
University of Warwick

ELENA RAVIOLA
LARS WALTER
University of Gothenburg

**This article reviews scholarship dealing with the notion of "boundary work," defined as purposeful individual and collective effort to influence the social, symbolic, material, or temporal boundaries, demarcations; and distinctions affecting groups, occupations, and organizations. We identify and explore the implications of three conceptually distinct but interrelated forms of boundary work emerging from the literature. *Competitive* boundary work involves mobilizing boundaries to establish some kind of advantage over others. In contrast, *collaborative* boundary work is concerned with aligning boundaries to enable collaboration. Finally, *configurational boundary work* involves manipulating patterns of differentiation and integration among groups to ensure that certain activities are brought together, whereas others are kept apart, orienting the domains of competition and collaboration. We argue that the notion of boundary work can contribute to the development of a uniquely processual view of organizational design as open-ended, and continually becoming, an orientation with significant future potential for understanding novel forms of organizing, and for integrating agency, power dynamics, materiality, and temporality into the study of organizing.**



**TABLE 1**
**Three Types of Boundary Work**

| | Competitive Boundary Work | Collaborative Boundary Work | Configurational Boundary Work |
|---|---|---|---|
| Schematic representation |  |  |  |
| Agents, positions, and purposes | People raising boundaries around themselves to protect territory and exclude others | People realigning the boundaries separating them to enable collaboration | People designing boundaries to orient configurations of differentiation and integration among groups |
| Historical and theoretical roots | Social studies of science (Gieryn, 1983); Practice theory (Bourdieu, 1977) | Negotiated order theory (Strauss, 1978); Practice theory (Bourdieu, 1977) | Boundary theories (Lamont & Molnár, 2002); Boundary organizations (Guston, 2001) |
| Adjacent perspectives | Professions, occupations (Abbott, 1988, 1995) | Boundary spanning (Levina & Vaast, 2005); Boundary objects (Carlile, 2002, 2004) | Framing and spaces from social movement theory (Benford & Snow, 2000) |
| Modes of boundary work | Working for boundaries:<br>Defending<br>Contesting<br>Creating | Working at boundaries:<br>Negotiating<br>Embodying<br>Downplaying | Working through boundaries:<br>Arranging<br>Buffering<br>Coalescing |
| Consequences of boundary work | Creation, maintenance, or disruption of power relations between groups | Collaboration, learning, and coordination among different groups | Reconfiguration of patterns of collaboration and competition among groups |

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# New organisations/communities: Trading Zones.

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informs
DOI 10.1287/orsc.1050.0157


## Life in the Trading Zone: Structuring Coordination Across Boundaries in Postbureaucratic Organizations

Katherine C. Kellogg
Organization Studies, MIT Sloan School of Management, E52-544, 50 Memorial Drive, Cambridge, Massachusetts 02142, kkellogg@mit.edu

Wanda J. Orlikowski
Information Technology and Organization Studies, MIT Sloan School of Management, E53-325, 50 Memorial Drive, Cambridge, Massachusetts 02142, wanda@mit.edu

JoAnne Yates
Communications, Information, and Organization Studies, MIT Sloan School of Management, Cambridge, Massachusetts 02142, jyates@mit.edu

In our study of an interactive marketing organization, we examine how members of different communities perform boundary-spanning coordination work in conditions of high speed, uncertainty, and rapid change. We find that members engage in a number of cross-boundary coordination practices that make their work visible and legible to each other, and that enable ongoing revision and alignment. Drawing on the notion of a "trading zone," we suggest that by engaging in these practices, members enact a coordination structure that affords cross-boundary coordination while facilitating adaptability, speed, and learning. We also find that these coordination practices do not eliminate jurisdictional conflicts, and often generate problematic consequences such as the privileging of speed over quality, suppression of difference, loss of comprehension, misinterpretation and ambiguity, rework, and temporal pressure. After discussing our empirical findings, we explore their implications for organizations attempting to operate in the uncertain and rapidly changing contexts of postbureaucratic work.

*Key words*: knowledge; information technology; new organizational forms; work practices; trading zone; cross-boundary coordination

# Knowledge sharing

”The literature on knowledge sharing suggests that organization members from diverse specialties can best work across community boundaries when they: (i) share a common lexicon; (ii) help to reconcile interpretive differences by creating shared meaning; and (iii) facilitate means through which individuals can jointly transform their local knowledge. Carlile (2002) refers to these three processes as transferring, translating, and transforming. (syntax, semantics, pragmatics).

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# Trading zone – what it is, how it functions…

”Engaging in a trading zone suggests that diverse groups can interact across boundaries by **agreeing on the general procedures** of exchange even while they **may have different local interpretations** of the objects being exchanged, and may **even disagree on the intent** and meaning of the exchange itself. Such an understanding evokes a view of cross-boundary coordination as performative, as emergent in recurrent actions, and thus as a provisional and ongoing accomplishment”.

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# Internet of Things (IoT) – need of standrads

AI & SOCIETY
https://doi.org/10.1007/s00146-018-0807-y

OPEN FORUM

## Internet of Things and Big Data: the disruption of the value chain and the rise of new software ecosystems

Norbert Jesse[1,2]

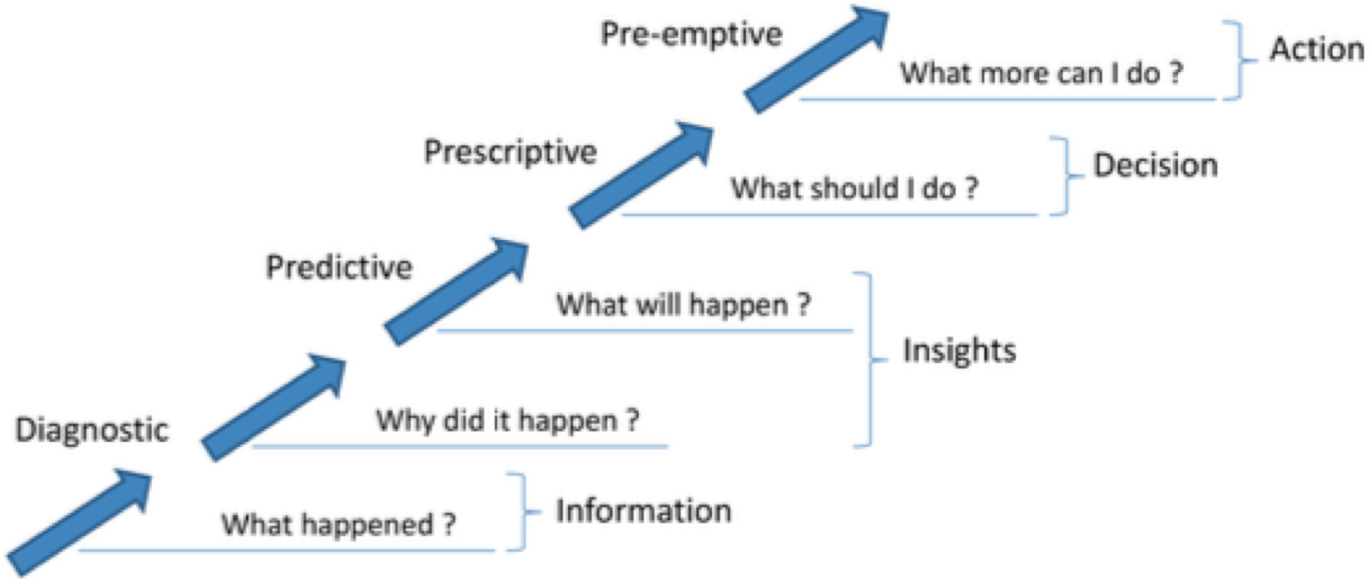
Received: 24 April 2017 / Accepted: 22 January 2018


**Abstract**
IoT connects devices, humans, places, and even abstract items like events. Driven by smart sensors, powerful embedded microelectronics, high-speed connectivity and the standards of the internet, IoT is on the brink of disrupting today's value chains. Big Data, characterized by high volume, high velocity and a high variety of formats, is a result of and also a driving force for IoT. The datafication of business presents completely new opportunities and risks. To hedge the technical risks posed by the interaction between "everything", IoT requires comprehensive modelling tools. Furthermore, new IT platforms and architectures are necessary to process and store the unprecedented flow of structured and unstructured, repetitive and non-repetitive data in real-time. In the end, only powerful analytic tools are able to extract "sense" from the exponentially growing amount of data and, as a consequence, data science becomes a strategic asset. The era of IoT relies heavily on standards for technologies which guarantee the interoperability of everything. This paper outlines some fundamental standardization activities. Big Data approaches for real-time processing are outlined and tools for analytics are addressed. As consequence, IoT is a (fast) evolutionary process whose success in penetrating all dimensions of life heavily depends on close cooperation between standardization organizations, open source communities and IT experts.

**Keywords** Internet of Things · Smart factories · Big Data · Software platforms · Data science

# Different attention

**Fig. 7** From hindsight to insight to foresight (based on HP 2014)

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# Platforms


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Research Article

## The digital platform: a research agenda

Mark de Reuver[1], Carsten Sørensen[2], Rahul C. Basole[3]

[1]Faculty Technology Policy and Management, Department Engineering Systems and Services, Delft University of Technology, Jaffalaan 5, 2628BX Delft, Delft, The Netherlands;
[2]Department of Management, The London School of Economics and Political Science, London, UK;
[3]College of Computing and Tennenbaum Institute, Georgia Tech, Atlanta, Georgia, USA

**Correspondence:**
**C Sørensen, Department of Management, The London School of Economics and Political Science, London, UK.**
**E-mail: c.sorensen@lse.ac.uk**

**Abstract**
As digital platforms are transforming almost every industry today, they are slowly finding their way into the mainstream information systems (ISs) literature. Digital platforms are a challenging research object because of their distributed nature and intertwinement with institutions, markets and technologies. New research challenges arise as a result of the exponentially growing scale of platform innovation, the increasing complexity of platform architectures and the spread of digital platforms to many different industries. This paper develops a research agenda for digital platforms research in IS. We recommend researchers seek to (1) advance conceptual clarity by providing clear definitions that specify the unit of analysis, degree of digitality and the sociotechnical nature of digital platforms; (2) define the proper scoping of digital platform concepts by studying platforms on different architectural levels and in different industry settings; and (3) advance methodological rigour by employing embedded case studies, longitudinal studies, design research, data-driven modelling and visualisation techniques. Considering current developments in the business domain, we suggest six questions for further research: (1) Are platforms here to stay? (2) How should platforms be designed? (3) How do digital platforms transform industries? (4) How can data-driven approaches inform digital platforms research? (5) How should researchers develop theory for digital platforms? and (6) How do digital platforms affect everyday life?
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**Keywords:** digital platforms; digital infrastructures; digital ecosystems; digital innovation; research agenda

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# A new way to structure - Platforms

**Table2** Main issues, risks and recommendations for digital platform scholars

| | *Issue* | *Risk* | *Recommendation* |
|---|---|---|---|
| Concepts | Conceptual ambiguity | Platform concept becomes a fad | Provide clear definitions of platforms and ecosystems, drawing upon previous research |
| | Differing units of analysis across studies | Lack of comparability between studies | Identify the unit of analysis and its boundary |
| | Differing framing of platforms | | Specify whether the perspective on platforms is technical or sociotechnical in nature |
| | Importance of digitality | Lack of understanding how digitality affects platforms | Make digitality an integral aspect of the definitions |
| Scoping | Digital platforms appear on multiple levels of technical architecture (vertical scoping) | Sacrificing comparability across studies or relevance and sustainability of discourse | Widen scope of digital platform research |
| | Platforms are emerging for specific application categories such as payment, share economy, media and health (horizontal scoping) | Lack of understanding how intertwinement of digital platforms with systems and institutions affects outcomes | Develop contextualised theory on digital platforms |
| Methodology | Difficult to isolate unit of analysis | Lack of comparability between studies | Conduct embedded case study approaches to compare platforms within the same larger ecosystem |
| | Digital platform and ecosystem dynamics have long time horizon | Snapshot research methods do not provide understanding of causalities | Conduct longitudinal studies on platform dynamics |
| | Bias towards successful cases, studied ex-post | Lack of design knowledge on digital platforms | Study failure cases<br>Employ a design science approach to digital platform research |
| | Digital platforms are large, complex, and dynamic | Small-scale methods do not lead to holistic understanding | Conduct data-driven approaches, including network analysis<br>Visualise structure and dynamics of digital ecosystems<br>Conduct computational modelling of ecosystem behaviour |

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# What is a Platform Company?

Cusumano, et al, 2019, The Business of Platforms

”More importantly, they bring together individuals and organizations so the can **innovate** or **interact** in ways not otherwise possible, withe the potential for **nonlinear** increases in utility and value”

- Nonlinear
- Network effects: positive feedback loops. Economies of Scale!

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# What makes industry platforms unique?

- Engage multiple sides of a market: **bringing together** two or more market actors, or ”sides” that would **not otherwise interact** or easily **connect.**

- Generate network effects.

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# Platform business models: two basic types

- **Innovation platforms** usually consist of common technological building blocks that the owner and ecosystem partners can share in order to create new complementary products and services. E.g Google, IBM Watson, Amazon AWS.

- **Transaction platforms.** Largely intermediaries or online marketplaces that make it possible to share information or to buy, sell or access a variety of goods and services. E.g. Facebook, Uber, Airbnb.

- **Hybrids:** emphasize a combination of product and platform businesses. E.g Apple, Oracle