
Measuring organisational innovation – concepts, indicators and outcomes

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Non-Technical Innovations – Definitions, Measurement and Policy Implications

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Outline

- Challenges in surveying organisational innovations – conceptual considerations
- Surveying different forms of organisational innovation
- Measurement of the outcomes of organisational innovations
- Measuring the effects of organisational innovations – some empirical results
- Conclusions



Challenges in surveying organisational innovations

- Organisational innovations are addressed by **different academic disciplines** from different theoretical backgrounds (organisational science, economics, work psychology, sociology etc.)
- No single commonly accepted **definition** and **theory** base
- **Outcomes** of organisational innovations are difficult to define and measure
- Specific (new) set of performance **indicators** necessary for the measurement of organisational innovations



What is an organisational innovation?

Organisational innovations can be understood in different ways:

- (1) **Enablers for other types of innovations:** implementation and use of other forms of innovations (e.g. material product, service or technical process innovations) might be linked to organisational innovations
- (2) **Distinct form of innovation - direct source of competitive advantage:** organisational innovations can directly improve performance
- (3) **Prerequisites for knowledge development in firms:** Firms' ability to acquire, create and make the best use of competencies, skills and knowledge is closely linked to organisational and managerial practices



What is an organisational innovation?

- Organisational innovations can be understood as the non-technical part of *process innovations*
- Unlike product and service innovations, process innovations (technical and non-technical) are *not directly implemented in the market*
- While the effects of product and service innovations can be directly measured by monetary indicators (share of sales), the effects of process innovations are not directly visible in shares of sales and are *therefore more difficult to measure*.



What is an organisational innovation?

- Schumpeter: success (economic, market, social etc.) distinguishes an innovation from an invention, therefore organisational innovations need to be defined and measured in relation to their outcomes/effects.
- Organisational innovation versus organisational change?



Organisational innovation vs. organisational change

- Organisational innovation involves a certain degree of **intentionality**
- Organisational innovation typically has a specific aim – **intended outcome**
- Organisational innovation is mostly an organisational change, but not every organisational change is also an organisational innovation
- The distinction between organisational change and organisational innovation is clearly possible **ex post** – after the outcome can be observed (due to time-lag)

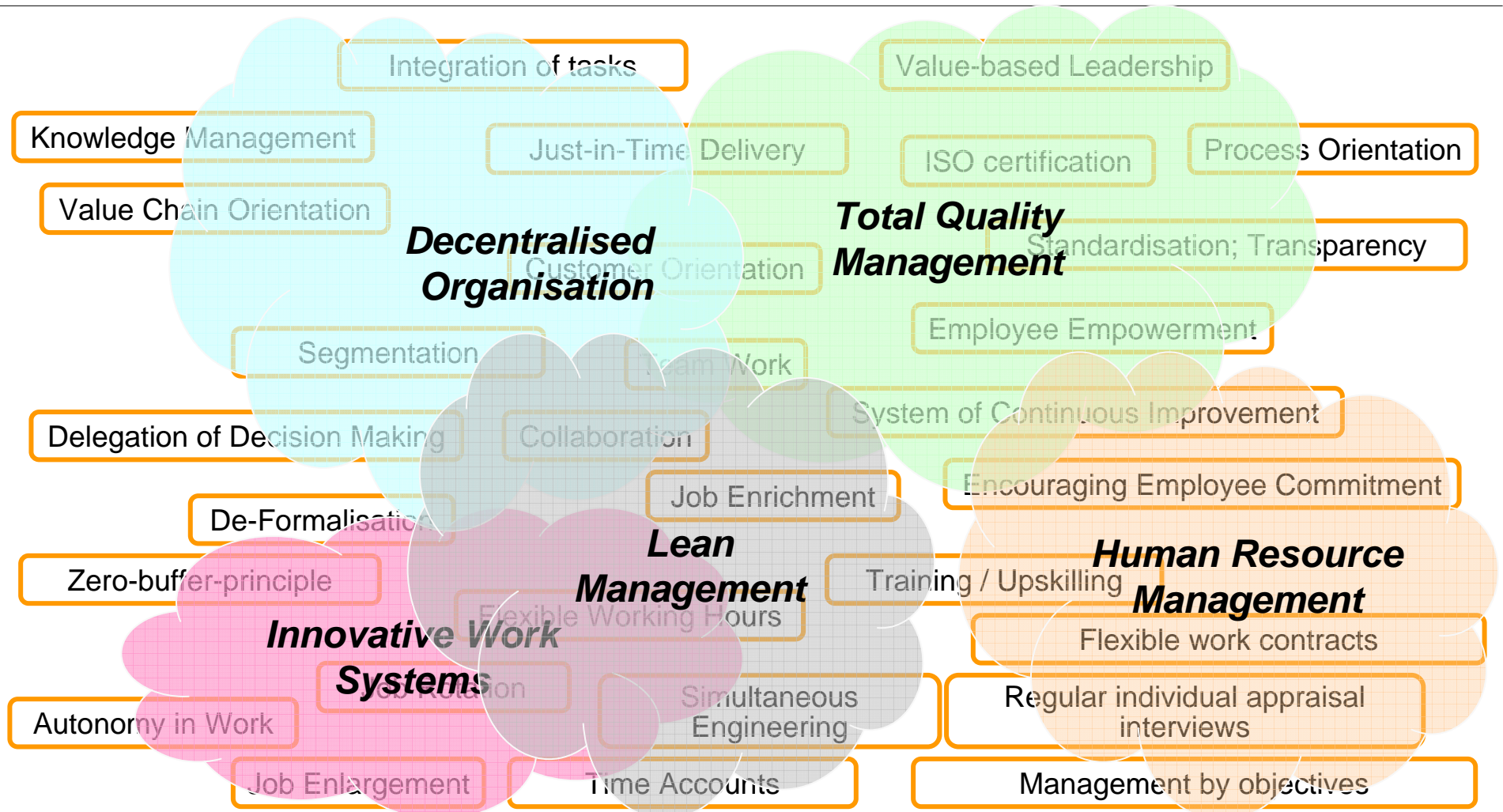


Measuring *different forms* of organisational innovation

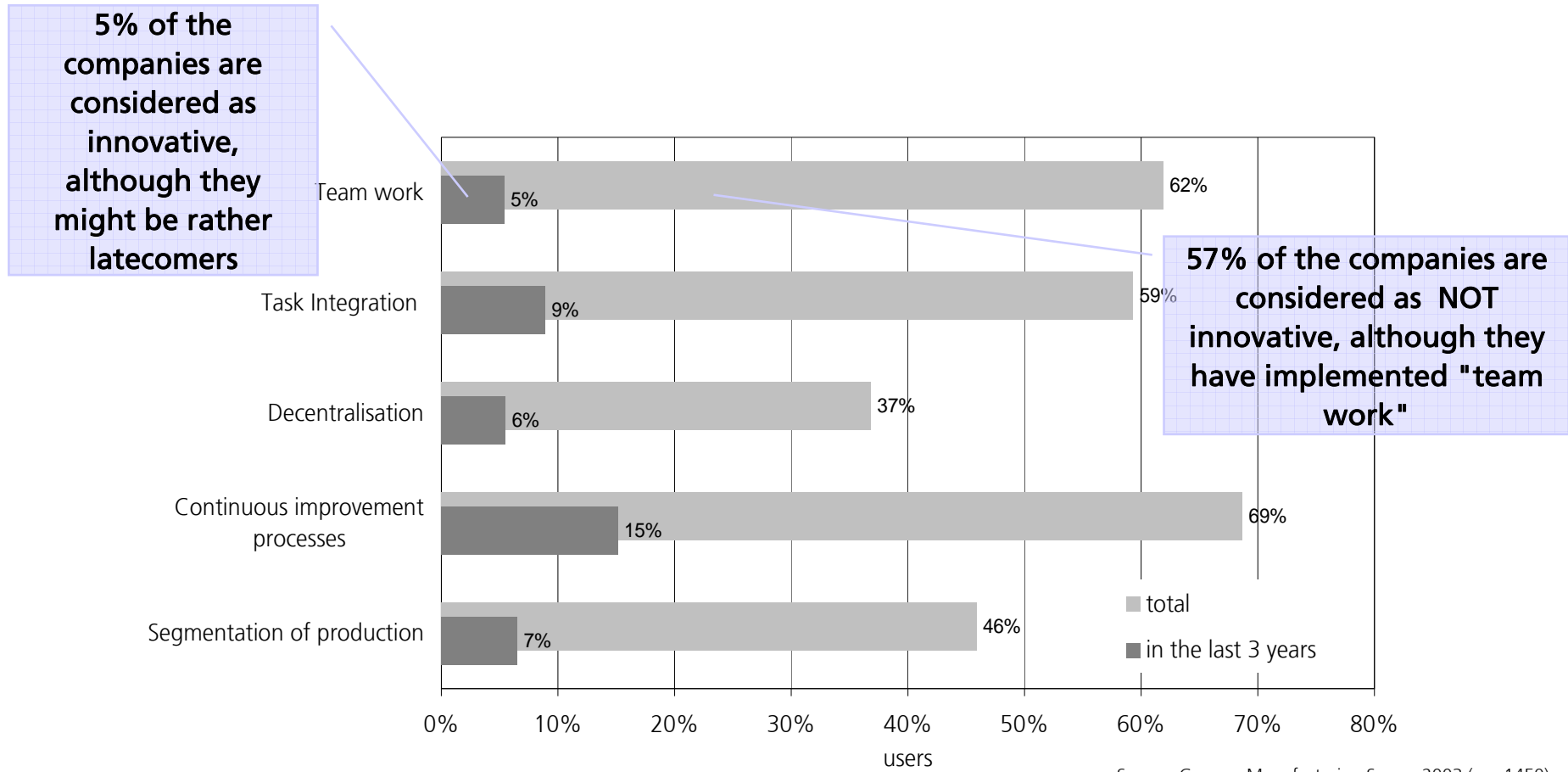
- a) **Complexity and *different aggregation levels* of organisational innovations:** Organisational innovation is not one aggregated concept, but is composed of many different aspects (great variety of specific indicators)
- b) **Different *life cycle* of organisational innovations:** Organisational innovations do not have a 'sell-by-date' as product and service innovations tend to have (typically 3 years). Novelty does not seem to be the single main criterion defining an organisational innovation
- c) **Interfirm versus *intrafirm* diffusion of organisational innovations**
The extent of implementation within the firm seems to be important. Partial implementation vs. full use of organisational concepts makes a great difference



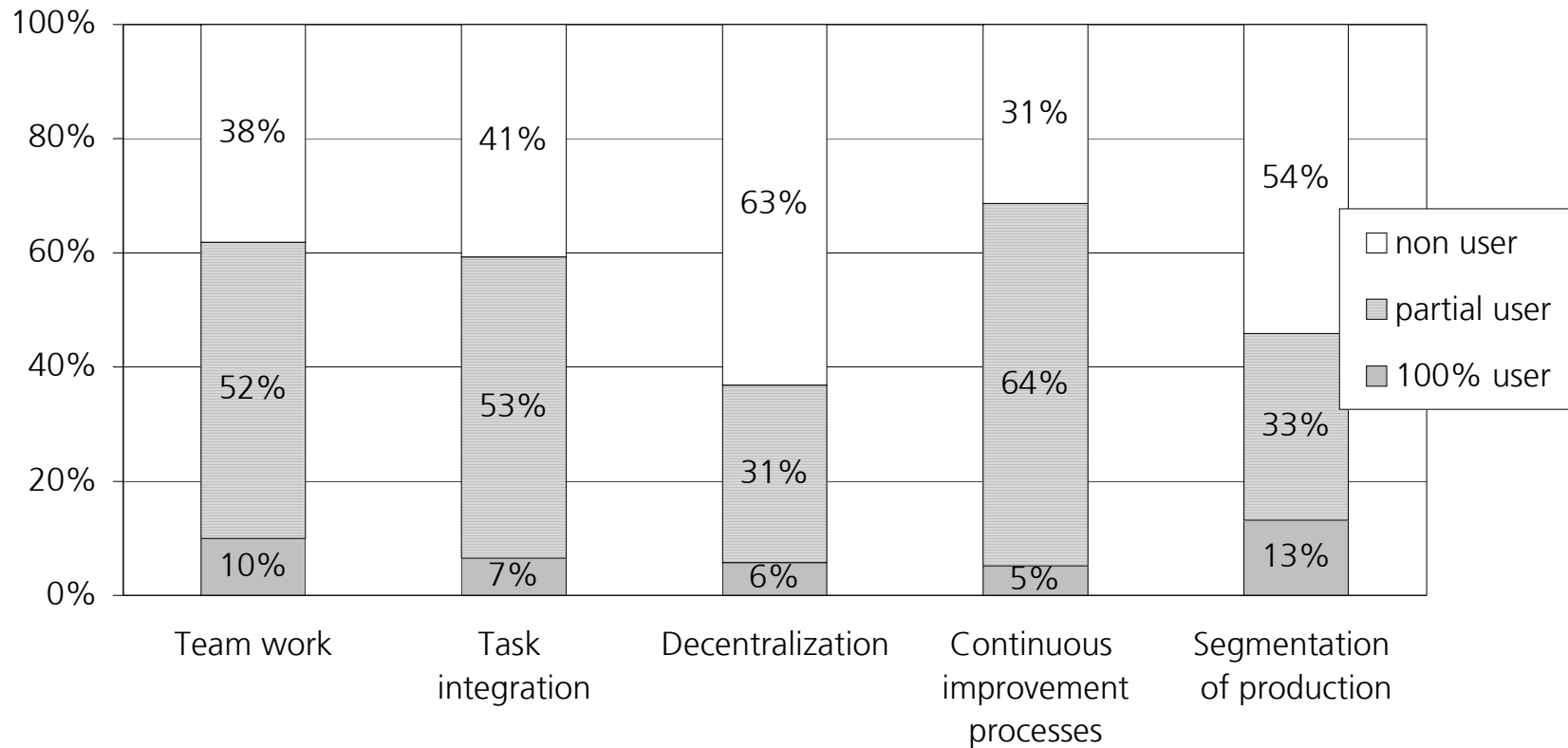
Complexity and different aggregation levels of organisational innovation



Life cycle of organisational innovation



Intrafirm diffusion of organisational innovation



Source: German Manufacturing Survey 2003 (n = 1450)



Measuring the *outcomes* of organisational innovation

- **Multidimensional relationship between organisational innovations and their outcomes.** There is no "one best indicator" to measure the effect/outcome of organisational innovation, given that organisational innovation itself is a multidimensional phenomenon
- **Different categories of outcomes of organisational innovations:** firm level outcomes and/or employee level outcomes



Measuring the *outcomes* of organisational innovation

Potential firm level outcomes of organisational innovations:

- Improved quality of goods or services
- Reduced costs
- Reduced time to respond to customers or suppliers
- Increased flexibility (product, process flexibility)
- Increased productivity
- More product or service innovations
-



Measuring the *outcomes* of organisational innovation

Potential employee level outcomes of organisational innovations:

- Improved employee satisfaction
- Improved work-life balance
- Increased autonomy at work
- Increased motivation
- ...

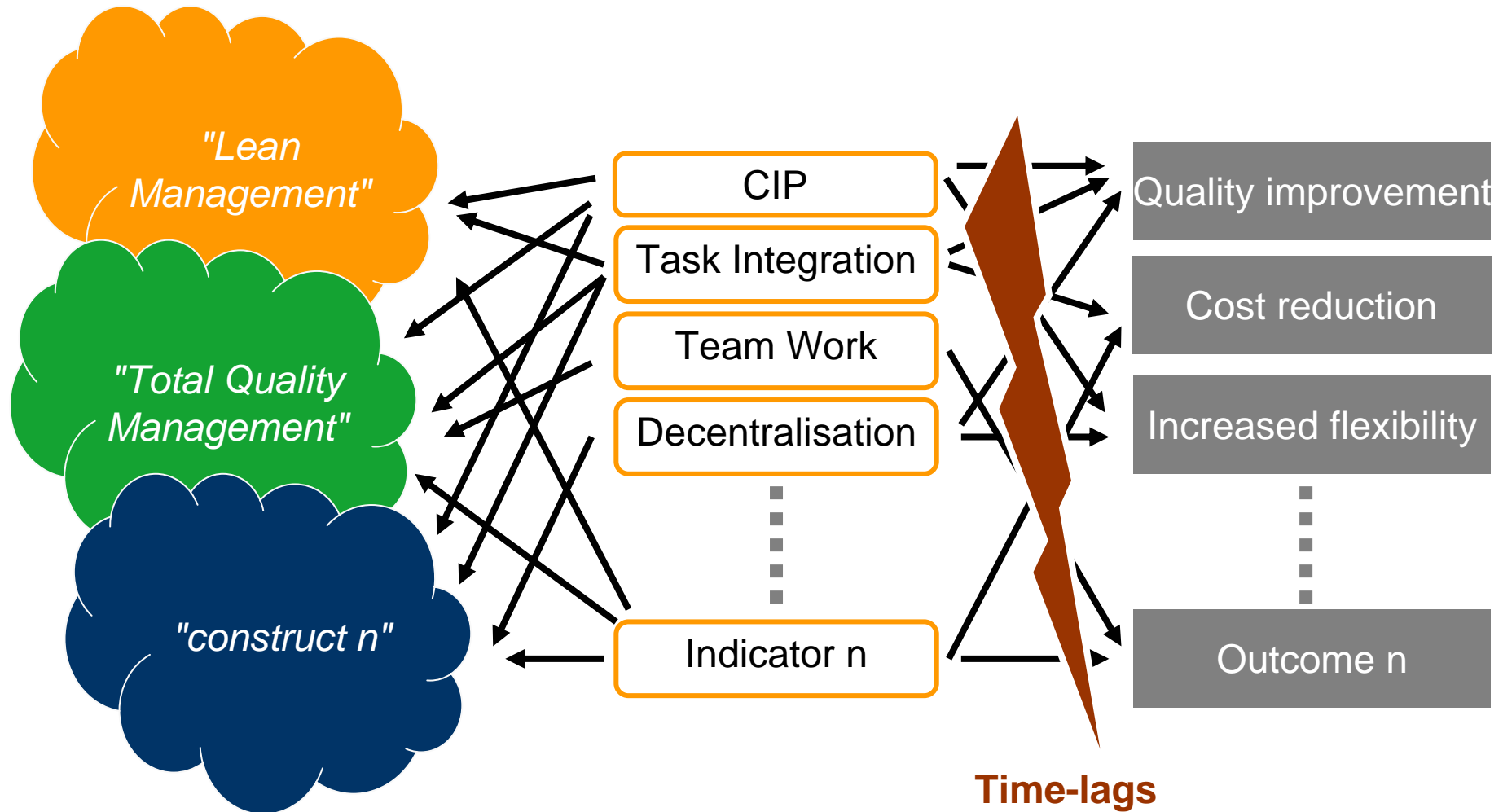


Measuring the *outcomes* of organisational innovation

- **Complementarity of organisational innovations:** different organisational innovations can aim at the same outcome (e.g. task integration and flexible working schedules both aim at increased flexibility)
- **Conflicting effects of organisational innovations:** different organisational innovations can be conflicting in their effects (e.g. standardisation might increase quality but at the same time decrease flexibility)



Multidimensionality and time-lags



Some empirical evidence...

European Manufacturing Survey – German Sample

- German part of the *European Manufacturing Survey* (conducted in 15 countries)
- Firms of **manufacturing sectors** (NACE 15-37) with 20 or more employees
- Responses: **1,663** in 2006 (rate 12.4%)
- Written survey with a questionnaire of six pages sent out by Fraunhofer Institute for Systems and Innovation Research (ISI) in spring/summer 2006 (sixth round after 2003, 2001, 1999, 1997 and 1995)
- Asking for facts and figures
- Topics are modernisation of manufacturing by implementation of innovative manufacturing technologies and organisational practices as well as performance indicators and company data
- Answered by general management, plant or manufacturing managers



Linear regression model on the effects of selected organisational innovations

Additional explanatory effect of *intrafirm* diffusion!

Organisational concepts	Performance Indicators					
	Labour Productivity		Average lead time		Average scrap rate	
	use / non-use	intrafirm diffusion	use / non-use	intrafirm diffusion	use / non-use	intrafirm diffusion
Regular individual consultation	+	+				+
Just-in-time delivery to customers		+	+	+	+	+
Team work	+	+				+

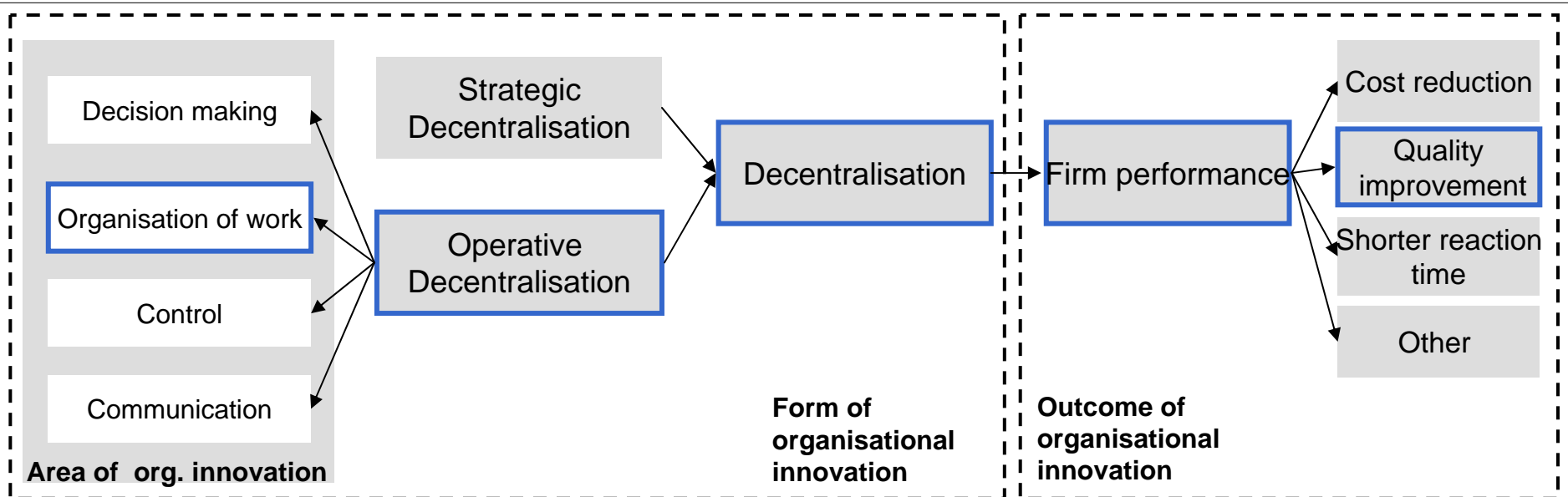
Level of Significance: *** p<.001; ** p<.05; * p<.1

Source: German Manufacturing Survey 2003, Fraunhofer ISI

Control variables: firm size, region, industry sector, batch size, product complexity and type of production



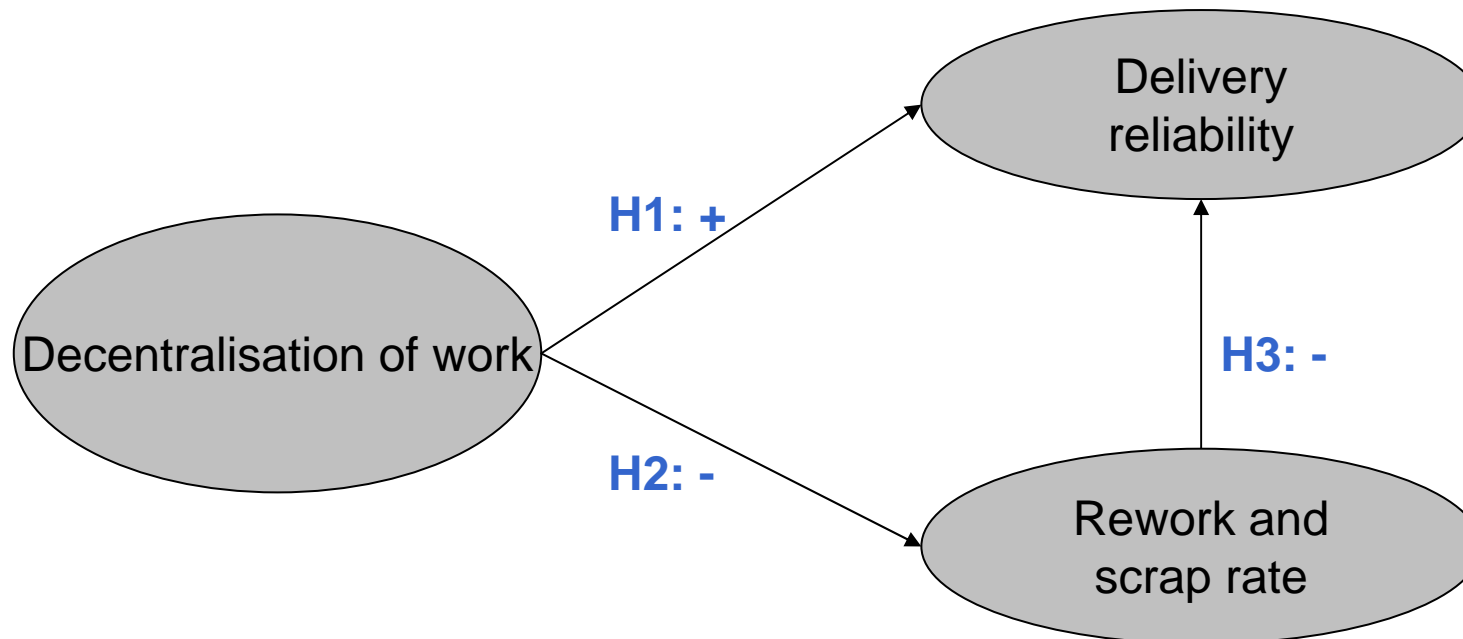
Structural equation modelling - the effect of decentralisation



Indicators	<p>Decentralisation of work (introduced before 2005):</p> <ul style="list-style-type: none"> • Task integration • Creating product or customer focused lines/cells • Decentralisation of planning, operating and controlling functions • Team work 	<ul style="list-style-type: none"> • Delivery reliability • Rework and scrap rate
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Hypotheses of the basic model



Hypotheses of basic model

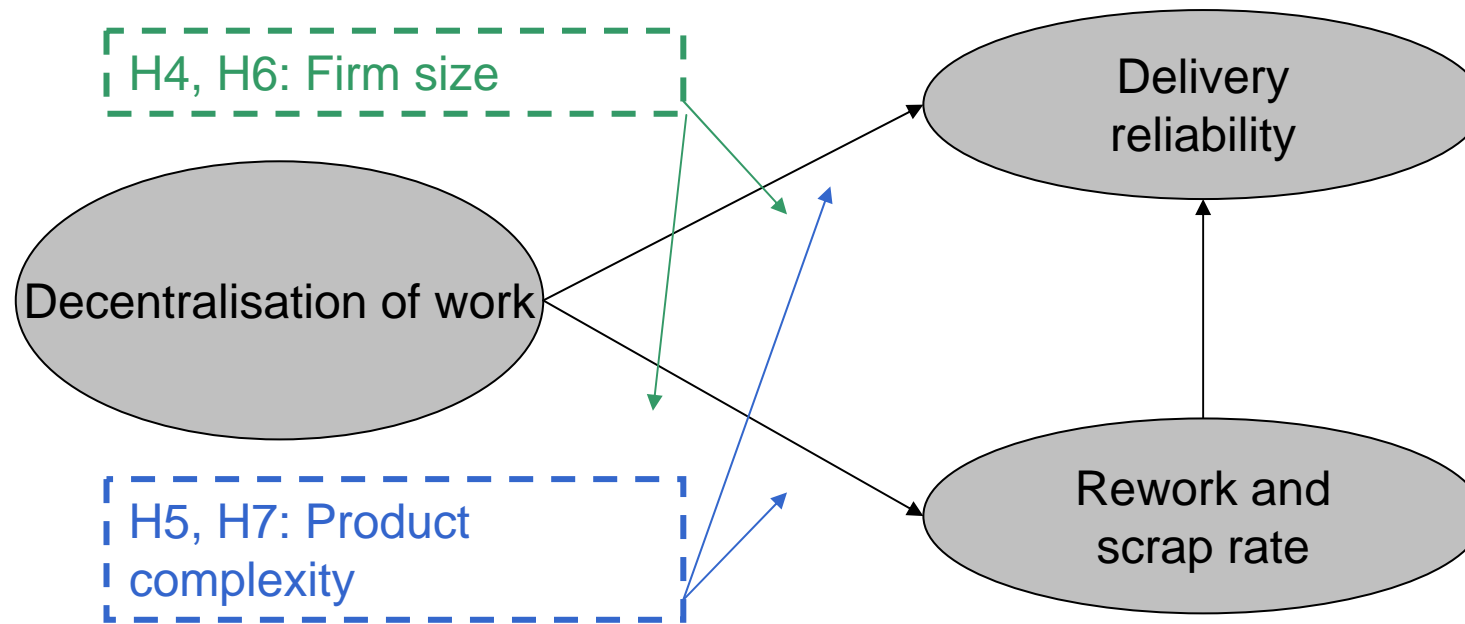
H1: Decentralisation of work affects delivery reliability in a positive way

H2: Decentralisation of work affects the rework and scrap rate in a negative way

H3: The rework and scrap rate affects delivery reliability in a negative way



Hypotheses of adjusted model



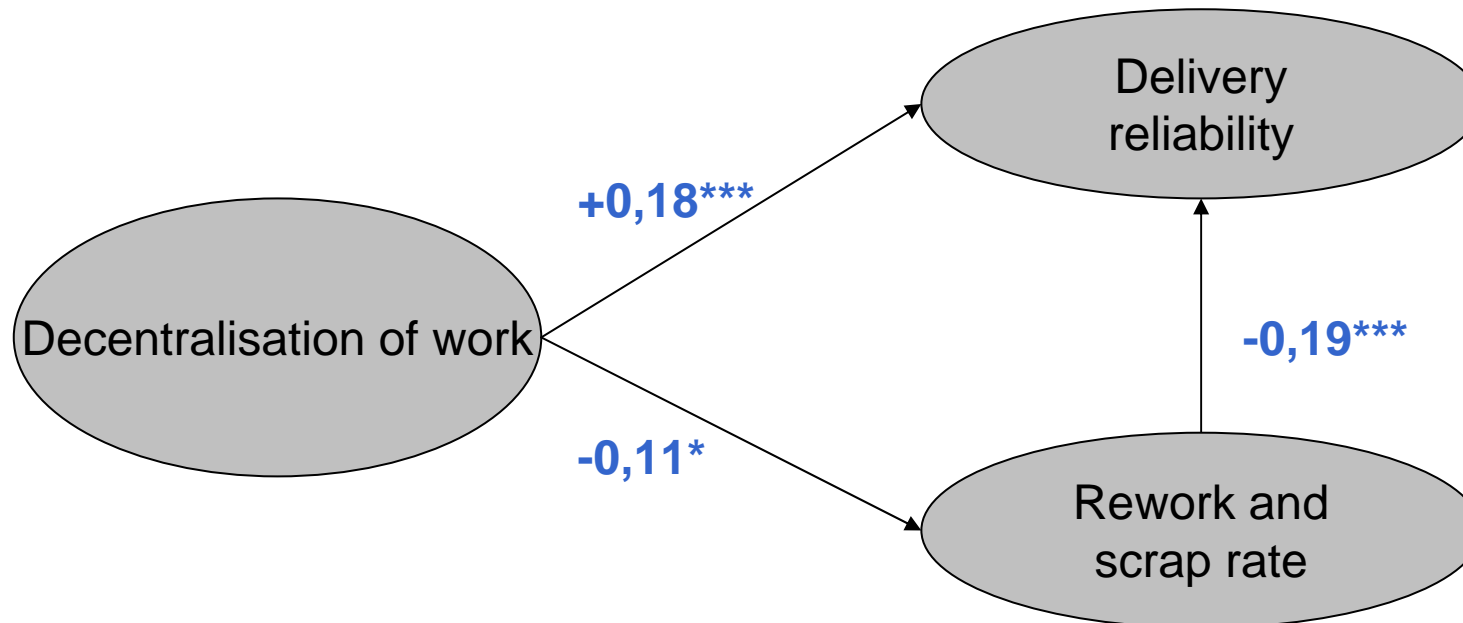
Hypotheses of adjusted model

H4, H5: In large firms, the effect of decentralisation of work on delivery reliability and rework/scrap rate is stronger than in small firms

H6, H7: In firms with high product complexity, the effect of decentralisation on delivery reliability and rework/scrap rate is stronger than in firms with low product complexity



Hypotheses of basic model



Hypotheses of basic model

H1: Decentralisation of work affects delivery reliability in a positive way ✓

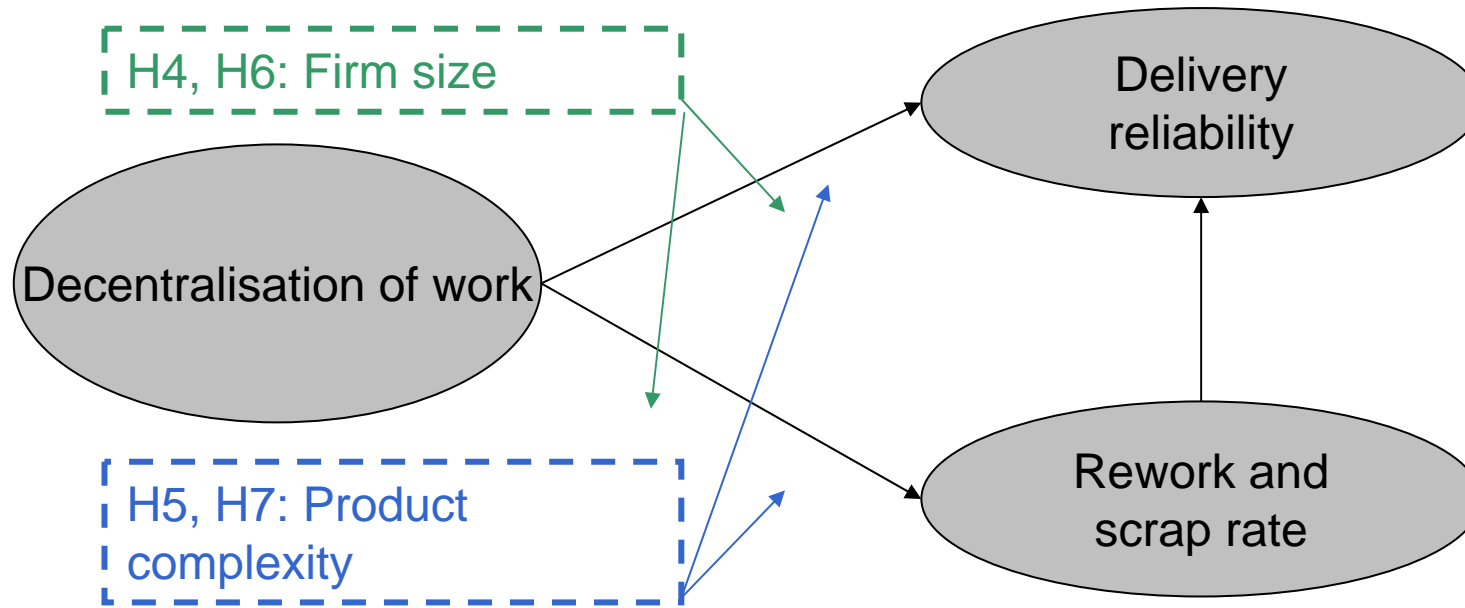
H2: Decentralisation of work affects the rework and scrap rate in a negative way ✓

H3: The rework and scrap rate affects delivery reliability in a negative way ✓

Source: German Manufacturing Survey 2006 (n = 364)



Hypotheses of adjusted model



Hypotheses of adjusted model

H4, H5: In large firms, the effect of decentralisation of work on delivery reliability and rework/scrap rate is stronger than in small firms

H6, H7: In firms with high product complexity, the positive effect of decentralisation on delivery reliability and rework/scrap rate is stronger than in firms with low product complexity

Source: German Manufacturing Survey 2006 (n = 364)



Conclusions

- Organisational innovations can be understood both as enablers for other types of innovations and as a distinct form of innovation (direct source of competitive advantage)
- Measurement of organisational innovations and their effects is methodologically challenging :
 - Complexity of organisational innovations – **organisational innovation is a multidimensional phenomenon** (different aggregation levels)
 - **Longer life cycles** of organisational innovations than of product or service innovations (novelty less important)
 - Significant differences regarding the **intrafirm diffusion** of organisational innovations (extent of implementation)
 - **Multidimensional relationship** between organisational innovations and their **outcomes** (complementarity vs. conflicting effects)
 - **Structural equation modelling** offers the possibility to consider some of these aspects



Thank You!



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