



How Does Digital Transformation Change Work Design and Leadership? - A Comprehensive Framework -

Tanja Schwarzmüller, Prisca Brosi , Denis Duman, & Isabell M. Welpé

Technical University of Munich
Chair for Strategy and Organization
Prof. Dr. Isabell M. Welpé

The influence of digital transformation on work design and leadership sparks public interest...



[Agenda](#) [Initiatives](#) [Reports](#) [Events](#) [About](#)

[TopLink login](#)

[中文](#) [Español](#)

[Global Agenda](#) > [Digital](#) > [Employment and Skills](#) > [Hyperconnectivity](#)

How technology will change the future of work



AUG 23, 2013 @ 10:19 AM **13,095** VIEWS

How To Be A Digital Leader



Harvard
Business
Review

ORGANIZATIONAL CULTURE

How to Create a Digital Workplace

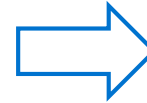
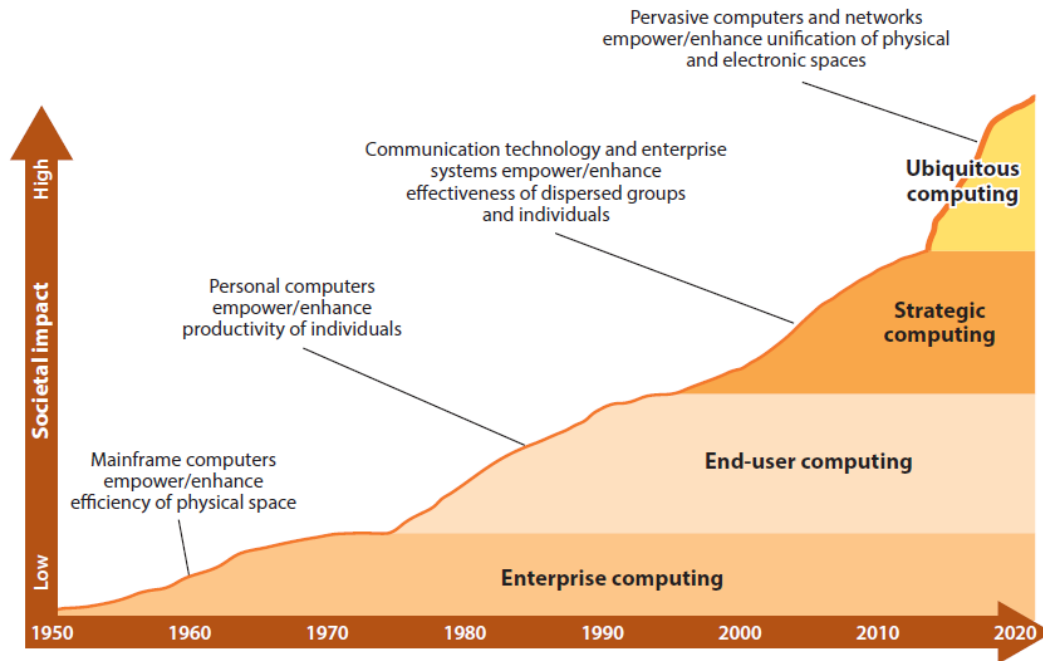
SEPTEMBER 22, 2016, 12:00PM - 1:00PM EDT

McKinsey&Company

Leading in the digital age

...yet research on this topic “is still in its infancy”

(Cascio & Montealegre, 2016, p. 365)



Computing devices are everywhere:

- Smartphones and tablets
- Sensors and processors
- Wearables
- GPS devices
- Drones
- Robots
- Virtual & augmented reality

Source: Cascio & Montealegre (2016)

**How do these changes affect the nature of work?
What does leadership mean in this new era?**

- Due to the digital transformation, the world of **work** in organizations **changes dramatically** (Grant & Parker, 2009; Grant et al., 2010; Parker et al., 2001) and will **continue** to be changing (Colbert et al., 2016)
- Valuable research studying consequences of separate aspects of digitalized work design for individuals, teams and organizations, e.g.:
 - Implications of **teleworking** (Gajendran & Harrison, 2007; Golden et al., 2008; Golden et al., 2006)
 - Implications of increased **availability / constant connectivity / blurring between work- and non-work boundaries** (Boswell & Olson-Buchanan, 2007; Mazmanian, 2013; Reyt & Wiesenfeld, 2015)
 - Implications of working in **virtual teams** (Sinha & Van de Ven, 2005) and by means of **virtual team communication** (Perry et al., 2016)

- Existing research provides important insights into the **consequences of specific changes in work design due to digital transformation**
- Yet, a systematic **overview on the changes that actually follow for work design from the digital transformation** is still lacking (Oldham & Hackman, 2010)

⇒ **Research question 1: How does digital transformation change work design?**

- Digital transformation **also changes leadership** and the skills, roles and behaviors required from leaders (Avolio et al., 2009; Cascio & Montealegre, 2016)
- Valuable research studying separate aspects of leadership in a digital world, e.g.:
 - Effective leadership of **virtual teams** (Hoch & Kozlowski, 2014; Joshi et al., 2009; Malhotra et al., 2007)
 - Effective **e-leadership** (Avolio et al., 2001; Avolio et al., 2014)
 - Managerial **decision-making under time pressure** and **information overload** (Perlow et al., 2002; Van Knippenberg et al., 2015)

- But, again:
 - As previous research has usually been rather focused, we still “have **relatively little understanding** of the potential effects of these technologies on the leadership dynamic” (Avolio et al., 2014, p. 126)
 - **No comprehensive framework** depicting the changes of leadership due to digitization (Avolio et al., 2009; Oldham & Hackman, 2010)

⇒ **Research question 2: How does digital transformation change leadership?**

- **Changes in work design and leadership** due to digital transformation are likely to **associated with each other**:
 - **Leaders affect** the way in which **work** is designed (Grant & Parker, 2009; Hackman & Oldham, 1975), such as when encouraging autonomous and proactive work designs with their leadership style (Williams et al., 2010)
 - **Leaders might also react to changes in work design** by adapting their own behavior, such as by focusing more on relationship building when teams manage their work themselves (Druskat & Wheeler, 2003)
- Interestingly, these potential interrelations have often been **noticeably absent** from the literature (Williams et al., 2010)

⇒ **Research question 3: How are changes in work design and leadership interrelated?**

Sample:

- 49 German-speaking **experts on the digital transformation** from different domains (57 % business, 32 % research, 7 % associations, foundations, or unions, 4 % politics)
- Identified via a **comprehensive internet research**
- Exemplary **indicators of expertise:**
 - Positions **analyzing** or **advancing digital transformation** in companies or foundations
 - Membership in **political committees** on the **future of work**
 - **Research projects** and **publications, books** or **speeches** on the digital transformation
- **Intensely** dealt with **digital transformation** ($M = 6.64$, $SD = 0.72$)*
- 70 % male, $M_{age} = 47$ years, 89 % in a leadership function

* Scale from 1 (not at all) to 7 (very much)

Procedure:

- Standardized **online interview questionnaire**
- Experts were to name and describe at least **six specific changes in work and leadership** due to digital transformation (Schmidt et al., 2001):
 - “How do **work and work design** (the way in which employees work as well as the conditions under which they do so)* in organizations change as a result of digital transformation?”
 - “How does **leadership** (the way in which leaders deal with their employees and make them contribute to organizational goals)** change as a result of digital transformation?”
- Experts’ written descriptions of these individual changes were about 30.81 words long ($SD = 57.72$)

*Specification of work / work design follows Parker et al. (2001)

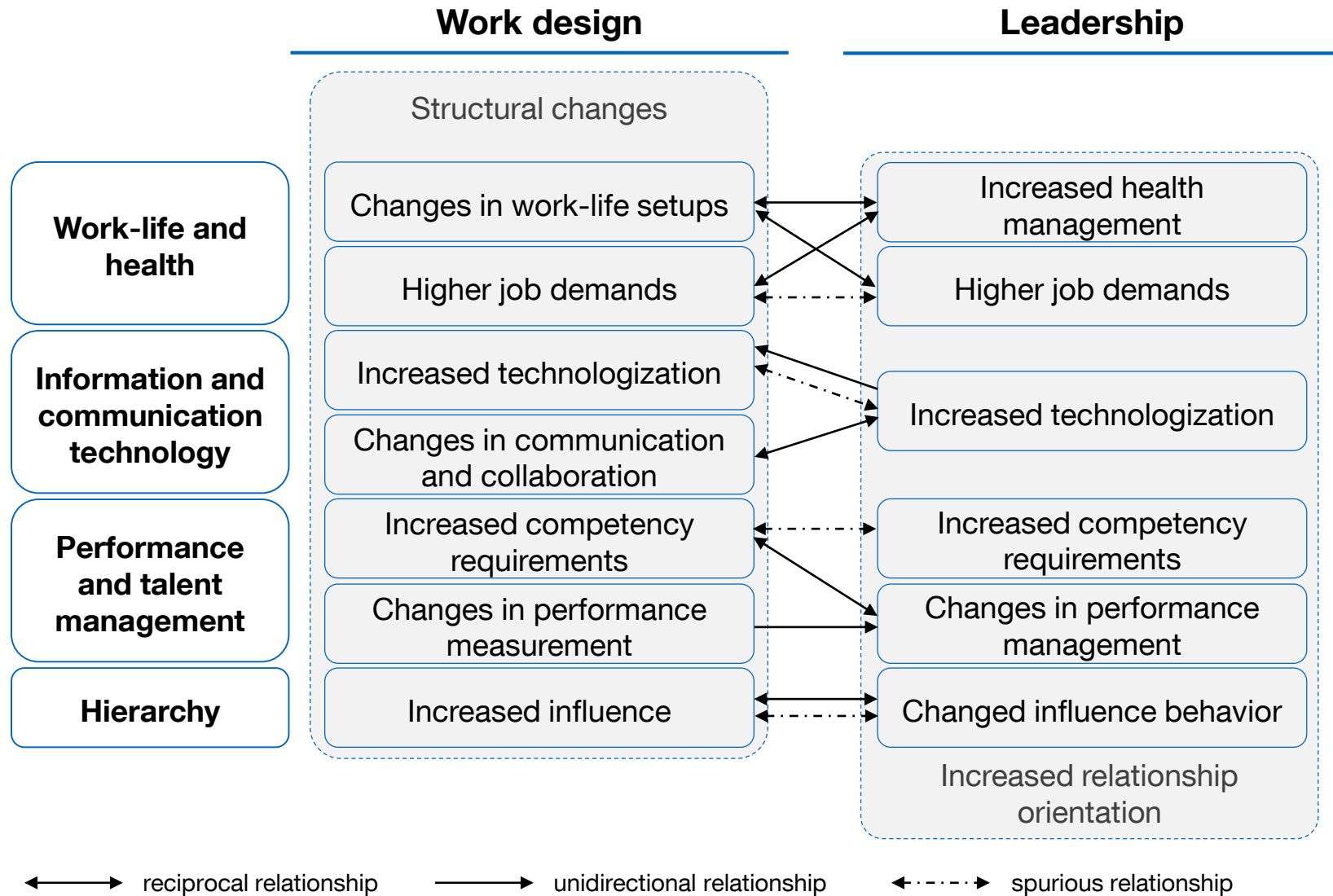
**Specification of leadership follows Yukl & Van Fleet (1992)

Coding:

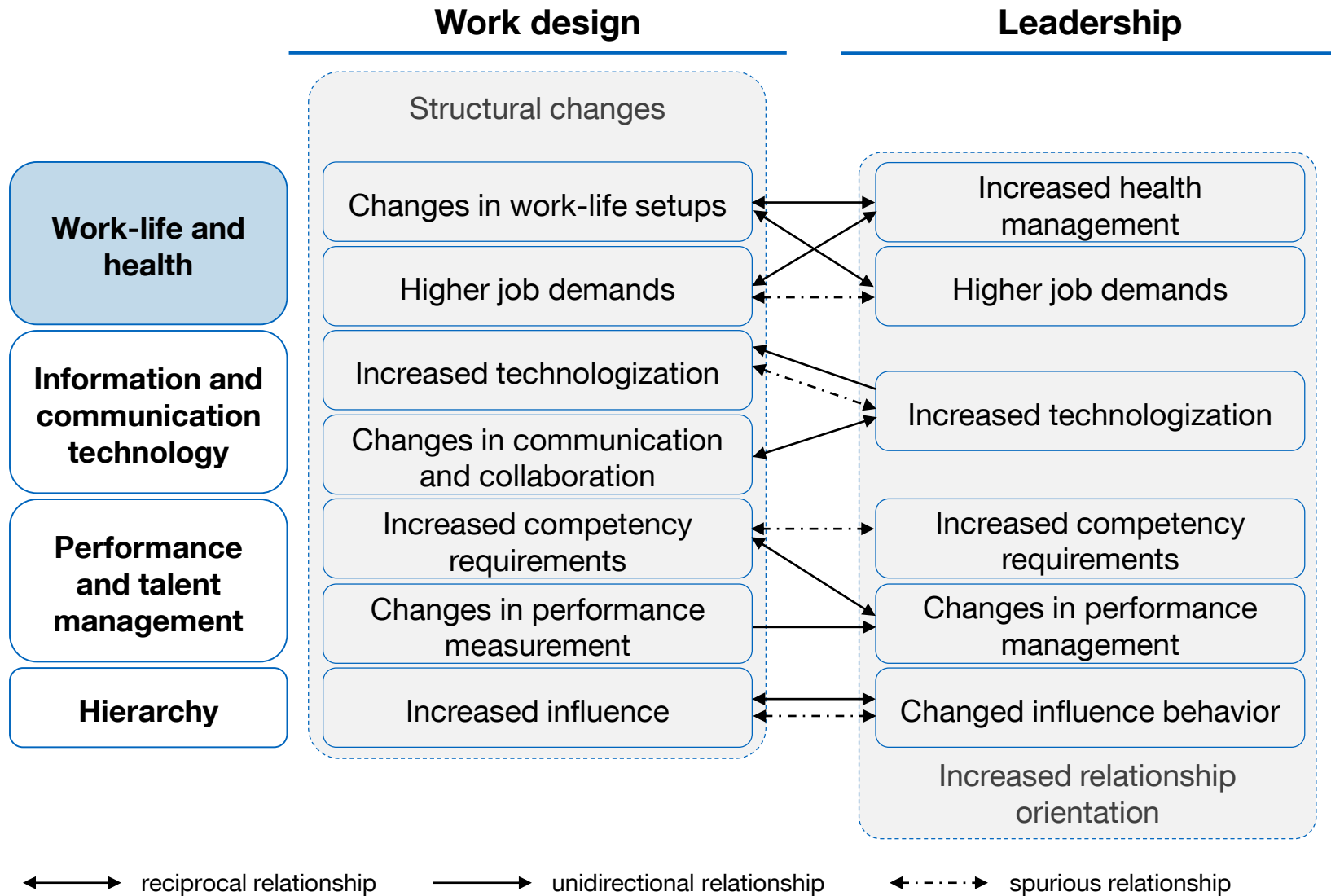
Based on **content analytic coding procedure** outlined by Weber (1990)

- **Step 1: Provisional category scheme.** Coder 1 used 50% of the material to derive first-order codes and preliminary second-order categories
- **Step 2: Revision of the category scheme.** Coder 2 applied category scheme to the rest of the interview material. New categories were constructed and existing ones revised. Changes were discussed.
- **Step 3: Coding of complete material.** Both coders then coded all material independently; interrater reliability indicated full agreement ($\kappa = .84$; Landis & Koch, 1977); differences were resolved through discussion.
- **Step 4: Deduction of overarching dimensions.** After coding, common theoretical themes emerging between second-order categories were identified.

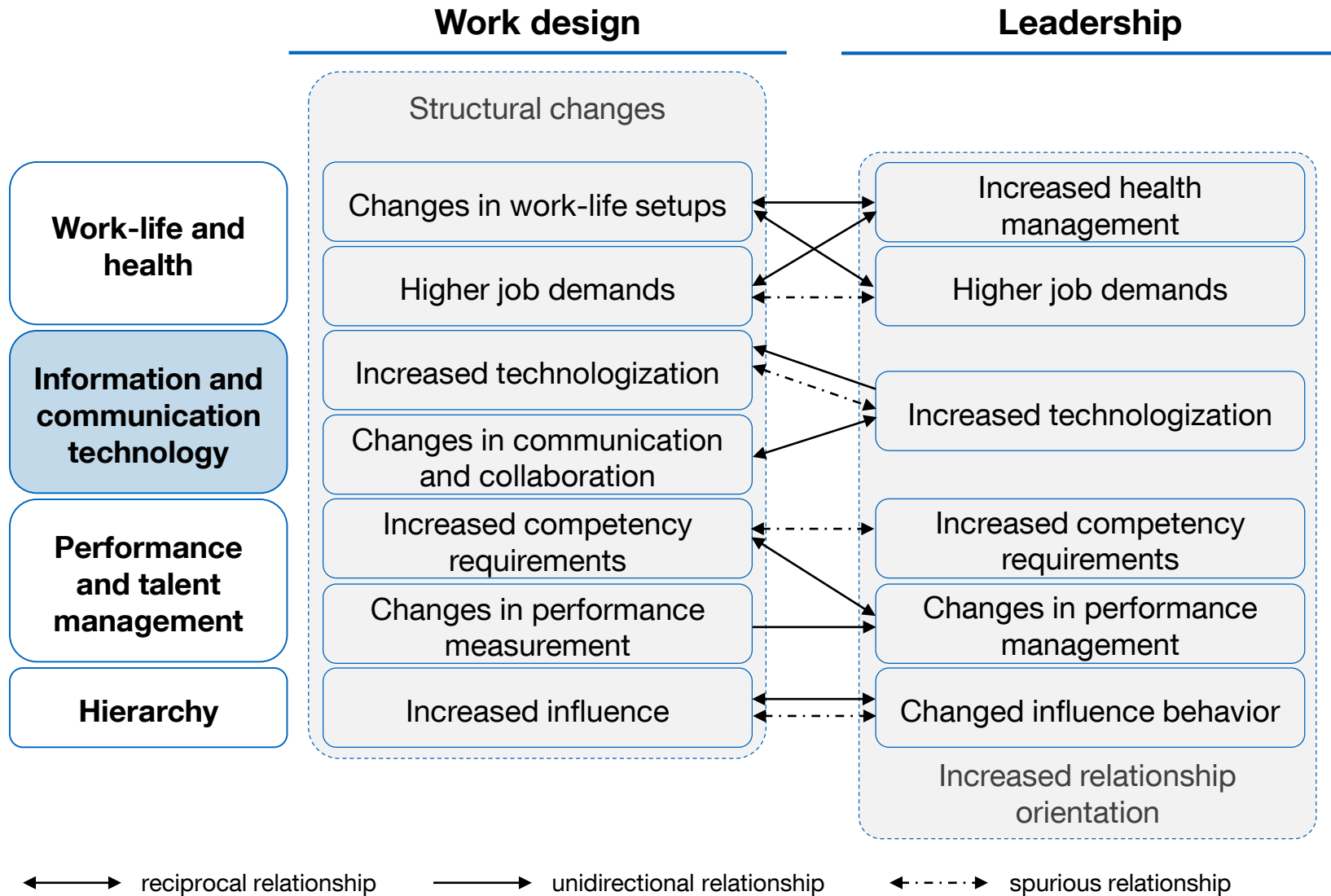
Results – Overarching model of changes on work design and leadership



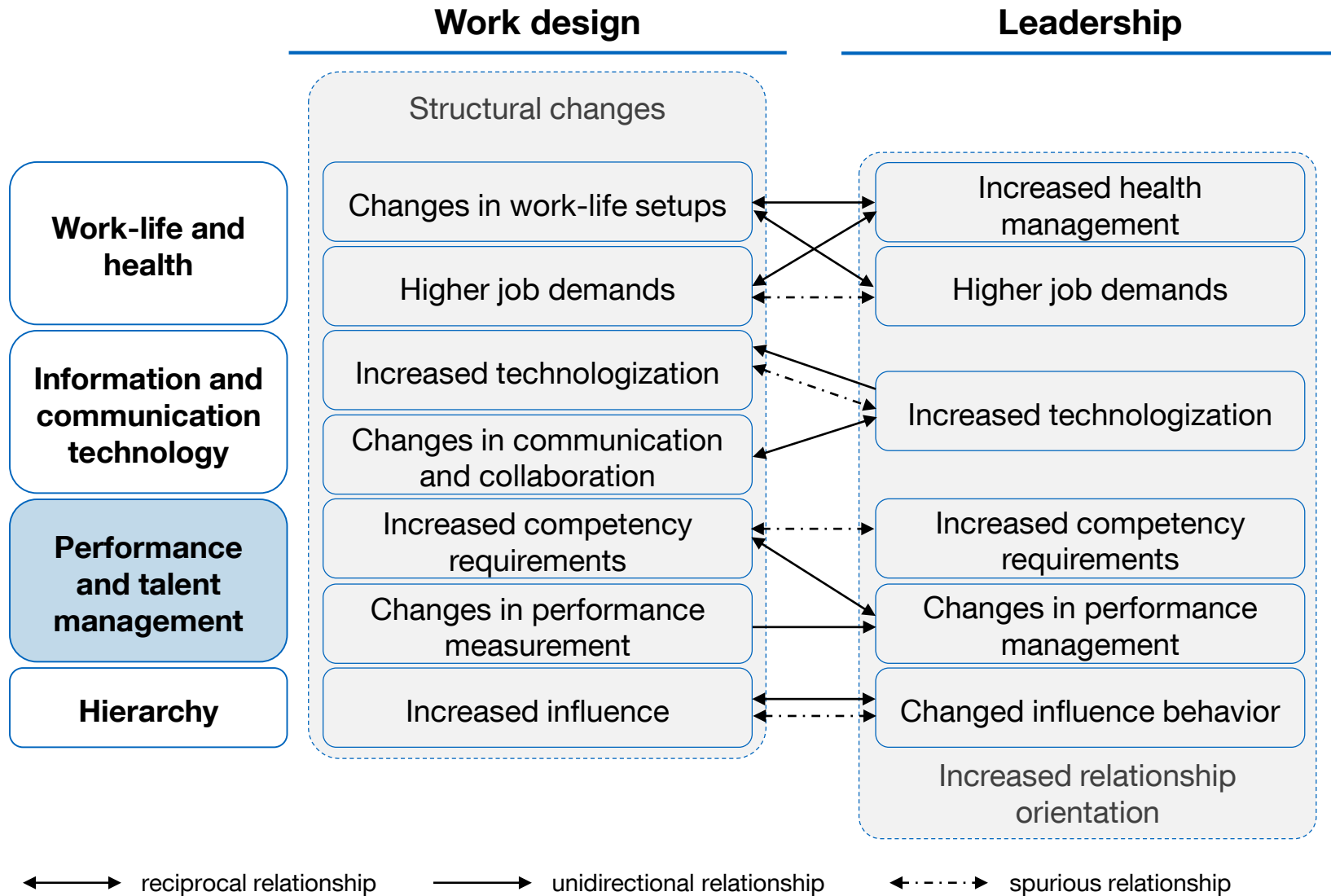
Results – Overarching model of changes on work design and leadership



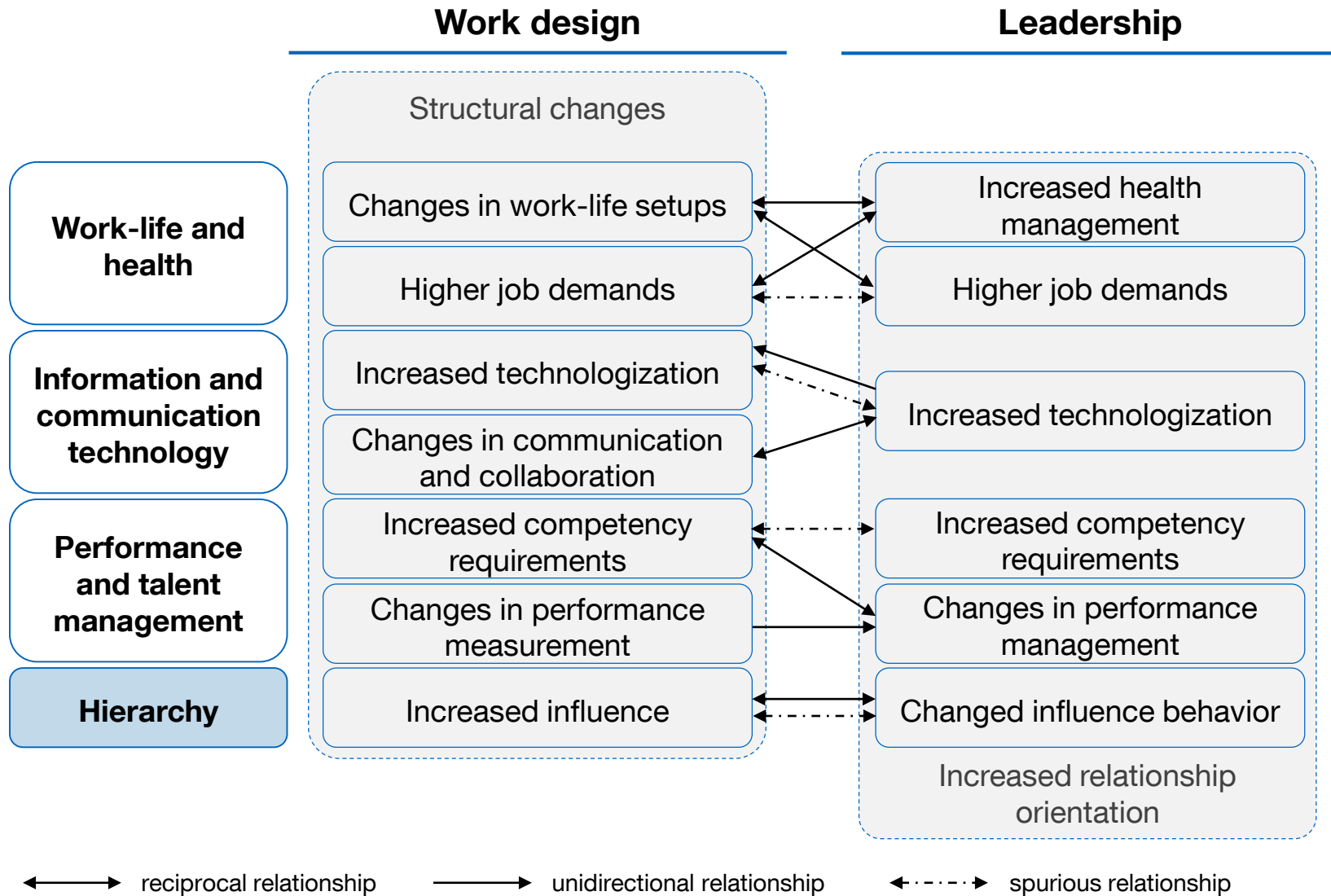
Results – Overarching model of changes on work design and leadership



Results – Overarching model of changes on work design and leadership



Results – Overarching model of changes on work design and leadership



Results – RQ1: How does digital transformation change work design?

Work design

Work-life and health

Information and communication technology

Performance and talent management

Hierarchy

Structural changes

Changes in work-life setups

Higher job demands

Increased technologization

Changes in communication and collaboration

Increased competency requirements

Changes in performance measurement

Increased influence

- Increased temporal and spatial flexibility
- More work-life-balance
- Increased availability
- Blurring of boundaries

“Increasing pressure to be available 24/7 and a shorter reaction time – the “always-on” mentality is transferred to working life” [E29]

“private life becoming professional, and professional life becoming private” [E42]

Results – RQ1: How does digital transformation change work design?

Work design

Work-life and health

Information and communication technology

Performance and talent management

Hierarchy

Structural changes

Changes in work-life setups

Higher job demands

Increased technologization

Changes in communication and collaboration

Increased competency requirements

Changes in performance measurement

Increased influence

- Higher complexity
- More insecurity
- Acceleration
- Increased workload
- More stress

“Due to electronic communication channels, the amount of available information increases continuously and challenges many employees to maintain an efficient working method and to avoid getting distracted by emails and social media feeds” [E29]

“The amount of data and the higher frequency of decisions often overburdens employees. [...] This causes stress” [E13]

Results – RQ1: How does digital transformation change work design?

Work design

Work-life and health

Information and communication technology

Performance and talent management

Hierarchy

Structural changes

Changes in work-life setups

Higher job demands

Increased technologization

Changes in communication and collaboration

Increased competency requirements

Changes in performance measurement

Increased influence

- More support through machines and IT
- Increased automatization

“A high number of data are made available on screens, electronic dashboards, and mobile devices, which will make detailed processes and even single stages of work flows controllable” [E6]

“With increasing machine-to-machine communication, more intelligent algorithms (AI) and more efficient energy storage systems, computers or robots can take over more and more tasks that were previously carried out exclusively by human resources. This applies even to very “human” tasks like nursing” [E11]

Results – RQ1: How does digital transformation change work design?

Work design

Work-life and health

Changes in work-life setups

Higher job demands

Increased technologization

Changes in communication and collaboration

Increased competency requirements

Changes in performance measurement

Hierarchy

Increased influence

- New types of teamwork
- More teamwork
- More use of new media
- More communication via interfaces

“Knowledge as a resource can only be developed and advanced together. Communication and cooperation serve as a prerequisite” [E42]

“Due to digitalization, operational and technical functions are coalescing... the growing interconnectedness of systems requires more communication across interfaces” [E44]

Results – RQ1: How does digital transformation change work design?

Work design

Work-life and health

Changes in work-life setups

Higher job demands

Information and communication technology

Increased technologization

Changes in communication and collaboration

Performance and talent management

Increased competency requirements

Changes in performance measurement

Hierarchy

Increased influence

- Higher need for IT competencies
- More need for cognitive work
- Higher need for agility
- More lifelong learning

“Intelligent systems, tools and networks will intensify the relationship between men and machines and offer the opportunity to automate standardized processes. Thereby, knowledge workers will be relieved from routine tasks, while at the same time the percentage of tasks that require a high degree of creativity and initiative and that constitute high value added increases” [E22]

“Lifelong learning is a necessity. Nowadays, knowledge has a half-life of a few years. There are no more jobs that can be performed based on knowledge from 10 years ago” [E38]

Results – RQ1: How does digital transformation change work design?

Work design

Structural changes

Changes in work-life setups

Higher job demands

Increased technologization

Changes in communication and collaboration

Increased competency requirements

Changes in performance measurement

Increased influence

Work-life and health

Information and communication technology

Performance and talent management

Hierarchy

- More transparency
- Higher output orientation

“It’s less about face-time than about what followers deliver” [E45]

Results – RQ1: How does digital transformation change work design?

Work design

Work-life and health

Changes in work-life setups

Higher job demands

Information and communication technology

Increased technologization

Changes in communication and collaboration

Performance and talent management

Increased competency requirements

Changes in performance measurement

Hierarchy

Increased influence

- More participation
- Higher autonomy
- Flatter hierarchies

“Employees can be better involved and also have the expectation of being involved” [E13]

“Control activities previously exerted by leaders vanish. Employees working on a topic take the responsibility for the quality of their work” [E15]

Results – RQ1: How does digital transformation change work design?

Work design

Work-life and health

Changes in work-life setups

Higher job demands

Information and communication technology

Increased technologization

Changes in communication and collaboration

Performance and talent management

Increased competency requirements

Changes in performance measurement

Hierarchy

Increased influence

- Changes in job profiles
- More flexible employment
- Less social embeddedness

“Skilled workers in a smart factory will carry out less diverse tasks on a higher number of machines and monitor machines based on signals instead of visual inspection. They will turn more into problem solvers and fix malfunctions in cooperation with machines instead of on their own” [E6]

“New technologies lead to new job profiles and specializations (e.g., digital journalism, blogging, online marketing, app development, etc.)” [E29]

Results – RQ2: How does digital transformation change leadership?

Leadership

Work-life and health

Increased health management

Higher job demands

Information and communication technology

Increased technologization

Performance and talent management

Increased competency requirements

Changes in performance management

Hierarchy

Changed influence behavior

Increased relationship orientation

- Increased attention to employees' health
- Allowing for flexible work arrangements

“Leaders need to ensure that the flexibility of work time and space does not lead to a perceived or actual overload of employees. For instance, it is possible to define to what extent emails and messages should be processed on weekends” [E8]

Results – RQ2: How does digital transformation change leadership?

Leadership

Work-life and health

Increased health management

Higher job demands

Information and communication technology

Increased technologization

Performance and talent management

Increased competency requirements

Changes in performance management

Hierarchy

Changed influence behavior

Increased relationship orientation

- Acceleration
- Increased availability
- More stress

“Acting quickly, failing early, pivoting become socially accepted” [E19]

Results – RQ2: How does digital transformation change leadership?

Leadership

Work-life and health

Increased health management

Higher job demands

Information and communication technology

Increased technologization

Performance and talent management

Increased competency requirements

Changes in performance management

Hierarchy

Changed influence behavior

Increased relationship orientation

- Increased support through machines and IT
- Communication via new media

“For organizational tasks, management information systems will provide more data to support decision-making in the future. Thus, management decisions can be made faster and on a more informed basis” [E25]

“IT tools for career development, feedback, career management, etc. and manager self-service will further increase. Ideally, these resources allow managers to have more time for leadership, especially for face time and personal contact” [E15]

Results – RQ2: How does digital transformation change leadership?

Leadership

Work-life and health

Increased health management

Higher job demands

Information and communication technology

Increased technologization

Performance and talent management

Increased competency requirements

Changes in performance management

Hierarchy

Changed influence behavior

Increased relationship orientation

- Higher need for IT competencies
- Ability to lead from a distance
- Intercultural and language competencies
- Need for managing uncertainty and complexity
- More change management

“I just can’t lead through presence any longer. I simply can’t go somewhere quickly and look around and thump the table. [...] Hence, I need to lead from a distance and possess the necessary instruments and related behavioral patterns” [E41]

“The complexity and quantity of changes with which leaders are confronted are on the rise... Leaders need more competencies in dealing with changes on their own and in communicating stability and continuity to their employees, while things are changing constantly” [E17]

Results – RQ2: How does digital transformation change leadership?

Leadership

Work-life and health

Increased health management

Higher job demands

Information and communication technology

Increased technologization

Performance and talent management

Increased competency requirements

Changes in performance management

Hierarchy

Changed influence behavior

Increased relationship orientation

- Easier measurement of performance
- Higher output orientation
- More personnel development

“Missing competencies of employees need to be recognized and compensated for by means of training. [...] Employees’ strengths (competency profile) need to be known and aligned with the requirements. People become ill if they are over- or under-challenged” [E16]

Results – RQ2: How does digital transformation change leadership?

Leadership

Work-life and health

Increased health management

Information and communication technology

Higher job demands

Performance and talent management

Increased technologization

Hierarchy

Increased competency requirements

Changes in performance management

Changed influence behavior

Increased relationship orientation

- Increased participation of employees
- Fostering autonomy in employees
- More trust in employees
- More inspiration and motivation

“It is not the leader’s job anymore to define and distribute tasks, but to define a goal and let employees find their own way to reach this goal [...]” [E40]

“let go and to trust in the competencies of [...] employees, who typically are more competent in their area of expertise” [E32]

Results – RQ2: How does digital transformation change leadership?

Leadership

Work-life and health

Increased health management

Higher job demands

Information and communication technology

Increased technologization

Performance and talent management

Increased competency requirements

Changes in performance management

Hierarchy

Changed influence behavior

Increased relationship orientation

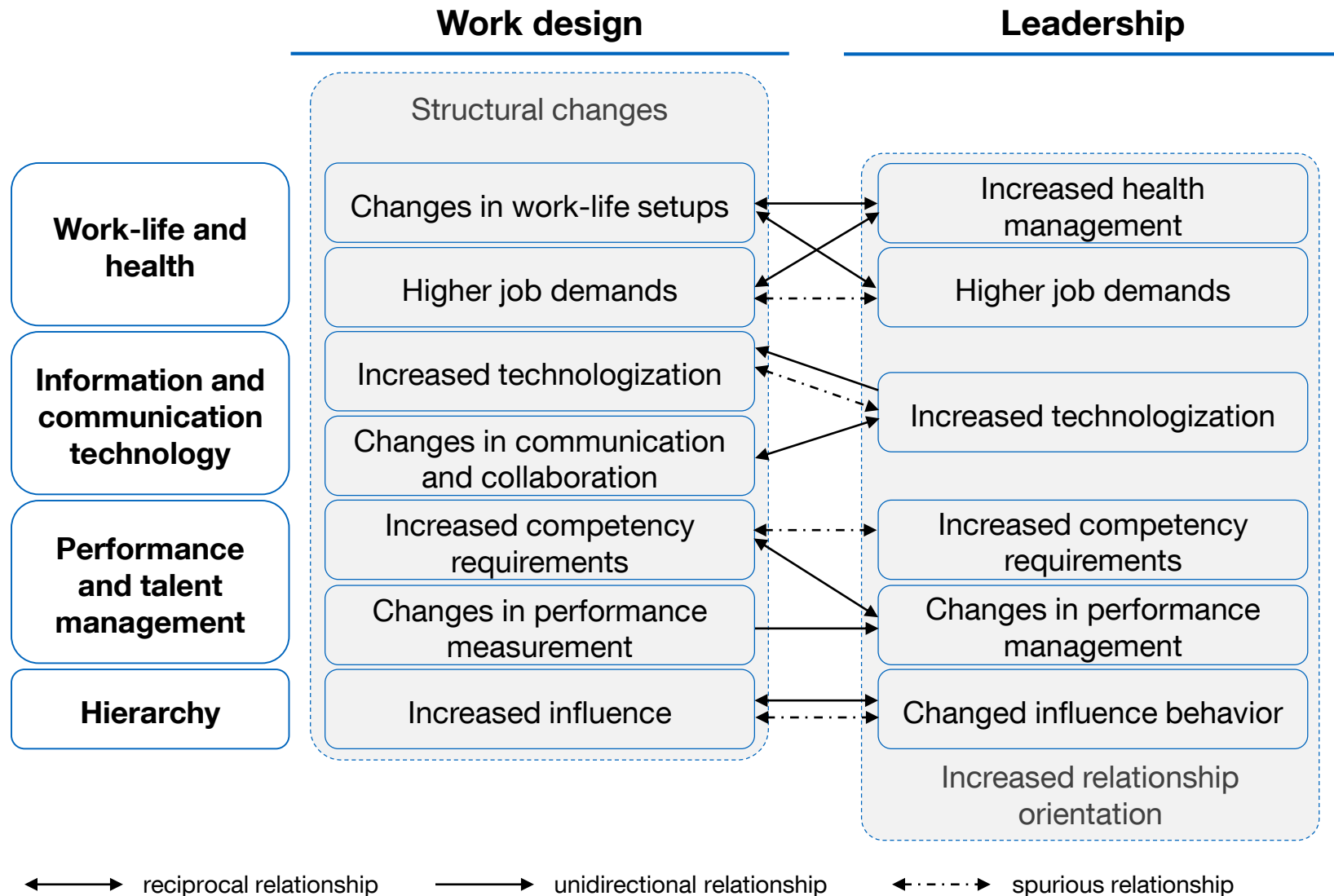
- More coaching and enabling
- More individualized consideration
- Increased networking behavior
- More need for teambuilding

“Employees should be empowered to solve tasks on their own. In the event that they encounter difficulties, the leader ought to intervene in a coaching manner, and a solution should be developed together” [E40]

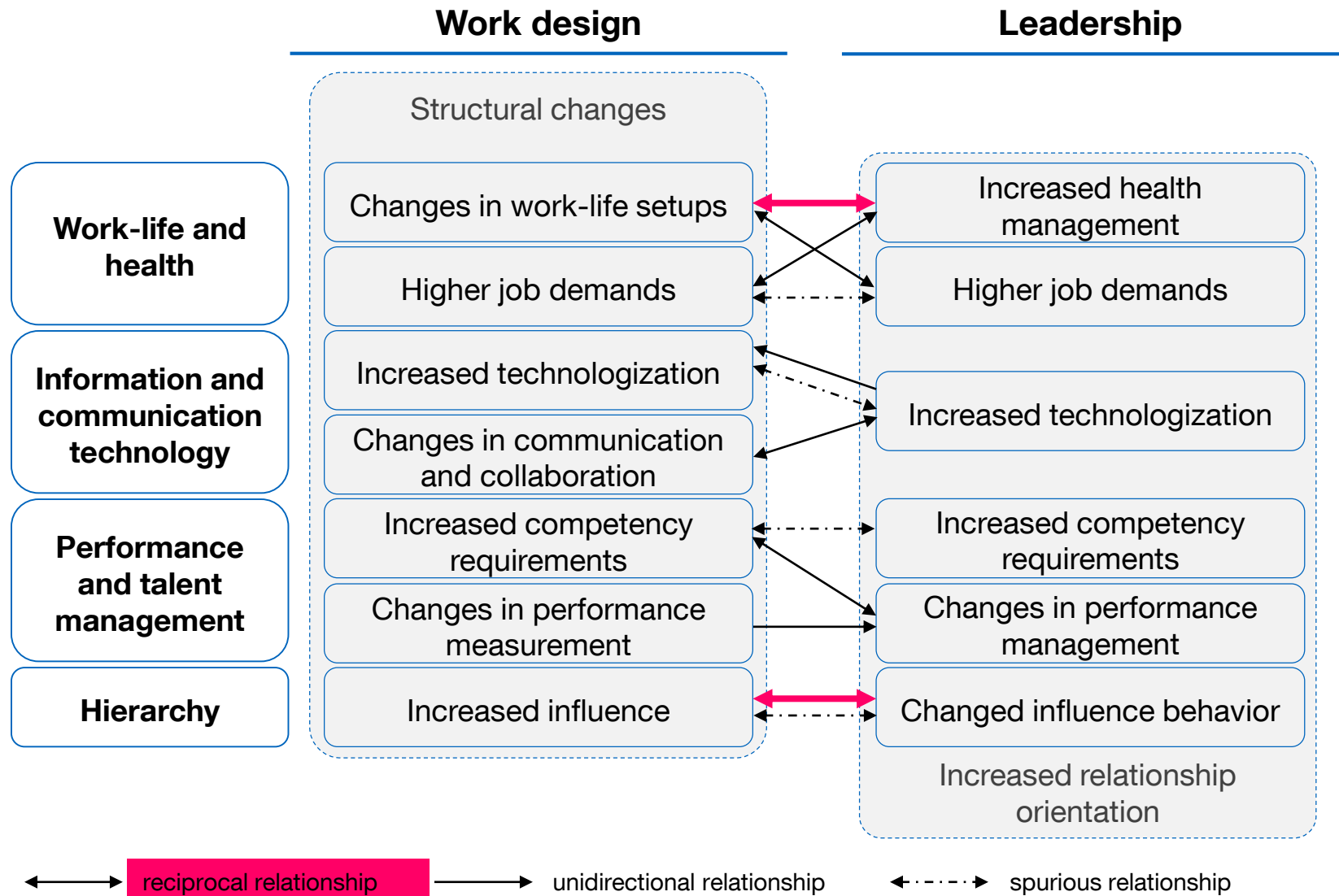
“Leadership means organizing a network: leadership must ensure that the best competencies for a given task come together and work together efficiently” [E7]

“Due to agile organizational structures, teambuilding [...] becomes a constant challenge” [E5]

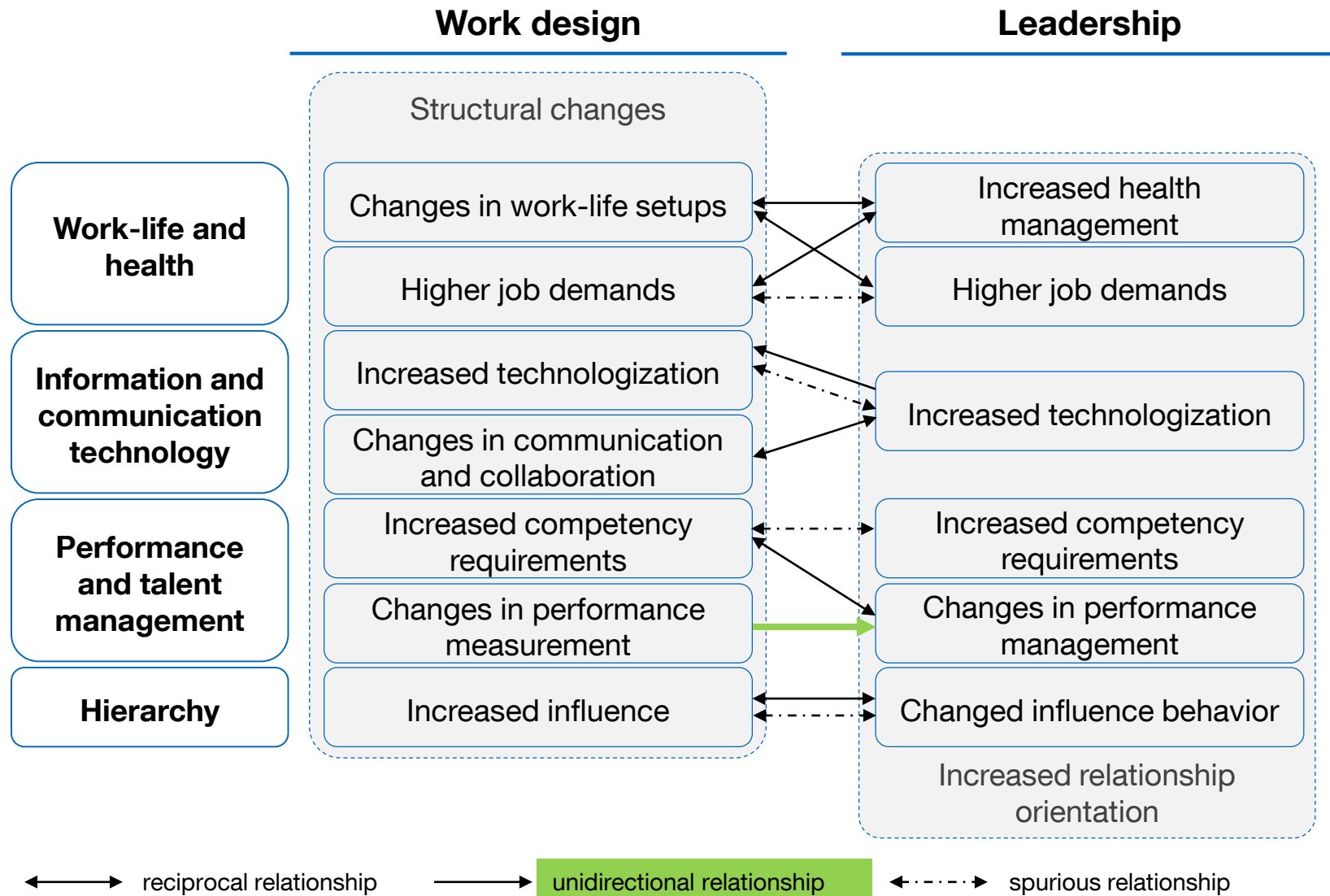
Results – RQ3: How are changes in work design and leadership interrelated?



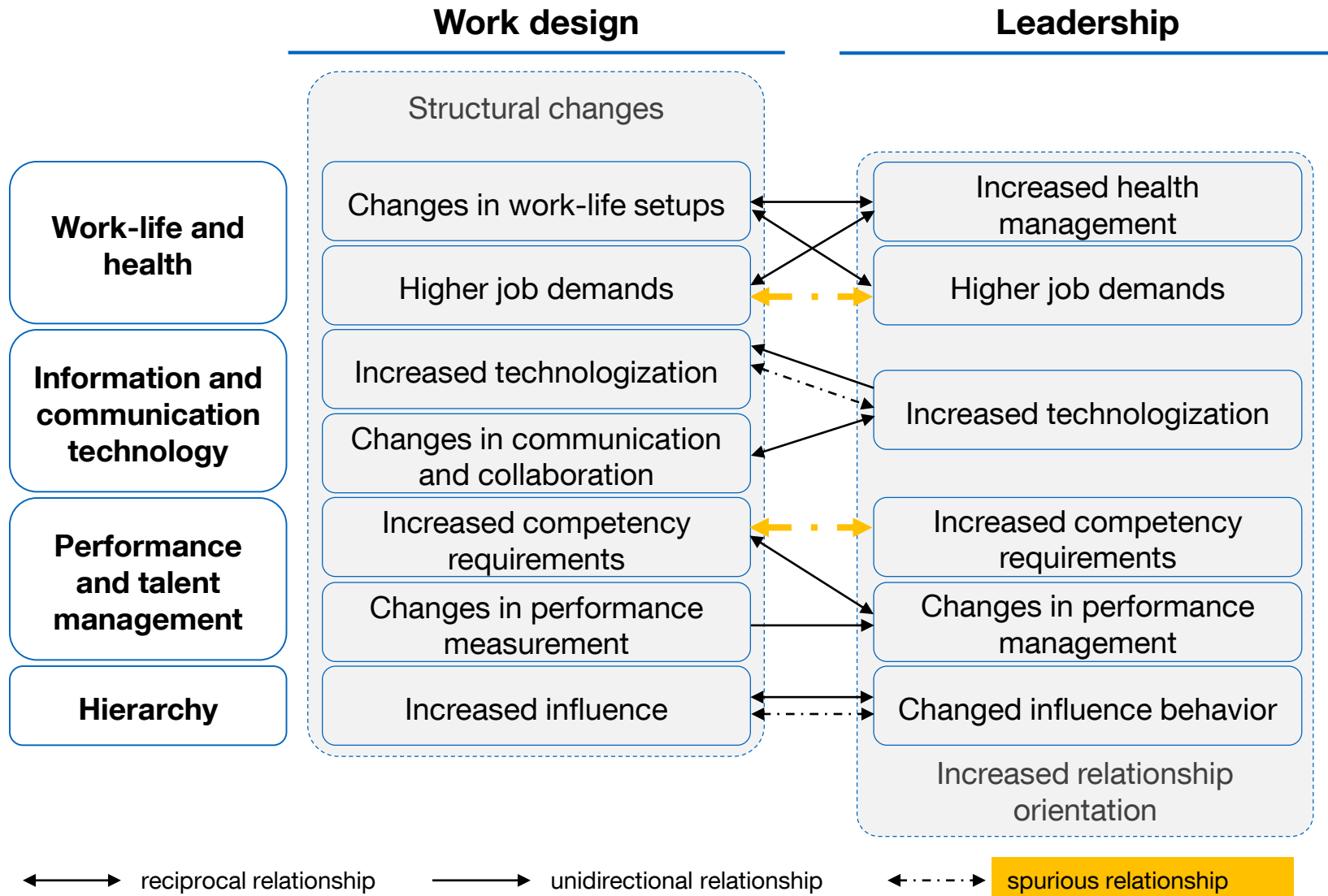
Results – RQ3: How are changes in work design and leadership interrelated?



Results – RQ3: How are changes in work design and leadership interrelated?



Results – RQ3: How are changes in work design and leadership interrelated?



- **Provides an overarching framework** on the changes of work design and leadership resulting from digital transformation:
 - **Four overarching dimensions of change:** work-life and health, information and communication technology, performance and talent management, hierarchy
 - **Two macro-level changes:** structural changes of work and relationship-oriented leadership
 - **Manifold interrelations** between changes in work design and leadership
- May be used as a **basis for future research** which strives to analyze the **benefits and costs** associated with the digital transformation as well as the **dynamic relationship** between changes in work design and leadership
- Can help organizations **to select and develop their personnel** to achieve optimal fit with the requirements of the digital age (Cascio & Aguinis, 2008) and to **design meaningful work and leadership** (challenge vs. hindrance stressors; Cavanaugh, Boswell, Roehling, & Boudreau, 2000)

- **Replicate in other cultural contexts**
 - Based on German experts
 - Germany's level of digitalization is similar to that of other advanced societies such as the US, South Korea or Australia (Baller et al., 2016)
- **Actually measure changes resulting from digital transformation**
 - While qualitative research is suitable for building models on organizational change, longitudinal or (quasi-)experimental studies might be valuable for actually empirically assessing changes in work design and leadership

Questions or comments?



For further information on our research,
just write me an email:

t.schwarzmueller@tum.de