JYVÄSKYLÄN YLIOPISTO
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Työsuojelurahasto
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The Finnish Work Environment Fund

Unseen Burdens: The Meta-Work and Technostress Dilemma

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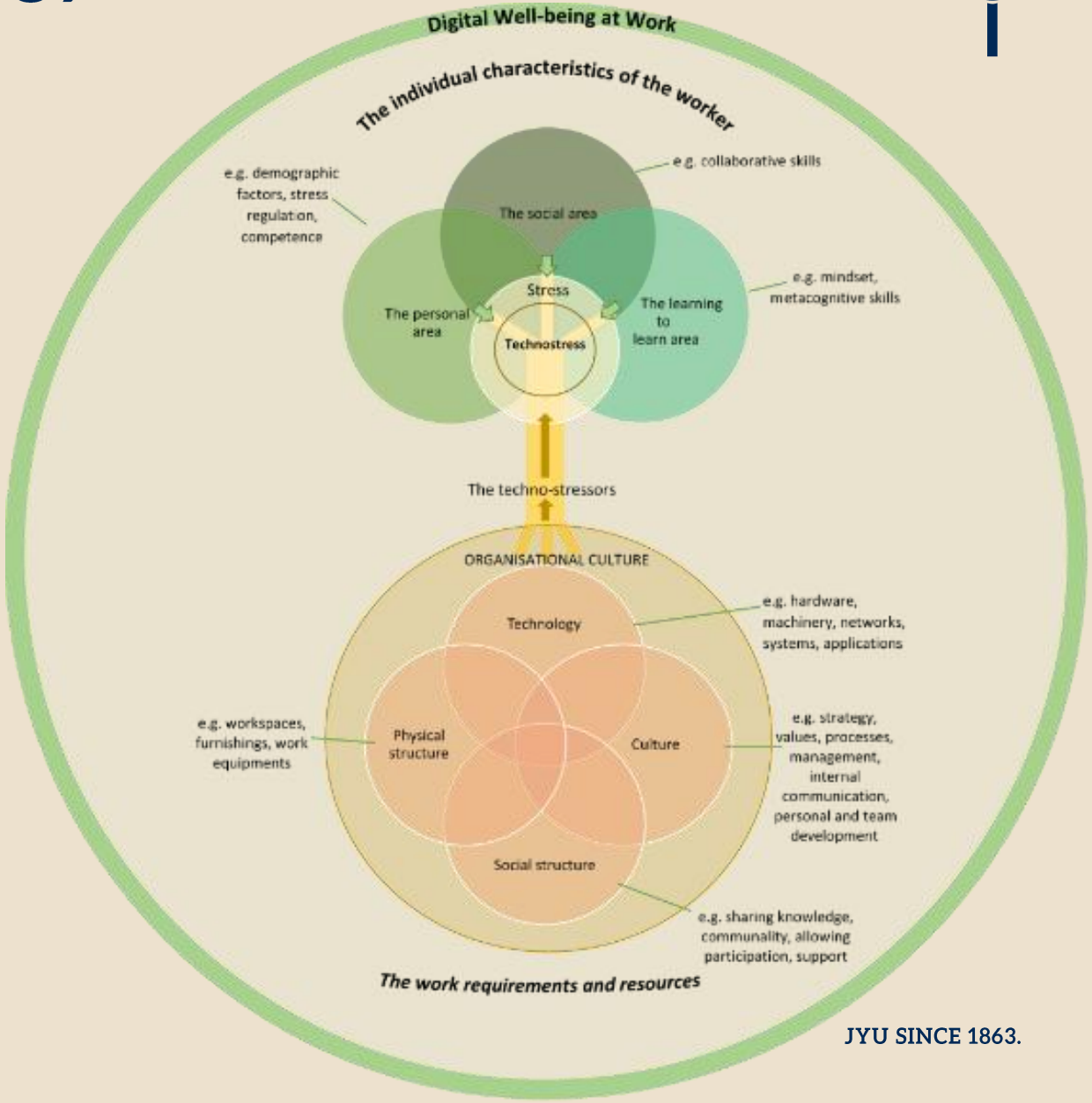
Digital technologies are praised for efficiency and innovation. But hidden costs like technostress and meta-work are often overlooked. This presentation explores their impact on employee well-being. Our study explored how technostress and meta-work affect employees in digitalized workplaces.

Technostress: When Technology Becomes a Burden

- Technostress refers to the stress people experience due to the demands of using technology (Pothuganti, 2024).
  - Not just technical issues—also about pace, expectations, and boundaries. Key stressors include overload, invasion, complexity, insecurity, and uncertainty (Fischer & Riedl, 2017; La Torre et al., 2019; Ragu-Nathan et al., 2008; Tarafdar et al., 2019).
  - Individuals experience technostress differently, and organizational context and culture influence stressors (Rikala et al., 2022)
  - When individuals struggle to manage and cope with these stressors, they then experience technostress (Wang et al., 2021).
- Consequences include burnout, reduced engagement, and increased turnover intentions, all of which harm employees' well-being (La Torre et al., 2019; Fischer & Riedl, 2017).

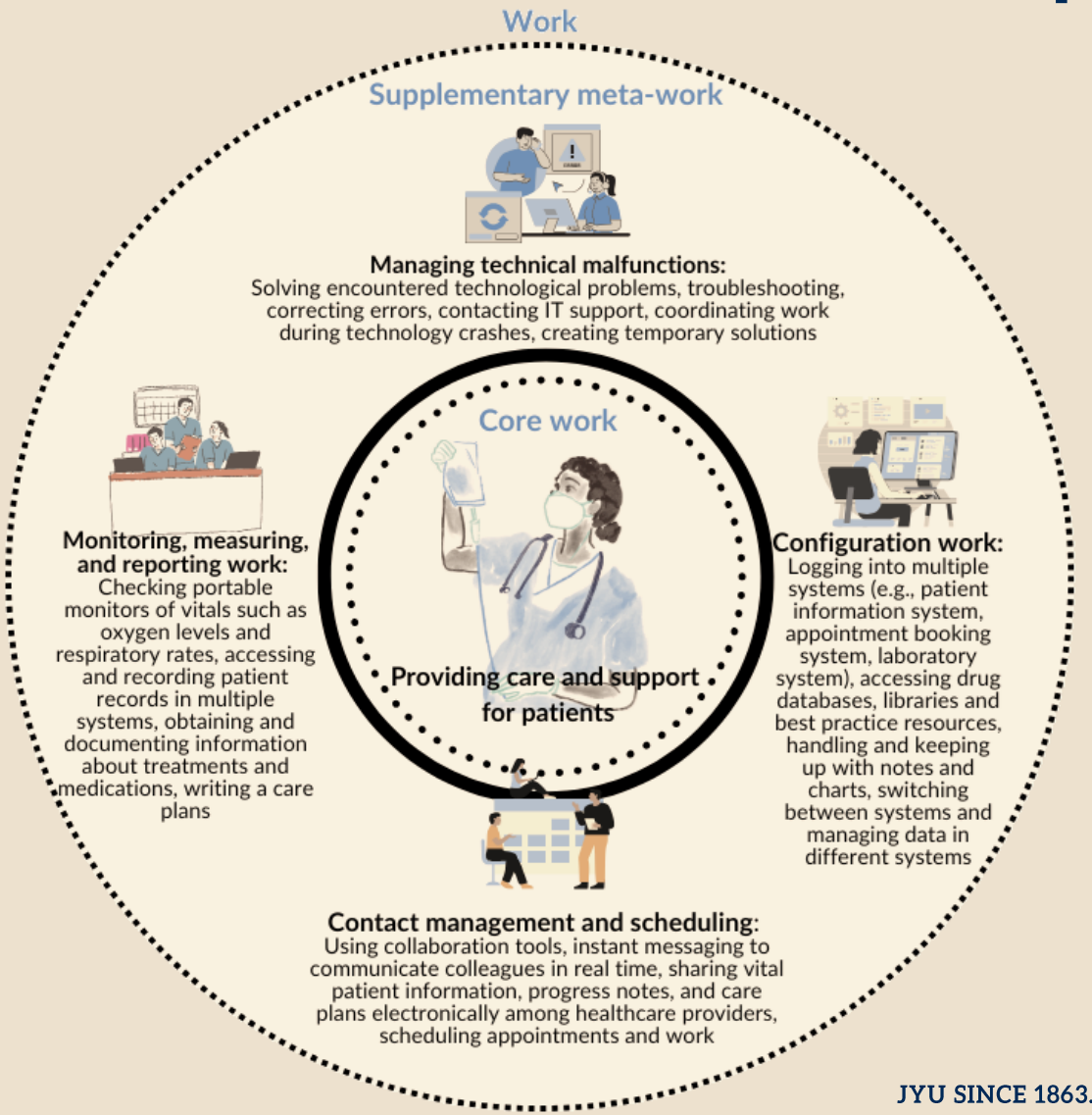


Technostress profiles

- Previous research has identified distinct user profiles based on how individuals experience technostress and interact with digital technologies. These profiles help us understand how factors like digital competence and age influence stress levels and attitudes toward technology. However, there is still limited knowledge about the effects of meta-work on technostress and employee well-being.
  - **Rosa et al. (2025):**
    - *Techno-functional* – Positive technology attitude, low stress
    - *Techno-strained* – Older, skeptical, moderate stress
    - *Techno-addicted* – High stress, pessimistic view
  - **Ficapal-Cusí et al. (2024):**
    - Categorized users into high, moderate, and low technostress profiles.
  - **Niu et al. (2022):**
    - High digital competence = low technostress, low burnout, better learning outcomes.
  - **Ylönen et al. (2025):**
    - *Motivated digital experts* – Skilled, non-stressed
    - *Burdened digital users* – Stressed, moderate skills
    - *Frustrated survivors* – Low skills, high stress

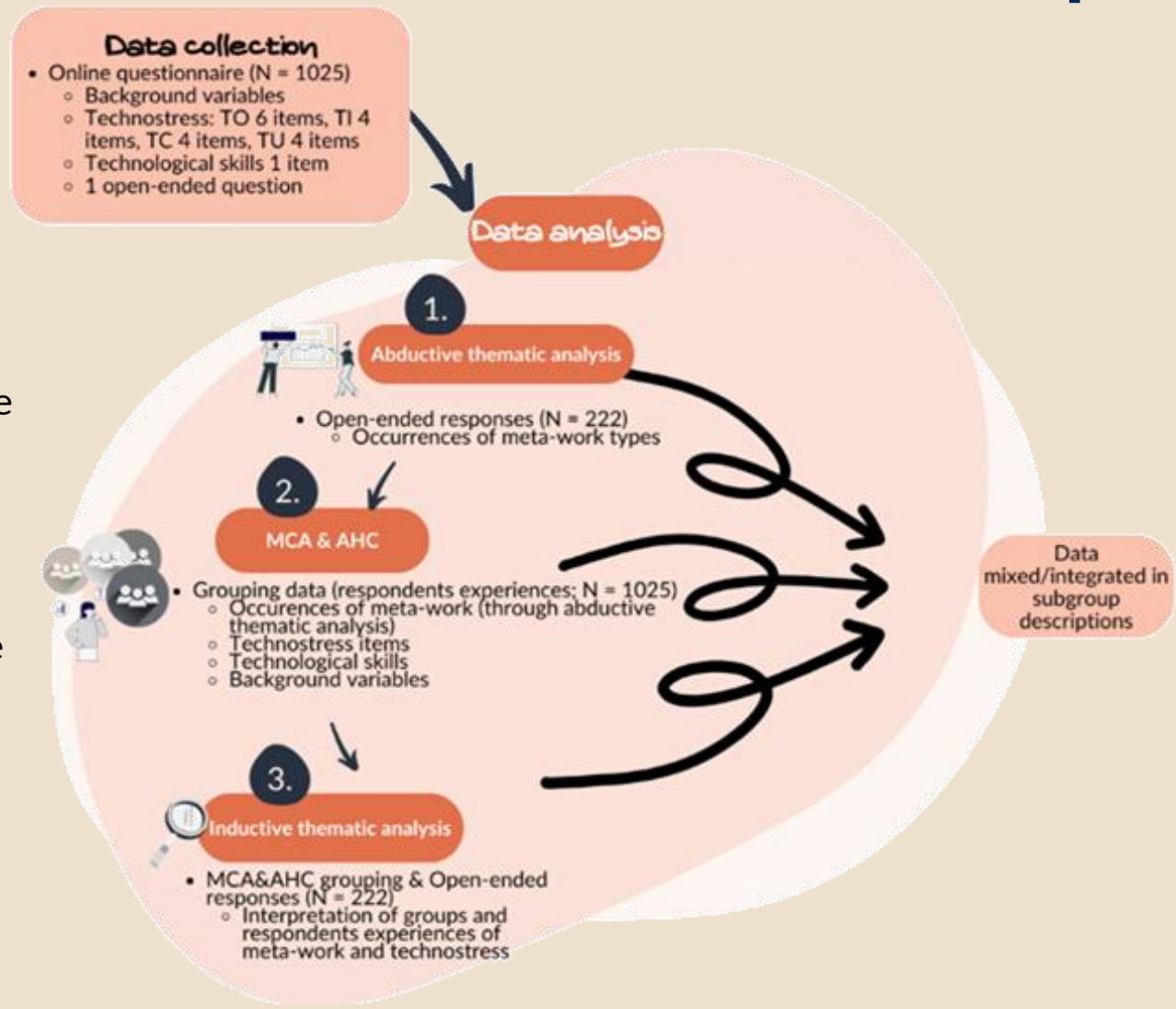
Meta-Work: The "Invisible Layer" of Digital Work

- Meta-work is the work that makes work possible. (Aroles et al., 2023).
  - The types and presence of meta-work tasks differ across various professions (Palen & Salzman, 2004).
    - Encompasses supporting tasks such as adaptation, configuration, communication and information coordination, maintenance and technical work, and monitoring, measuring, and reporting (e.g., Aroles et al., 2023; Beer & Mulder, 2020; Huang, 2021; Bruun & Krause-Jensen, 2022; Palen & Salzman, 2004; Jarrahi et al., 2017; Bourlakis et al., 2023; Justesen & Plesner, 2024; Scaramuzzino & Martinell Barfoed, 2023; Castillo et al., 2023)
- Meta-work, thus, involves additional tasks on top of core assignments, increasing workload (Scaramuzzino & Martinell Barfoed, 2023). Often invisible, not in job descriptions, but mentally demanding.



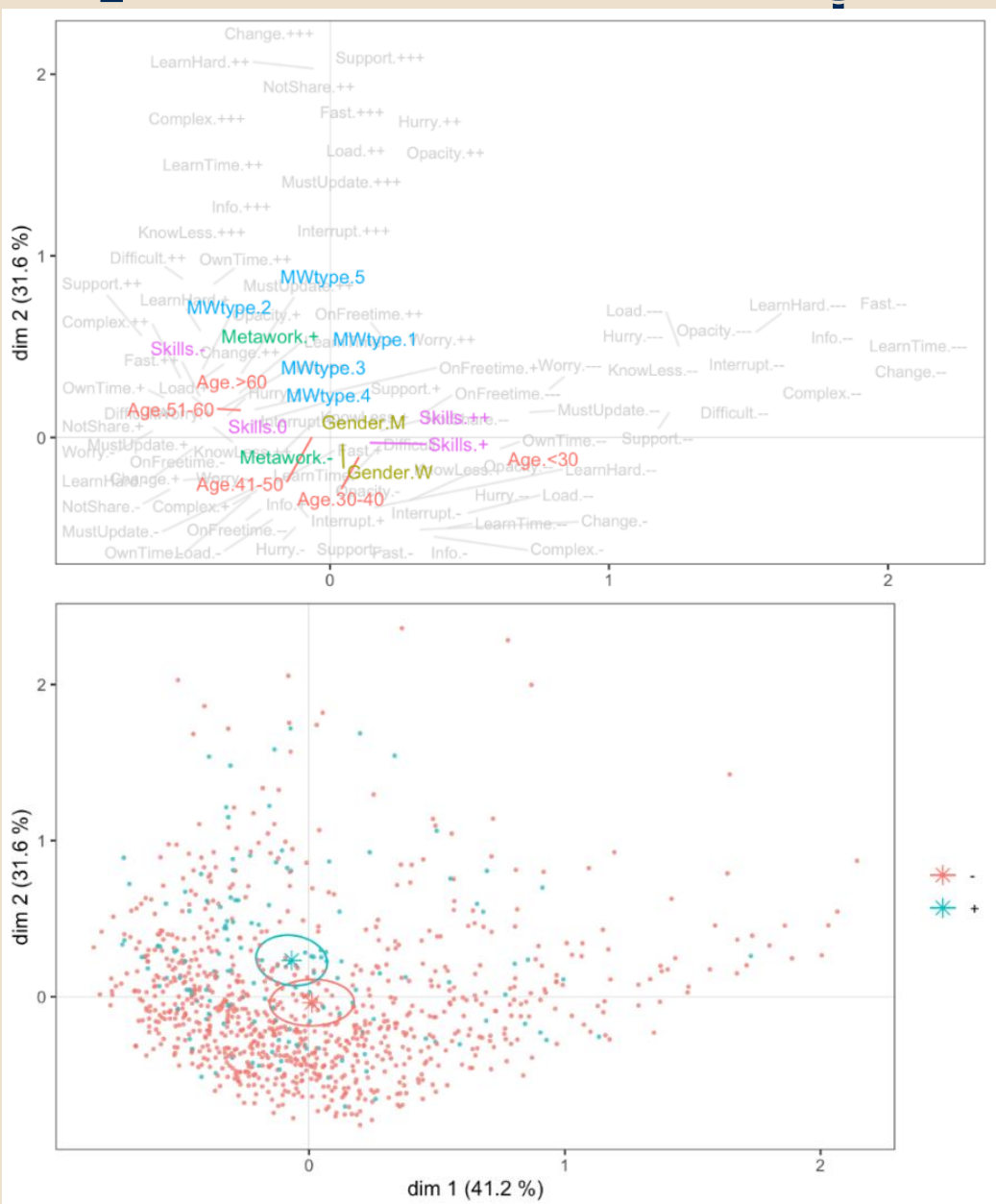
Aims & Methods

- Our mixed-methods study investigated the impact of digital transformation on employees, drawing on the job demands-resources model (Bakker et al., 2014) and sociotechnical systems theory (Pasmore et al., 2018). The aim was **to identify subgroups among Finnish employees based on their experiences with meta-work and technostress**.
- Data were collected via an online survey of employees in Finnish companies and hospitals in early 2020. Qualitative data highlighted different types of meta-work, while quantitative results identified sources of technostress using scales adapted from Ragu-Nathan et al. (2008).
- An abductive thematic analysis (Thompson, 2022) categorized meta-work forms, complemented by multiple correspondence analysis and hierarchical clustering (Greenacre, 1984; Beh & Lombardo, 2014). Results were visualized in a biplot (Kim et al., 2024) and interpreted through inductive thematic analysis (Bingham, 2023) and statistical tests.



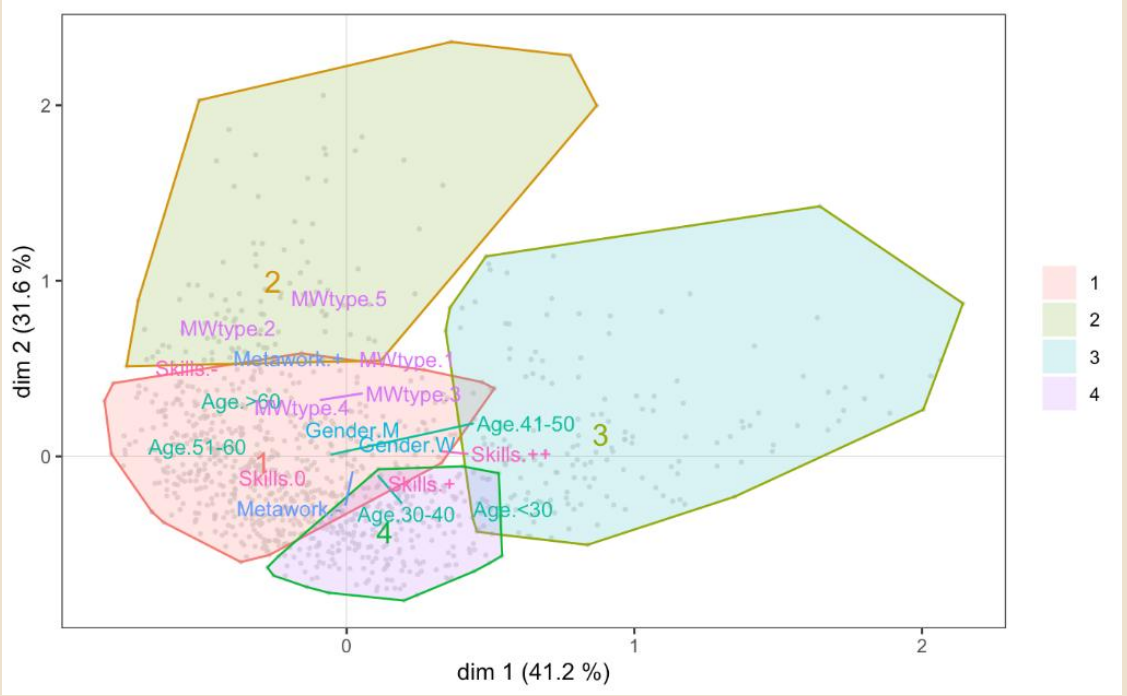
Meta-work instances and technostress patterns

- Overall, only 14% of responses reported instances of meta-work. Of these 143 identified meta-work instances, 13% were configuration work (MWtype1), 23% were contact management (MWtype2), 34% were troubleshooting (MWtype3), 11% were administrative duties (MWtype4), and 20% were constant learning (MWtype5).
- The data indicated that the centers of meta-work (+) and non-meta-work (-) were statistically distinct within a 95% confidence interval, indicating unique challenges with meta-work.
- Younger employees (under 30) exhibited higher technological skills and lower levels of technostress, while older employees (50+) demonstrated the opposite—higher technostress and lower technological skills. Overall, higher technological skills were associated with reduced technostress, whereas lower skills correlated with increased technostress across all dimensions.



Grouping of employees based on technostress and meta-work

- The clustering showed that four groups were optimal and that meta-work was centered over the boundary between cluster groups 1 and 2.
  - 1) Moderate technostress with high meta-work engagement
    - Typically middle-aged, experienced employees with basic technological skills. They experience moderate technostress, mainly due to system complexity and disruptions, which increase their workload and strain. Common meta-work tasks include troubleshooting and communication management. Cluster 1 showed that digital tasks can distract from core activities, leading to a disconnect from primary professional identity.
  - 2) High technostress with moderate meta-work engagement
    - Also typically middle-aged and experienced with basic technological skills. They report high levels of technostress caused by information overload, frequent interruptions, and complex technologies.
      They often need to update and learn new skills to keep up with constant changes.
  - 3) Low technostress with effective coping and low meta-work engagement
    - Typically, younger adults with **strong technological skills** but less work experience. They experience low technostress and have a positive relationship with technology, effectively using coping strategies to manage stress.
  - 4) Low technostress with ineffective coping and very low meta-work engagement
    - Typically, younger adults with basic technological skills. They have ambivalent feelings toward technology, suggesting potential vulnerability to technostress—especially if their coping and learning skills are not adequately supported.



Characteristics of each subgroup

Cluster 1: technological complexity, communication overload, and role conflicts driving moderate technostress and intensive meta-work in middle-aged professionals with basic technological skills *"Technology is helpful in nursing, but it takes time away from direct patient care. My working hours have not increased, and patient numbers haven't decreased. I find myself on the computer more than with patients, which feels upside down"* (F, 30–40, nurse, healthcare).

Cluster 2: technological complexity, communication overload, and organizational factors driving high technostress and moderate meta-work in middle-aged professionals with basic technological skills *"There have been plenty of new digital tools, and I feel that there has been very little guidance on how to use them. They will be introduced in a hurry, and in some cases, perhaps they will be a little unfinished. There are often overlapping systems, and things have to be searched for or done through several programs, which in reality, decreases efficiency"* (M, 41–50, sales, Forest industry).

Cluster 3: effective coping with technostress, positive attitudes, and low meta-work engagement in younger professionals with versatile technological skills *"Trying out new technologies is valuable and may require some study. Once you learn how to use a new tool, you can see its benefits. A negative attitude toward learning can hinder the adoption of new technology" (F, 30–40, project management, stock and retail sales).*

Cluster 4: low technostress, ineffective coping and very low meta-work engagement in younger professionals with basic technological skills and mixed attitudes and training needs *"Technology simplifies our work, but humans still handle most tasks. Companies could use technology to streamline and automate processes, making workloads more manageable" (F, 30–40, system/application development, stock and retail sales).*

Implications

- Meta-work significantly contributes to technostress levels, supporting the JD-R model. Our study also underscored the importance of considering both social and technical factors in addressing technostress, which is in line with STS theory.
  - Subgroups were differentiated based on technological skills, age, work experience, and organizational factors. While prior research (e.g., Ficapal-Cusí et al., 2024; Rosa et al., 2025; Keshavarz et al., 2025; Ylönen et al., 2025) has identified three technostress profiles, our findings reveal a fourth cluster, showcasing more complex experiences of digital transformation, meta-work, and technostress.
  - Different forms of meta-work increase employee workloads and intensify technostress.
- The study emphasizes the need for coping strategies, recommending that organizations provide training, implement user-friendly technologies, and create supportive environments.
  - All subgroups highlighted the necessity of adequate training. Tailored support is essential to help employees navigate advanced digital processes without feeling overwhelmed. User-friendly tools can mitigate cognitive load, while automating administrative tasks allows employees to focus on their core responsibilities.
  - Addressing technostress and meta-work is crucial for fostering positive and sustainable digital workplaces. While meta-work is inevitable, it should be regarded as part of work hours.
- Our study on Finnish workers, thus, highlights unique challenges with technostress and meta-work. While our mixed-methods approach provided insights, challenges in qualitative data collection limited depth. Future research should investigate the long-term effects of meta-work and technostress, update measurement scales to align with technological trends, and develop effective coping strategies.
  - There is a need to enhance tracking of meta-work instances, potentially through a validated metric or innovative methods, to address challenges with online surveys and free-text responses.

Thank you !

Read More: Rikala, P., Heilala, V., Karhapää, A., & Hämäläinen, R. (2025). Exploring Technostress and Meta-Work: Identifying Subgroups Among Finnish Employees. *International Journal of Human–Computer Interaction*, 1–25. https://doi.org/10.1080/10447318.2025.2531276

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