SOCIETY AND ECONOMY (2026), DOI: 10.14267/1588970X.2026.009

Digitalisation Anxiety in Czech Industrial Workplaces: A Multilevel Qualitative Study

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Received: 20 February 2025 – Revised: 28 October 2025 – Accepted: 24 November 2025

ABSTRACT: Digitalisation is reshaping industrial work, yet employees' lived experience determines whether its promised value is realised. Drawing on 66 semi-structured interviews with employees in Czech industrial workplaces, this study maps overall stance and delineates multilevel triggers of digitalisation-related anxiety. A large majority expressed a predominantly optimistic view (53/66; 80.3%), while pessimistic (5/66; 7.6%) and ambivalent (8/66; 12.1%) minorities reported concerns. Anxiety clustered at societal (e.g., macro-uncertainty about employment and safety due to failures), organisational (implementation quality, availability of qualified staff, training and help desks, transparency of data-driven monitoring) and individual levels (interpersonal frictions, fatigue, sleep disturbance). Across levels, uncertainty emerged as the primary driver, interacting with perceived decision latitude and support. On this basis, we outline actionable interventions: the transparent communication of scope and timelines; participatory implementation to increase discretion; task-relevant training and competent help desks; team-level norms that contain communication overload; and individual bounded-attention routines that reduce techno-overload. Conceptually, the paper advances a process-plus-content perspective on digitalisation anxiety that integrates societal, organisational and individual triggers and clarifies where to target the socio-technical system. While qualitative and sector-specific, the findings are transferable rather than statistically generalisable and provide a practical scaffold for designing inter-

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ventions that sustain employees' broadly positive orientation while tempering anxiety during ongoing digital change.

KEYWORDS: digitalisation; workplace anxiety; technostress; job demand–control–support; qualitative interviews; industrial workplaces; Czech Republic.
JEL CODES: O33, J28

1. Introduction

Across advanced and emerging economies, rapid digitalisation is reshaping how work is organised, experienced, and governed, spurring new patterns of efficiency gains as well as novel risks to employees' wellbeing and performance (Nambisan et al. 2017; Vial 2019; Legner et al. 2017).

However, despite substantial progress in information systems and organisational research, we still know comparatively little about how workers subjectively experience digitalisation in everyday industrial settings and which specific triggers are most salient in eliciting anxiety in the workplace (Tarafdar et al. 2015a; Ayyagari et al. 2011). This study, therefore, addresses the following research problem: *What are employees' perceptions of workplace digitalisation in Czech industrial enterprises, and which societal, organisational, and individual factors trigger digitalisationrelated anxiety?* (Pfaffinger et al. 2021).

The significance of this problem is twofold. First, digitalisation alters job demands, decision latitude, and social support – the core levers in classic occupational stress frameworks – thus potentially amplifying or mitigating job strain in ways that are insufficiently theorised regarding digitally intensive contexts (Karasek 1979; Johnson – Hall 1988). Second, evidence on the negative effects of digital technologies indicates that technology characteristics (e.g., intrusiveness, pace of change) can act as stressors with adverse effects on satisfaction, productivity and wellbeing, underscoring the need for sectorspecific, empirically grounded insights (RaguNathan et al. 2008; Tarafdar et al. 2010; Tarafdar et al. 2015b).

Throughout the study, we use *digitisation* to denote the conversion of analogue artefacts into digital form, whereas *digitalisation* refers to the broader sociotechnical transformation whereby digital technologies reconfigure organisational processes, roles and value creation (Gobble 2018; Legner et al. 2017; Vial 2019). Building on recent work, we define digitalisation anxiety as feelings of tension and discomfort related to both existing and future technologies, encompassing not only specific tools but also the process of their pervasive integration across levels of analysis—individual, organisational, and societal (Pfaffinger et al. 2021). This construct is analytically distinct from technostress (stress due to ICT use), technologyinduced anxiety (preimplementation threat perceptions),

and computer anxiety (state anxiety tied to computer presence), which focus primarily on technology use rather than on the multilevel permeation process of digitalisation (Ayyagari et al. 2011; Kummer et al. 2017; Cambre – Cook 1985).

We adopt the demand–control–support perspective, positing that anxietyrelevant triggers may emerge where high digital demands coincide with limited decision latitude or insufficient social support, while also engaging adjacent IS scholarship that documents negative outcomes from ICT overuse and technostressors (Karasek 1979; Johnson – Hall 1988; Tarafdar et al. 2015a). In parallel, we recognise the role of digital infrastructures and innovation dynamics in shaping new forms of work and control, motivating contextualised inquiry into how these macrolevel shifts translate into microlevel experiences in industrial workplaces (Tilson et al. 2010; Nambisan et al. 2017).

To investigate these issues, we conducted 66 semistructured indepth interviews with employees from Czech industrial enterprises between November and December 2023, sampling across roles and subsectors and analysing data via qualitative content analysis with iterative, inductive coding mapped to societal, organisational and individual trigger levels (Hsieh – Shannon 2005; Gale et al. 2013).

Interviews lasted on average 35 minutes (min. around 24; max. 60) and covered technology exposure, organisational support, perceived impacts, safety, and suggestions for mitigating negative consequences, following good practice for transparent analytical procedures (Hsieh – Shannon 2005).

Most interviewees expressed a generally optimistic stance towards workplace digitalisation, though a nontrivial minority reported negative or ambivalent feelings, with the most frequently mentioned anxiety triggers located at the societal level (e.g., unpredictability, job insecurity), followed by organisational (e.g., capability gaps) and individual (e.g., strained interactions) levels (Pfaffinger et al. 2021).

These patterns align with occupational stress theory, in which high demands and low control/support increase strain, and with IS evidence that technostressors such as overload, invasion and uncertainty impair wellbeing and performance (Karasek 1979; Johnson – Hall 1988; RaguNathan et al. 2008).

Empirically, the article provides one of the first qualitative examinations of digitalisation anxiety in CentralEuropean industrial workplaces, offering a trilevel map of triggers grounded in workers' voices and suggesting targeted interventions; theoretically, it integrates the digitalisationanxiety lens with the demand–control–support framework to clarify mechanisms by which digitalisation shapes strain (Pfaffinger et al. 2021; Karasek 1979).

The article is organised as follows. Section 2 provides a critical review of the relevant literature, identifying conceptual gaps and outlining the theoretical framework. Section 3 describes the methodological approach, including sampling, data collection, and analytical procedures. Section 4 presents the empir-

ical results, while Section 5 offers an in-depth discussion of the key findings in relation to previous research. Section 6 translates the findings into practical implications for organisations, policymakers, and employees. Section 7 concludes the paper by summarising the main insights, outlining limitations, and suggesting directions for future research.

2. Literature review

2.1. From computer anxiety and technostress to digitalisation anxiety

Early work conceived technology-related unease primarily as computer anxiety, a state-like fear response to the presence or anticipated presence of computers (e.g., Raub 1981; Cambre – Cook 1985). As digital tools became ubiquitous, research pivoted to technostress, focusing on how ICT use generates strain via stressors such as overload, invasion, complexity, insecurity and uncertainty (Tarafdar et al. 2007; Ragu-Nathan et al. 2008). Robust evidence links technostress to role stress and reduced productivity and illuminates organisational inhibitors (training, literacy, support) that can buffer its effects (Tarafdar et al. 2007; Tarafdar et al. 2015). Recent syntheses consolidate these negative effects but also note the fragmentation of constructs and measures across disciplines (Bondanini et al. 2020; La Torre et al. 2019).

A second important stream distinguishes technostrain (anxiety, fatigue, scepticism, inefficacy) from technoaddiction and shows that heavy ICT use can elicit clinically relevant stress reactions (Salanova et al. 2013). Complementary questionnaire-based evidence and neurobiological studies demonstrate that system breakdowns causally increase cortisol, reinforcing the psychophysiological plausibility of technology-elicited stress (Riedl et al. 2012).

While this literature richly characterises responses to specific tools and systems, it says comparatively less about anxiety regarding the ongoing process of digital change itself: what will change, how, and when. In addressing this gap, digitalisation anxiety has been conceptualised and operationalised as distress tied to the emergence and integration of new technologies in work and life, with four trigger domains (societal; interaction/leadership; within-person; and implementation process) and demonstrated negative relationships with well-being and performance (Pfaffinger et al. 2021). This process-plus-content framing complements technostress (use-centred) by foregrounding the uncertainty and temporality inherent to digital transformation.

2.2. Digital change and the job demand–control–support (DCS) model

The DCS model posits that psychological strain intensifies when demands are high, and decision latitude and social support are low (Karasek 1979; Johnson–Hall 1988). Applied to digital transformation, the model clarifies why the same technology can be experienced as enabling or threatening: poorly planned implementations increase demands (new tasks, pace, monitoring), while reshaping or reducing perceived control (opaque algorithms, non-negotiable workflows) and, absent investment, undermining support (insufficient training, inaccessible help desks). The DCS frame thus predicts that anxieties about digitalisation will be most acute under combinations of rising ambiguity and declining control/support.

2.3. Multilevel triggers: societal, organisational and individual

Societal conditions shape background anxiety. Estimates of automation risk vary by method: occupation-based projections suggest high exposure (Frey – Osborne 2017), whereas task-based analyses yield lower averages (around 9% across OECD countries) but emphasise strong cross-country heterogeneity (Arntz et al. 2016). These contrasting results illustrate that macro-level narratives can alternately amplify or temper fears, even before any concrete organisational change occurs.

At the organisational level, digitalisation reconfigures structures, roles and control systems. The algorithmic management literature shows that data-driven systems reshape control through 'six Rs' (restrict/recommend; record/rate; replace/reward), often increasing opacity and perceived surveillance—classic pathways for reducing control and increasing demand (Kellogg et al. 2020). Converging findings from information systems research indicate that technostress creators impair satisfaction and performance unless countered by inhibitors (e.g., literacy, participation, supportive leadership) (Tarafdar et al. 2007; Tarafdar et al. 2015).

At the individual level, antecedents include competence beliefs, self-efficacy, and affective dispositions; consequences include overload, fatigue, sleep disturbance, and withdrawal (Ayyagari et al. 2011; La Torre et al. 2019). Notably, neuroendocrine evidence corroborates subjective reports by linking failure events to cortisol spikes (Riedl et al. 2012). Together, these results caution against treating resistance to change as an individual deficiency; they point instead to situated interactions between technological demands, available resources and uncertainty.

2.4. Synthesis and theoretical contribution of this study

Across streams, the literature tends to decouple (a) anxiety about the process of digital change from (b) stressors related to the use of specific systems, and to treat triggers at one dominant level (tool/user or organisation), with limited integration across societal–organisational–individual layers. Building on Pfaffinger et al. (2021) and the DCS tradition, our paper advances a processpluscontent, multilevel framework of digitalisation anxiety and demonstrates its empirical contours in an industrial, Central European context. Specifically, we:

1. integrate societal narratives (e.g., automation risk), organisational controls (e.g., algorithmic monitoring, implementation quality) and individual resources (e.g., competence, fatigue) into a single explanatory lens;
2. specify how digital transformation increases demands (pace, surveillance, ambiguity) while lowering control (opaque systems) and sometimes support (insufficient training), thus operationalising DCS in digital change; and
3. ground levelspecific interventions (communication to reduce uncertainty; participatory implementation; skills and helpdesk support) directly in employees' accounts rather than generic checklists. In this way, we move beyond catalogues of 'stressors' to a transferable explanatory account of where digitalisation anxiety arises and how it can be mitigated in practice.

3. Methods

In designing, conducting, and reporting this qualitative study, we followed established best-practice guidance to maximise transparency and trustworthiness (e.g., COREQ). We explicitly document our sampling logic, interviewer procedures, triangulation choices and analytic workflow, including how codes and categories were generated and agreed upon. Where we deliberately did not adopt a particular technique (e.g., method triangulation), we provide a principled rationale for this grounded in the qualitative methods literature (Tong et al. 2007).

3.1. Sampling procedure

Guided by Robinson's four-point approach to qualitative sampling, we (1) defined the sample universe, (2) determined an indicative sample size, (3) selected a sampling strategy and (4) sourced participants (Robinson 2014). Because our aim was to understand work-related stress and negative feelings in the context of digital transformation, current employment was the key inclusion criterion. To

capture variation across contexts, we used purposeful maximum-variation sampling (across sectors, job roles/seniority, and degree of digital exposure), implemented through outreach to accessible organisations and networks (i.e., purposive sampling with pragmatic recruitment). Purposeful approaches are the norm in in-depth interview studies and are appropriate when the objective is analytic depth and contrast rather than statistical inference (Patton 2015; Palinkas et al. 2015; Robinson 2014). We therefore do not claim statistical generalisability; instead, we support transferability through thick descriptions of cases and contexts (Lincoln – Guba 1985).

We considered sample sufficiency using the information power principle (Malterud et al. 2016): given our relatively focused aim and the breadth of heterogeneity we sought across sectors and roles, a larger sample than is typical in narrowly bounded designs (e.g., IPA case studies) was warranted to secure the robust coverage of contrasts. We monitored informational redundancy during fieldwork and ceased recruitment when additional interviews yielded only minor elaborations of established categories (Guest et al. 2006; Malterud et al. 2016).

We acknowledge that purposeful (non-random) sampling can introduce selection bias. We mitigated this by (i) setting a priori variation axes (sector, role, digital tool exposure), (ii) recruiting from multiple organisations, and (iii) documenting recruitment flows to provide an audit trail. As is standard in qualitative inquiry, our claims are framed in terms of theoretical/analytical generalisation and transferability rather than population-level generalisation (Lincoln – Guba 1985).

All invitees received written study information and provided informed consent, including permission to audio-record, with no compensation offered. Procedures adhered to institutional ethical standards; approval was obtained from the authors' institution.

3.2. Sample of respondents

A single interviewer approached 70 employed adults (men: n = 54; women: n = 16; mean age: 36.44 years). Four potential participants were excluded because they did not meet the inclusion criteria or withdrew prior to the interview, resulting in 66 completed interviews (men: n = 54; women: n = 12; mean age: 35.82 years). Participants worked mainly in manufacturing (engineering, defence, electrical, foundry) and in one agricultural enterprise (an organic farm), with 3 to 40 years of work experience. All reported the routine use of digital tools at work (e.g., enterprise systems, computer-mediated communication, digital service applications). Some held strategic roles in digital transformation; others were rank-and-file users impacted by such changes.

Using one trained interviewer ensured procedural consistency and reduced between-interviewer variability in question delivery and probing. To mitigate interviewer-specific bias, we used a piloted semi-structured guide, standardised prompts, and systematic reflexive memoing with supervisory debriefs—approaches recommended in qualitative interviewing texts (Kvale – Brinkmann 2015; Guest et al. 2013).

3.3. Data Collection

We conducted semi-structured, in-depth interviews in Czech between November and December 2023. Interviews averaged 35.29 minutes (min = 23.71; max = 60). The guide covered seven domains: (1) the respondent's definition and use of 'new technologies'; (2) duration of use and employer support (infrastructure, training, help-seeking, peer support, problem resolution); (3) reasons for non-use (if applicable); (4) perceived impacts on mental state, performance and personal life; (5) organisational readiness and competence development; (6) occupational health and safety in relation to new technologies; (7) respondent suggestions for reducing negative impacts and improving the quality of working life. The guide ensured consistent coverage while allowing flexible sequencing and probing to elicit depth, following best-practice for semi-structured interviewing (Kallio et al. 2016). Immediately after each interview, the interviewer wrote reflexive field notes to capture contextual cues and emergent insights for subsequent analysis. Where English-language excerpts are presented elsewhere in the manuscript, they were translated by the first author and checked by a bilingual co-author to minimise meaning loss.

We employed investigator triangulation at the analysis stage and data-source triangulation through the heterogeneity of sectors/roles. We did not apply method triangulation (e.g., observations/documents) because our primary objective was to elicit lived experiences through depth interviewing; in such designs, credibility can be robustly supported via analyst triangulation, negative-case analysis, reflexivity and an audit trail (Patton 1999; Carter et al. 2014; Lincoln – Guba 1985).

3.4. Data Analysis

Audio recordings were transcribed verbatim. We conducted inductive qualitative content analysis with constant-comparison moves, complemented by reflective, theme-building work. Concretely, we (i) familiarised ourselves with the material; (ii) generated initial data-proximal codes inductively; (iii) iteratively grouped codes into categories; and (iv) developed these into more abstract,

interpretative axial categories/themes that captured patterned meanings across the corpus (Elo – Kyngäs 2008; Miles et al. 2014; Braun – Clarke 2006). To enhance transparency and retrieval, we managed data and coding in NVivo (QSR International); as emphasised in the methods literature, computer-assisted qualitative data analysis software (CAQDAS) facilitates systematic data management and audit trails but does not, in itself, guarantee analytic quality (Woods et al. 2016; Pope et al. 2000).

Coding was iterative. The first author developed a draft codebook on a subset of transcripts; a second analyst independently coded around 20% of transcripts using this draft. The team then held consensus meetings to discuss coding rationales, merge/split codes and clarify definitions, privileging negotiated agreement over mechanical reliability metrics because the analysis aimed at interpretative depth rather than positivist replication (Braun – Clarke 2019; O'Connor – Joffe 2020). We documented all changes in a version-controlled audit trail and maintained analytic memos throughout. We additionally conducted deviant/negative-case analysis to test and refine emergent interpretations (Pope et al. 2000; Patton 1999; Nowell et al. 2017).

4. Results

4.1. What counts as 'new technologies' in participating firms?

Participants displayed a high degree of convergence in how they conceptualised 'new technologies' (n = 64 statements). In industrial firms (and one agricultural enterprise), these were described as automatic, digital, or robotic systems: CNC machines, automated lines, robotics, modern displaycontrolled machinery, computers, tablets, mobile phones, 3D printing, and software. Two employees reported uncertainty (e.g., 'I do not know; I do not work with them', Company H, R10) despite demonstrable, routine interaction with such technologies.

4.2. Overall affective orientation towards digitalisation

To gauge valence, responses to the opening question were aggregated into an overall attitude code: *positive* (only optimistic responses), *negative* (only pessimistic responses), or *ambivalent* (both optimistic and pessimistic). A large majority of interviewees were generally optimistic (53 respondents; e.g., 'I'm happy to work here with robots—so optimistic', Company H, R9). Five were generally pes-

simistic (e.g., 'Rather pessimistic', Company CH, R5) and eight ambivalent (e.g., 'About half and half; everything has pluses and minuses, even new technologies', Company C, R2).

4.3. Levels-of-analysis framework and prevalence of anxiety triggers

To identify triggers of digitalisation-related anxiety, interviewees reflected on the extent to which digitalisation elicited joy/happiness versus fear/anxiety. Six interviewees explicitly articulated concerns and were probed regarding the underlying triggers. Following Pfaffinger et al. (2021), triggers were classified at societal (macro), organisational (meso), and individual (micro) levels.

Among those who described anxiety triggers (n = 6), five located them at one level of analysis, and the responses of one respondent spanned all three levels. We therefore report findings by level while cross-referencing salient interdependencies (e.g., organisational processes shaping individual strain).

4.4. Societal (macro-level) triggers

Participants most frequently invoked concerns about the broad consequences of digitalisation for health and safety, job security, and the predictability of work processes. Illustrative excerpts included:

- 'My biggest concern is losing job security' (Company B, R2).
- 'It is unreliable, slow, expensive; machine inaccuracy can be dangerous for those around it' (Company C, R3).

A recurrent theme concerned process instability during failure events, described as acute chaos, task disruption, and heightened pressure for immediate remediation: 'When [the technology] does not work, it brings more problems—chaos, disruption of tasks, pressure to resolve the malfunction immediately. It is stressful' (Company D, R6).

Some respondents objectified technology as inhuman or alien (an artificial, inhuman thing; a big monster, Company CH, R4). Others noted broader labour-market issues, namely a shortage of technology-savvy workers, and the growing burden of surveillance/monitoring technologies ('You used to watch people and animals; now you watch the technology', Company D, R6).

4.5. Organisational (meso-level) triggers

Organisationally controllable triggers, although less frequently voiced (n=2 statements in the coded corpus), were salient where they arose. Interviewees expressed concern about the future viability of firms lacking sufficient qualified staff to operate and maintain new technologies ('Without people who know how to control the technologies, it will be very difficult—or it will not work at all', Company E, R3). A second theme involved managerial capability and supportiveness, including the elevation of technical experts without leadership experience ('Executives do not do anything for us; I solve everything with a union representative', Company CH, R4).

4.6. Individual (micro-level) triggers

At the micro level, interviewees pointed to time scarcity for training and practice, internal pressure to keep up with technological change, limited technological affinity, demotivation, and fatigue. One respondent highlighted interpersonal complexity around technology use ('Some colleagues are unsympathetic or difficult', Company CH, R3). Several described fear responses linked to perceived physical risk ('I am afraid of my life when I approach robots', Company B, R2) and to loss of control amid an accelerated work pace. Collectively, these account for an individualised stress process that is catalysed by organisational demands and technological characteristics.

4.7. Health, safety, and quality-of-working-life implications

Perceived health impacts were mixed. Many respondents reported no discernible effect (n=55 statements; e.g., 'It never affected me much—mentally or physically; I was proud we were modern', Company C, R1). Others perceived negative effects (n=6; e.g., 'Technology affects the soul negatively and reduces performance', Company CH, R5). Regarding the quality of working life, positive evaluations substantially outnumbered negative ones (52 vs 7 statements). We therefore avoid parity framing: the data indicate predominantly positive perceived impacts, with a minority reporting fear, stress or reduced well-being.

Workplace occupational safety and health (OSH) arrangements associated with new technologies were mostly appraised positively (n=59 statements). Seven respondents were unsure or unable to assess.

4.8. Support structures, readiness, and expectations (merged)

This subsection consolidates prior short segments on willingness to learn, organisational readiness, problem-solving, employee support needs, and expectations.

Support and problem-solving. Respondents widely reported access to designated support (n=65 statements), typically a manager, colleague, or technology specialist (service provider/supplier) when confronting knowledge-related issues (n=20). Many combined this with theoretical training and practical rehearsal to build durable competence (n=43). Employers were perceived as providing substantial competence development (n=61), primarily through training programmes and practice-based learning.

Readiness. Most respondents viewed their firms as ready for technological implementation (n=61; e.g., 'We are in the 21st century', Company H, R1) and employees likewise (n=52), with five uncertain. Perceptions of planning and implementation were generally positive ('An employer without innovation is a dead employer', Company C, R1), with managers highlighting anticipated process redesign and automation benefits at the system level (Company D, R1).

Support needs and expectations. Employees articulated clear expectations regarding enablement: structured training (theoretical and practical), on-the-job coaching, accessible documentation/video tutorials/online help, and reliable professional support. Broader expectations included proactive organisational development (n=21), stability (n=3), faster decision-making, the selective reduction of working hours tied to modernisation, better communication, high-quality services from vendors, and a constructive work climate. A small number proposed reassignment for employees misaligned with technology-rich roles.

Table 1. Framework of digitalisation-related anxiety triggers with illustrative elements from this study

Level	Illustrative triggers (not exhaustive)	Examples from interviews
Societal (macro)	Unpredictability of consequences; health and safety risks; job insecurity; reduced availability of work; perceived process chaos during failures; surveillance/monitoring load	'Losing job security' (B, R2); 'Inaccuracy can be dangerous' (C, R3); 'When it fails, chaos and pressure for immediate fixes' (D, R6)
Organisational (meso)	Staffing sufficiency and skills; managerial capability and support; adequacy of infrastructure and userfriendly systems; pace and sequencing of rollouts; clarity of expectations	'Without skilled people it will not work' (E, R3); concerns about inexperienced leaders (CH, R4)

Level	Illustrative triggers (not exhaustive)	Examples from interviews
Individual (micro)	Time for training/practice; internal pressure to keep up; technological affinity; demotivation; fatigue/sleep disruption; perceived loss of control; fear of injury; interpersonal frictions	'Afraid when approaching robots' (B, R2); 'Colleagues can be difficult' (CH, R3)

Source: authors, Pfaffinger et al. (2021).
Notes: (i) Items such as fatigue/poor sleep are treated as individual outcomes (not societal). (ii) Duplicative entries (e.g., 'work speed') are consolidated to avoid double-counting. (iii) Counts reported in the text refer to statements, not unique individuals, unless specified.

5. Discussion

The study described in this paper qualitatively examined employees' feelings about digitalisation at work and delineated multilevel triggers of anxiety regarding new technologies. Consistent with an overall positive orientation – approximately four-fifths of interviewees expressed predominantly favourable views – pockets of apprehension persisted. These concerns clustered at the societal, organisational, and individual levels, with societal-level triggers most frequently raised. We interpret this profile as evidence of a control gradient across levels of analysis: as triggers move from the individual to the societal domain, employees perceived that decision latitude typically contracts, which—under growing demand—heightens strain in line with job demand–control–support logic. In classic terms, high demands paired with low control (and, at times, insufficient support) are the conditions most likely to produce strain (Karasek 1979; Johnson – Hall 1988).

5.1. Why societal triggers dominate

Interviewees most often associated digitalisation with macro-level uncertainties (e.g., labour-market disruption, safety during breakdowns, and societal well-being). Two bodies of evidence help explain this salience. First, the automation risk literature yields divergent estimates depending on whether it uses task- or occupation-based approaches (high exposure in occupation-based projections versus substantially lower averages in task-based analyses), thus fuelling ambiguous public narratives that may heighten anticipatory anxiety (Frey–Osborne 2017; Arntz et al. 2016). Secondly, organisational-change research consistently shows that uncertainty – especially about the content, timeline and personal consequences of change – is a primary antecedent of anxiety and other strain responses; it is mitigated when employees experience greater control and credible communication (Bordia et al. 2004; Rafferty – Griffin 2006). Together,

these streams clarify why societal triggers (where individual control is lowest and narratives most contested) dominated our participants' accounts.

5.2. Organisational mechanisms and the role of control/support

At the organisational level, employees pointed to leadership capability, qualified staffing, training and access to help desks as pivotal in shaping their digitalisation experience. These observations align with information-systems research on technostress creators (overload, invasion, complexity, insecurity, uncertainty) and inhibitors (literacy facilitation, involvement, support), which link poor implementation to reduced satisfaction and performance and identify targetable buffers (Tarafdar et al. 2007; Ragu-Nathan et al. 2008; Tarafdar et al. 2015). Our data also resonate with the emerging literature on algorithmic control, which documents how data-driven systems can intensify perceived surveillance and reduce discretion through the 'six Rs' (restrict/recommend; record/rate; replace/reward) unless accompanied by transparency and voice (Kellogg et al. 2020). In DCS terms, poorly planned digitalisation raises demands (pace, monitoring, new process complexity) while reducing control (opaque workflows) and sometimes withholding support (thin training/help resources), thereby elevating strain.

5.3. Individual experiences, uncertainty and affective load

At the individual level, interviewees described interpersonal frictions, fatigue and sleep disturbance, symptoms consistent with technostrain and change-related uncertainty. Evidence across organisational psychology indicates that uncertainty is associated with psychological strain and adverse attitudes during change; both participation in decision-making and high-quality communication restore a sense of control and reduce strain (Bordia et al. 2004; Rafferty – Griffin 2006). Complementing self-reports, neurobiological experiments show that system breakdowns causally raise cortisol, lending mechanistic plausibility to the anxiety articulated in our interviews (Riedl et al. 2012). Importantly, these outcomes should not be read as individual-level 'resistance to change', but as situated responses to the interplay of demands, control and support during digital transformation.

5.4. Theoretical implications

Our findings advance a process-plus-content account of digitalisation anxiety that integrates societal, organisational and individual layers. Whereas much

of the technostress literature is use-centred (strain arising from interaction with specific ICTs), our respondents emphasised anticipatory and implementation-related uncertainty. This differentiation aligns with and extends the recent formalisation of digitalisation anxiety as a construct that explicitly captures anxiety about the process of digital change and its multilevel triggers and corroborates its negative associations with well-being and performance (Pfaffinger et al. 2021). By embedding these triggers in the DCS framework, we specify how digitalisation amplifies demands while attenuating control/support, and we clarify where interventions should target the socio-technical system.

5.5. Practical implications (brief overview)

The above interpretation points to priority levers. At the societal/sectoral interface, credible labour-market signals and safety standards can dampen macro-uncertainty; within organisations, early communication of scope and timelines, participatory implementation, task-relevant training, and responsive help desks directly increase control and support; for individuals, practices that build competence and self-efficacy and surface concerns (e.g., structured Q&A, peer coaching) address interpersonal strain. These levers are consistent with evidence that communication, participation and support reduce uncertainty-driven strain during change and that inhibitors buffer technostress (Bordia et al. 2004; Tarafdar et al. 2015). **In the context of natural resource management, these mechanisms are also relevant for forestry, where ongoing digitalisation—particularly through geographic information systems (GIS) and digital forest management systems—similarly affects planning, operational decision-making, and field documentation processes (Longley et al. 2015).**

5.6. Limitations and transferability

Our interpretation is bounded by the purposeful, non-probability sample concentrated in manufacturing; gender imbalance; and single-interviewer data collection. As such, we claim analytic transferability, not statistical generalisability. Nonetheless, the control-and-uncertainty logic articulated here is likely to apply in comparable industrial settings, and the level-specific pattern of triggers provides a transferable scaffold for intervention design. Future work should examine under-represented sectors (technology/IT, healthcare, education, financial services), employ cross-country comparisons, and combine interviews with observations/documents to enhance triangulation.

6. Practical implications

6.1. Provenance and framing

This section translates our qualitative findings into actionable, multilevel interventions. Recommendations are organised by locus of initiation—society/public policy, organisation, team, and individual—and by the principal mechanism through which they mitigate digitalisation-related anxiety, drawing on the job demand–control–support tradition and adjacent literatures on technostress and algorithmic control (Karasek 1979; Johnson – Hall 1988; Tarafdar et al. 2007; Ragu-Nathan et al. 2008; Tarafdar et al. 2015; Kellogg et al. 2020).

Table 2 presents the authors' synthesis grounded in themes repeatedly voiced by participants—macro-level uncertainty, implementation quality, qualified staffing, training and help desks, communication overload, and interpersonal frictions—and aligns each proposal with the primary DCS levers: reducing demands, increasing control, and strengthening support. The table is adapted from Pfaffinger et al. (2021) to the industrial context studied; items without empirical footing in our data are not included. Consistent with evidence on managing uncertainty in organisational change, the interventions prioritise transparent communication, participatory implementation, and capability-building to restore discretion and provide accessible help resources (Bordia et al. 2004; Rafferty – Griffin 2006).

6.2. Evidence-linked priorities

Across our 66 interviews, participants most frequently voiced societal-level uncertainty (e.g., labour-market disruption, safety during breakdowns), followed by organisational concerns (leadership capability, availability of qualified staff, training/help desks), and individual tensions (interpersonal frictions, fatigue). This pattern is consistent with DCS logic – strain is elevated where demands rise, and control/support diminish (Karasek 1979; Johnson – Hall 1988) – and aligns with research on technostress creators/inhibitors (Tarafdar et al. 2007; Ragu-Nathan et al. 2008; Tarafdar et al. 2015) and algorithmic control (Kellogg et al. 2020). The interventions described below therefore target uncertainty reduction and control/support enhancement at the level where each trigger arises, with transparent communication and participatory implementation as cross-cutting enablers (Bordia et al., 2004; Rafferty – Griffin 2006).

Table 2. Evidence-linked interventions against digitalisation anxiety

Initiator	Triggers addressed (from our data)	Primary DCS lever(s)	Example interventions (anchored in evidence)
Society / Public policy	Macrouncertainty about the labour market and safety during failures	↓Demands; ↑Control	(1) Clarify compliance concerning working-time recording and boundaries of availability in remote/hybrid work to avoid spillover and ambiguity (CJEU C55/18); (2) Fund targeted upskilling programmes for midcareer and older workers in industrial regions, with modular, practiceproximal curricula; (3) Strengthen sectoral safety standards for automated environments, including drills for failure modes. (Karasek 1979; Bordia et al. 2004; Rafferty – Griffin 2006)
Organisation (senior management)	Implementation quality; opaque monitoring; lack of qualified staff; thin training/help	↓Demands; ↑Control; ↑Support	(1) Communicate scope and timelines early (what/when/implications) and maintain open Q&A channels; (2) Participatory implementation (involve operators/maintainers) to raise discretion and improve fit; (3) Invest in competent help desks with clear SLAs; (4) Leadership capability building for digital change; (5) Algorithmic transparency and recourse for datadriven scheduling/performance systems; (6) Align staffing plans with new skill profiles. (Tarafdar et al. 2007; RaguNathan et al. 2008; Tarafdar et al., 2015; Kellogg et al. 2020)
Team / Line management	Availability expectations; communication overload; interpersonal tensions	↑Control; ↑Support	(1) Establish teamlevel norms for availability, channels, and response times; (2) Brief, rolespecific microtrainings and peer coaching; (3) Regular safety walkthroughs before/after deployments to surface issues early. (Bordia et al. 2004; Rafferty – Griffin 2006)
Individual employee	Fatigue; sleep disturbance; cognitive overload; skills gaps	↑Control; ↑Support	(1) Use bounded attention routines (timeboxed email checks, protected focus slots) to reduce technooverload; (2) Skillbuilding via organisational training and accredited microcourses; (3) Proactive helpseeking and feedback on tool usability; (4) Personal boundary management (worktime/availability) consistent with organisational norms. (Ayyagari et al. 2011; Tarafdar et al. 2015)

Source: authors, Pfaffinger et al. (2021).

Notes. OSH = Occupational Safety and Health. CJEU C55/18 = Court of Justice of the European Union, CCOO v Deutsche Bank SAE (14 May 2019).

6.3. Narrative guidance for implementation

Because respondents most often expressed macro-level uncertainty, policy measures that stabilise expectations—notably clear working-time recording requirements and defined boundaries of availability in remote/hybrid contexts—can reduce ambiguity and its affective load (CJEU C-55/18; Bordia et al., 2004). Targeted upskilling programmes for industrial regions may address perceived skill mismatches that underpin anxiety.

Our data linked anxiety to opaque or top-down deployments, under-resourced support, and uncertain expectations. Organisations should therefore (i) communicate what/when/impact in advance and maintain ongoing dialogue; (ii) involve end-users in configuring tools and workflows; (iii) ensure competent, responsive help desks; (iv) clarify availability windows and right-sized monitoring (transparency, purpose, recourse). These measures map to lower demands and higher control/support, the core pathways through which DCS predicts strain reduction (Karasek 1979; Johnson – Hall 1988; Tarafdar et al. 2015).

Teams should formalise communication norms to contain overload (channels, response SLAs, escalation), while individuals can adopt bounded attention routines and pursue targeted skill-building. These steps align with evidence that communication quality, participation and support attenuate change-related uncertainty (Bordia et al. 2004; Rafferty – Griffin 2006) and that technostress inhibitors (literacy facilitation, involvement, support) buffer negative effects (Tarafdar et al. 2015).

7. Conclusion

This study shows that employees in Czech industrial workplaces generally meet digitalisation with cautious optimism. Approximately four-fifths expressed predominantly positive views, yet anxieties persist and cluster at societal, organisational and individual levels. The prominence of societal triggers, chiefly macro-uncertainty about labour markets and safety during breakdowns, suggests a control gradient: as triggers shift from the individual to the societal domain, perceived decision latitude contracts, which, under rising demands, increases strain in line with the job demand–control–support tradition (Karasek 1979; Johnson – Hall 1988). The organisational themes we observed—implementation quality, availability of qualified staff, training and help desks, and the transparency of data-driven monitoring—mirror known technostress creators and highlight actionable inhibitors (Tarafdar et al. 2007; Ragu-Nathan et al. 2008; Tarafdar et al. 2015), while the individual themes (interpersonal frictions, fatigue, sleep disturbance) are consistent with technostrain and the affective burden of uncer-

tainty. Taken together, the evidence points to uncertainty reduction, increased control, and accessible support as the principal levers for practice.

7.1. Theoretical contribution

Conceptually, we advance a process-plus-content account of digitalisation anxiety that integrates societal, organisational and individual triggers rather than treating them in isolation. In contrast to much use-centred technostress research, which focuses on strain arising from interaction with specific ICTs, our analysis brings into focus anticipatory and implementation-related uncertainty as employees confront the ongoing process of digital change. This extends recent work that has formalised digitalisation anxiety (Pfaffinger et al. 2021) by embedding its triggers in the DCS framework and specifying how digitalisation raises demands (pace, monitoring, process complexity) while attenuating control (opaque workflows) and, at times, support (thin training/help resources). The result is a multilevel explanatory lens that clarifies where anxiety arises and how organisations can target it.

7.2. Limitations, scope of inference and justification of design choices

Our claims are bounded by design choices that were deliberate and theoretically warranted. First, we used purposeful, maximum-variation sampling to capture heterogeneity across subsectors, roles and exposure to digital tools; this is the methodological standard in interview-based qualitative research aimed at generating analytic depth and contrast, not parameter estimation (Patton 2015; Robinson 2014). We therefore make claims of transferability rather than statistical generalisability (Lincoln – Guba 1985). Second, the sectoral focus on manufacturing enhances internal coherence (digitalisation in industrial settings involves distinctive safety-critical breakdowns and algorithmic control regimes), but limits breadth; this boundary condition is stated to prevent over-reach. Third, our single-interviewer approach reduced between-interviewer variance and increased procedural consistency; potential interviewer bias was mitigated through a piloted guide, reflexive memoing and analytic triangulation during coding (see Methods). Fourth, the sample size exceeded classic qualitative minima because we targeted heterogeneity and monitored informational redundancy; recruitment ceased once additional interviews yielded only minor elaborations of established categories (Guest et al. 2006; Malterud et al. 2016). Finally, our cross-sectional, self-reported data foreground perceptions rather than

behavioural outcomes; the neurobiological association between failure events and cortisol spikes nevertheless lends mechanistic plausibility to the anxieties reported here (Riedl et al. 2012).

7.3. Transferability beyond the Czech industrial context

We expect the control-and-uncertainty logic identified here to be transferable to comparable industrial settings in Central and Eastern Europe and beyond, while recognising that the salience of specific triggers (e.g., safety standards, algorithmic monitoring, union representation) will vary with institutional context. Macro-level narratives about automation risk—whose estimates diverge by method—likely shape background anxiety in all contexts (Frey – Osborne 2017; Arntz et al. 2016). Organisations operating in different regulatory regimes should therefore adjust interventions to local working-time norms, OSH requirements and data-governance rules.

7.4. Future research

We recommend three avenues. First, a cross-country, cross-sector comparative design (e.g., technology/IT, healthcare, education, financial services) would test the scope conditions of our framework and map how institutional arrangements moderate the DCS levers. Second, longitudinal and multi-method work—combining interviews with observations, document analysis and, where appropriate, digital trace data—would strengthen triangulation and track how anxiety evolves across implementation phases. Third, intervention studies should assess whether uncertainty-reducing communication, participatory implementation, capability-building, and transparent algorithmic control causally reduce anxiety and improve performance, thereby connecting subjective experience to organisational outcomes.

In sum, while employees largely recognise and value the benefits of digitalisation (e.g., easier work, greater temporal–spatial flexibility), targeted interventions that lower uncertainty and restore discretion and support are essential to sustain this optimism and temper anxiety. By integrating multilevel triggers into a DCS-informed account, this study offers a transferable scaffold for diagnosing digitalisation anxiety and prioritising interventions in safety- and performance-critical environments.

Acknowledgement

This research was supported financially via institutional support for the long-term conceptual development of research organisations for the period 2023-2027 and forms part of the research task 'OSH in a transforming society' (No. 01-S4-2022-VÚBP) addressed by the Research Institute for Labour and Social Affairs in the period 2022-2024.

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