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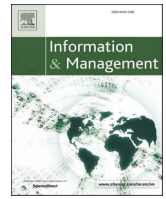
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Designing away technostress: Digital interface nudges, cognitive effort, and digital mindset in complex decision environments

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ABSTRACT

Complex digital decision tasks can become obstructive when interface design requires users to interpret, retrieve, and compare dispersed information under ambiguity. Although technostress research recognizes information system (IS) design as a potential mitigation lever, it remains underspecified how concrete interface-level mechanisms shape users' stress appraisals during interaction without removing objective task complexity. We theorize digital interface nudges, which are choice architecture based interface elements that structure options and guide attention without restricting choice, as a focused IS design lever that can reduce perceived cognitive effort during decision making and in turn lower perceived hindrance technostressors. We test this argument in an online experiment in which participants complete a complex car-booking task under either a default setting digital interface nudge, a salience-framing digital interface nudge, or a control interface. Both digital interface nudges reduce perceived hindrance technostressors relative to the control, and these reductions are stronger for individuals with a higher digital mindset. The study contributes to technostress research by showing how minimal choice architecture based interface interventions can shape how users appraise complexity in structured decision interfaces without removing objective complexity from the task itself. It also extends digital nudging research from behavioral choice outcomes to stress-related perceptual outcomes and identifies digital mindset as an initial user-level scope condition that shapes the effectiveness of interface structuring.

1. Introduction

Poor information system (IS) design remains a primary driver of user frustration and task abandonment in complex digital decision environments. When interfaces are complex, ambiguous, or poorly structured, users must invest substantial cognitive effort to locate, interpret, and compare information. These conditions can trigger hindrance technostress appraisals, that is, the perception that IS obstructs rather than supports task completion [1,2]. Such design-induced technostress is consequential: it reduces task performance and increases the likelihood that users abandon digital processes before completion [3–5]. Consistent with this concern, online transaction abandonment rates approach 70%, resulting in approximately \$260 billion in lost revenue annually [4]. Technostress research has generated rich insight into organizational and individual antecedents, but its design-side explanation remains less

precise, so that it recognizes IS design as relevant but does not sufficiently specify how concrete interface-level mechanisms can reshape users' stress appraisals during the moment of interaction [5].

Prior work on design-based technostress mitigation leaves this question underspecified. Much of the literature remains either conceptual, advocating better or simpler interfaces without specifying concrete design mechanisms, or oriented toward broad redesign efforts such as interface simplification, navigation optimization, or feature reduction [6–8]. These approaches are valuable, yet they often imply that technostress mitigation requires removing, simplifying, or substantially redesigning complexity rather than explaining how complexity can be structured differently within the interface. Therefore, they do not directly theorize how choice architecture inside an interface shapes users' stress appraisals while they are making decisions. As a result, a core theoretical problem remains unresolved: we lack knowledge about

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which concrete, implementable IS design interventions can mitigate perceived hindrance technostressors during use and the boundary conditions under which such interventions are effective.

We address this problem by theorizing digital interface nudges as a distinct class of IS design levers. Digital interface nudges adjust the presentation and default structuring of options to shape decision friction and guide user attention while preserving users' freedom of choice [9, 10]. This distinction matters theoretically because nudges operate through choice architecture mechanisms that are closely aligned with transactional stress appraisal processes [2,5,11]. Whereas redesign approaches typically aim to remove complexity, digital interface nudges aim to structure complexity so that decision-relevant information becomes cognitively accessible during interactions.

Accordingly, this study aims to explain whether and how two simple digital interface nudges – default-setting and salience-framing – reduce perceived hindrance technostress in a complex digital decision making task. Digital interface nudging is defined as digital interface design elements that steer user attention and decision making in predictable ways primarily to benefit the user, without restricting options or providing economic incentives [9]. We focus on a default-setting digital interface nudge that preselects an option while keeping alternatives available and a salience-framing digital interface nudge that makes task-relevant information more perceptually prominent (e.g., through visual emphasis) [10,12]. Importantly, our use of salience-framing nudge refers to cues at the digital interface level, not to broader message-framing mechanisms such as gain-loss framing. By structuring information and simplifying choices, digital interface nudging can lower perceived cognitive effort during decision making [10] and facilitate smoother IS interaction [12]. Hence, integrating digital interface nudging principles into IS design may help reduce the perception of technostressors. Practical findings from industry settings (e.g., Booking.com) illustrate the practical implementation of digital interface nudges within IS [13].

Digital interface nudging is unlikely to be uniformly effective across all users, however. Technostress research shows that individual characteristics shape how users perceive and react to technostressors [14–16]. Similarly, studies on digital interface nudging indicate that personal traits determine how users interpret and respond to nudges [17]. These streams jointly suggest that the impact of digital interface nudging on technostress may depend on users' disposition toward IS.

A particularly relevant disposition is the digital mindset. The digital mindset reflects an individual's established capabilities and experiences with IS and guides how individuals perceive and respond to specific situations regarding digital technologies [18]. The digital mindset impacts how individuals perceive intricate and complex tasks [19], feelings of helplessness while using IS [20], or complexity and ambiguity [21]. Individuals possessing a high digital mindset tend to perceive a wider range of potential actions and interactions with IS [18]. Consequently, users' digital mindset may determine both how they perceive technostressors and how they respond to digital interventions such as digital interface nudges. Therefore, we treat digital mindset as a plausible user-level scope condition.

Integrating these perspectives, we theorize that default-setting and salience-framing digital interface nudges structure information in ways that reduce perceived cognitive effort and thereby lower perceived hindrance technostressors. We focus on hindrance technostressors because they capture IS demands that are appraised as obstructive and are consistently associated with frustration, avoidance, and task abandonment [2,3,5,22]. Challenge technostressors, in contrast, reflect demands appraised as opportunities for growth and may involve different cognitive and motivational mechanisms [2]. Given our interest in stress-reducing interface interventions during complex decision making, hindrance technostressors provide the most theoretically aligned outcome construct and allow for sharper prediction and design guidance. Accordingly, our research question is:

How do digital interface nudging principles influence users' perception of hindrance technostressors in complex digital decision tasks, and how does digital mindset influence this relationship?

We test these relationships in an online experiment ($N = 214$) in which participants completed a complex car booking task on behalf of their supervisor across three experimental conditions: default-setting digital interface nudge, salience-framing digital interface nudge, and control. We find that both digital interface nudges reduce perceived hindrance technostressors relative to the control condition, and that this effect is amplified for users with a higher digital mindset.

This study contributes to technostress research by specifying IS design as a concrete, changeable, interface-level mechanism for shaping stress appraisals during use. Specifically, we theorize and empirically examine how minimal choice architecture-based interface interventions can alter the appraisal-relevant structure of digital decision environments. In doing so, we specify how interface structuring mechanisms influence technostress appraisals without fundamentally reducing the objective complexity of the underlying task. We thereby specify how IS design can function as a changeable lever in technostress mitigation. Second, we extend digital nudging research by demonstrating that digital interface nudging shapes perception central to technostress, not only choice-related endpoints emphasized in prior work. Third, we provide initial evidence that digital mindset operates as a user-level scope condition that strengthens the stress-reducing effects of digital interface nudges, which clarifies when and for whom minimal interface interventions are most effective. By specifying default-setting and salience-framing nudges as concrete, implementable IS design elements, we translate calls for *better IS design* in technostress research [e.g., 5,7] into testable mechanisms that reduce perceived hindrance technostressors during interaction, offering a theory-aligned basis for design guidance in complex decision environments. Overall, these contributions position interface choice architecture as a theoretical bridge between technostress appraisal and digital nudging research.

The paper unfolds as follows. The next section provides theoretical background on technostress, digital interface nudging, and digital mindset. This is followed by the development of our research model with four hypotheses. We then explain our methodological approach, present our results, and discuss our findings. In the final section, we explain the limitations of our study and draw implications for theory and practice.

2. Theoretical background

To develop a theoretical account of how perceived technostressors are shaped by digital interface nudges and digital mindset, we synthesize prior work on technostress, digital interface nudging, and digital mindset. We then integrate these perspectives into a conceptual model that explains how digital interface nudging reduces hindrance technostress and how digital mindset moderates this process.

2.1. Technostress and mitigating factors

Technostress refers to the stress experienced by users of IS [1]. It is a transactional process comprising causes, called technostressors, and psychological, physiological, or behavioral reactions [14]. Technostress appraisals can take one of two forms: hindrance or challenge [14]. Hindrance technostressors, such as complicated navigation [5], interruptions [22], perceived difficulty of use [23], unclear information display [5], and missing features [24], impede goal achievement and are associated with negative outcomes, including burnout [25], sleep problems [26], IS discontinuation [3], decreased productivity [27], and task abandonment [3]. Challenge technostressors, in contrast, represent demands perceived as opportunities for personal growth and innovation in IS use. Examples include managing heavy workloads or assuming IS-related responsibilities, which can foster positive outcomes and facilitate personal development [2]. As hindrance technostressors lead

to negative consequences, research and practice focus on identifying mechanisms that mitigate them [2].

Existing research distinguishes individual and IS-level mitigating factors. Individual characteristics, such as computer self-efficacy [28] and IT mindfulness [16,29] can reduce perceived technostress and can be developed and modified over time through interventions and training programs. Conversely, traits like personal innovativeness in IT [25] and the big five personality traits [14,15] also influence the perception of technostressors but are stable and less responsive to organizational interventions.

IS characteristics also can play a mitigating role. Many of these characteristics, such as IS presenteeism [30] and pace of change [31], are difficult to alter. In addition, recent technostress research points to the existence of another scarcely investigated IS characteristic that influences perceived hindrance technostressors: the design of IS [5]. The design of IS is changeable, and an effective IS design can structure information and decrease perceived cognitive effort while interacting with IS. For example, if users struggle to find the right button, feature, or information, the IS design can provide visual cues or prompts that guide the user in the right direction [10]. Such an IS design can mitigate technostress associated with unclear information or missing features [2, 5]. Effective IS design can help reduce information overload [10], representing another hindrance technostressor. Despite its potential, however, prior studies have not specified which IS design principles effectively mitigate perceived technostressors [5]. We address this gap by focusing on digital interface nudging as a concrete, design-oriented mechanism.

2.2. Digital nudging and cognitive structuring

Digital nudging in IS research commonly refers to digital interface nudges – micro-level design elements embedded in a user interface that shape how users attend to, process, and select options in a digital decision environment [9,10,32]. In line with the user-welfare orientation emphasized in prior work [e.g., 9], we conceptualize digital interface nudges as interventions intended primarily to benefit users while preserving freedom of choice. Because many foundational nudge mechanisms were originally studied in offline contexts [32], it is important to note that digital interface nudges may differ in how they operate. Interfaces can dynamically structure information, impose or remove interaction steps, and allocate visual salience in ways that directly affect users' perceived cognitive effort during decision making [9,12,17]. Previous studies have identified several forms of digital interface nudging, such as salience-framing, default-setting, social norms, loss aversion, or anchoring [33]. Of these, default-setting and salience-framing nudge are of particular interest in the context of technostress, as we highlight in what follows. Default-setting and salience-framing nudge target the specific mechanisms that are central to hindrance technostress in complex IS interactions, such as excessive search effort to find relevant information and comparison effort to evaluate multiple attributes across alternatives. While other nudges, such as social norms or anchoring can be effective for behavioral outcomes [12,34], default-setting and salience-framing nudge are especially suited for reducing decision friction and information-processing demands in the moment of use, precisely the conditions under which users are likely to appraise the IS as obstructive or overwhelming [2,22]. While both default-setting and salience-framing are conceptualized as digital interface nudges that structure decision environments and reduce perceived cognitive effort, they differ in how directly they intervene in the decision process. Default-setting reduces effort by preselecting options and thereby simplifying active choice, whereas salience-framing reduces effort by guiding attention and structuring information without altering the choice set.

Default-setting preselects an option that is automatically applied unless users actively change it [10,33,35]. This approach reduces the effort required to locate relevant information or settings and the effort

required to evaluate alternatives and select the option that best meets the user's goals [36,37]. By limiting the number of active decisions users must make, defaults simplify the interaction process and minimize decision fatigue [37]. Default-setting fosters consistency and continuity in IS interactions, leading to a sense of familiarity and comfort, ultimately mitigating perceived stress associated with navigating unfamiliar interfaces or options [9,32]. Technostress research shows that high cognitive effort can lead to technostressors associated with information overload and complexity [1]. With the help of default-setting, users can make a suitable decision in a given situation with less cognitive effort. In our experimental scenario, we use default-setting and pre-select a reasonable option in advance. This pre-selection reduces the user's required cognitive effort in comparing information and making a decision.

Salience-framing nudge, in contrast, alters the perceptual prominence and immediate accessibility of task-relevant information within the interface [10]. By emphasizing specific attributes through visual highlighting, salience-framing nudges direct attention toward decision-critical elements and reduce the effort required to locate, interpret, and compare information [10,12]. Importantly, this is conceptually distinct from broader linguistic message-framing traditions, such as gain-loss framing [33,38,39]. In the context of technostress mitigation, visual salience-framing is particularly relevant because hindrance technostressors often arise when interfaces present information in ways that are unclear, fragmented, or cognitively costly to process [1,2].

Both mechanisms operate by reducing users' perceived cognitive effort during decision making within the task environment [13]. Digital interface nudges primarily reduce perceived cognitive effort by structuring the user interface and clarifying the decision environment. From a technostress perspective, lower perceived cognitive effort leads to reduced hindrance appraisals [2].

Boundary conditions need to be considered, as the effectiveness of digital interface nudges is unlikely to be uniform across contexts. Digital interface nudges should be most beneficial when task complexity and choice set size increase cognitive effort required for interacting with IS, users face time pressure or accountability, and perceived risk makes information processing more demanding. Conversely, when tasks are simple, options are few, or users already possess clear preferences, digital interface nudges may have weaker effects or may even induce reactance if perceived as unnecessary steering. Mechanistically, digital interface nudges reduce technostress by lowering perceived cognitive effort, for example, by clarifying what matters or structuring information (see Fig. 1). These boundary conditions motivate our focus of this study on a high-complexity choice task and on an individual difference that shapes how interface cues are interpreted.

By organizing information and simplifying task structures, digital interface nudges reduce perceived cognitive effort to complete the current task [13,40]. Reduced perceived cognitive effort lowers users' perception of the IS as obstructive or overwhelming, thereby mitigating perceived hindrance technostressors [2].

However, the effectiveness of digital interface nudges is not uniform across all users. Prior research shows that individual characteristics influence how users interpret and respond to digital interface nudges, for example, such traits as the need for cognition or uniqueness can strengthen or weaken the effect of digital interface nudging [17,41]. Existing studies have focused on general personality traits rather than on IT-related dispositions. Consequently, our understanding of which individual characteristics are most relevant for explaining differences in users' responses to digital interface nudging remains limited.

In the context of technostress, this perspective is particularly important because users' reactions to IS design are closely linked to their underlying attitudes, beliefs, and capabilities in dealing with IS [15,25]. Consequently, we argue that an IS-specific disposition, such as the digital mindset, provides a more comprehensive and theoretically grounded lens to explain individual differences in how users perceive and respond

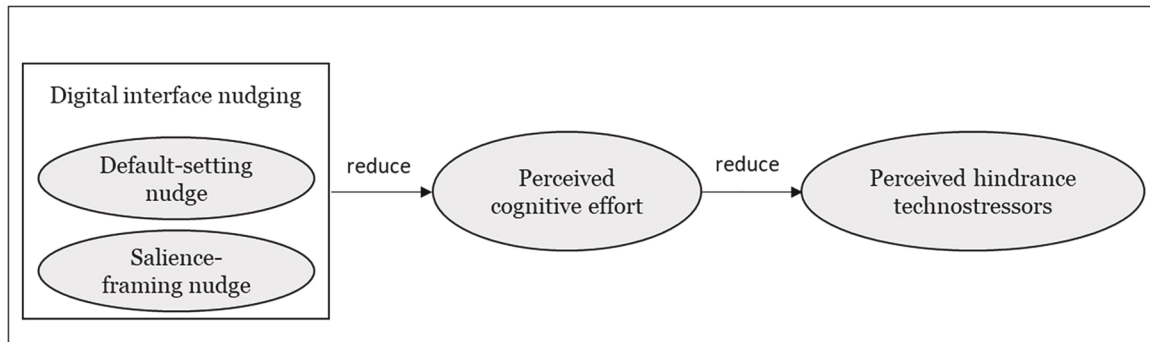


Fig. 1. Conceptual mechanism linking digital interface nudging, cognitive effort, and perceived hindrance technostressors.

to IS design features. In this context, we theorize digital mindset as a plausible IS-specific boundary condition that may shape both technostress appraisal and the extent to which users can benefit from digital interface nudging interventions within IS.

2.3. Digital mindset

Individual characteristics describe patterns of behavior, emotions, or thought that influence how individuals interpret and respond to certain situations [42]. In the context of IS usage, the digital mindset represents a relevant individual characteristic. It captures the cognitive frameworks and habitual ways of thinking that have emerged as individuals adapt to the pervasive presence of digital technologies [43].

Mindsets in general describe altered perceptions and interpretations that individuals maintain regarding specific environments and situations [44]. Those altered perceptions and interpretations ground on evolved cognitive schemas, developed through accumulated knowledge and experiences [45,46]. Hence, these schemas represent recurring patterns of thought derived from numerous instances of similar experiences concerning a particular concept and are changeable as they develop and change based on new information and experiences. Therefore, when individuals encounter stimuli or information, appropriate schemas are activated, directing attention towards relevant information to ensure that attention is focused on information congruent with existing schemas and away from other information, minimizing cognitive dissonance [46]. Further, they influence the inference of missing information and shape evaluations and judgments about stimuli that are congruent with existing schemas, potentially leading to confirmation bias [47]. Taken together, an individual's mindset describes a collection of cognitive schemas that shape perceptions and behaviors in a specific context [44,48]. Although mindset has been investigated in other contexts, such as globalization [48] and education [49], recent scholarly interest has focused on the digital mindset within the realm of digitalization and the widespread use of IS [43].

The digital mindset represents an individual's knowledge and experiences regarding digitalization, forming different cognitive schemas, also known as thinking patterns [18], regarding concepts relevant in the context of digitalization, shaping their perception and interpretation [43]. Conceptualizations of the digital mindset vary, but most agree that it involves habitual ways of thinking that enable individuals to effectively understand, use, and adapt to digital technologies [50]. Building on Hildebrandt and Beimborn [18], this study adopts a four-dimensional conceptualization comprising data-driven, combinatorial, generative, and risk-affine thinking (see Table 1).

Data-driven thinking reflects an individual's conviction that data is a valuable resource for understanding and solving problems. Users with a strong data-driven mindset are more likely to appreciate structured, information-rich IS interfaces and to use digital interface nudges that emphasize transparency or data-based guidance to their advantage. Combinatorial thinking refers to recognizing and valuing the potential

Table 1

Thinking patterns of the digital mindset relevant in the context of technostress.

Thinking pattern	Description
Generative thinking	Continuously thinking in ways that foster and include solution repurposing by integrating abstraction and modularity during interaction.
Data-driven thinking	Continuously recognizing data's potential and considering these in decision making or product development.
Combinatorial thinking	Continuously integrating the combinatorial characteristics of digital technologies in solution finding to broaden the potential solution space.
Risk-affine thinking	Continuous readiness of individuals to take calculated risks regarding digital technologies.

for combining IS functions and features in new ways [43]. Individuals high in combinatorial thinking tend to explore interface options more actively, which may buffer stress from complex systems but also increase perceived cognitive effort if IS design is suboptimal. Generative thinking involves perceiving digital technologies as flexible and extendable, seeing opportunities for creating new uses or functionalities. Such users may experience less frustration with evolving IS designs and respond positively to digital interface nudges that promote exploration or adaptation. Risk-affine thinking captures a willingness to engage with uncertain or experimental digital interactions. These individuals are more open to trying new system features or following unconventional navigation paths, potentially reducing perceived technostress from uncertainty but increasing susceptibility to overstimulation.

Taken together, the four dimensions capture a user's habitual cognitive frames for engaging with digital technologies. We argue that a well-developed digital mindset can reduce the likelihood of interpreting IS demands as overwhelming, thereby mitigating technostress. In this study, we operationalize digital mindset as a general, reflective higher-order construct indicated by the four dimensions. Accordingly, a "well-developed" digital mindset refers to consistently high levels across the four thinking patterns, reflecting a broadly flexible and opportunity-oriented cognitive orientation toward digital technologies. While we model digital mindset as a unified higher-order construct in the main analysis, our exploratory post-hoc results indicate that generative and combinatorial thinking primarily drive the observed moderation effects, suggesting promising avenues for future dimension-specific theorizing.

Digital mindset is conceptually distinct from adjacent IT-related individual traits that have been widely used in IS research. Digital literacy primarily captures users' functional skills and competencies in operating digital technologies and processing digital information, for example, the ability to use specific tools or features effectively [51]. IT self-efficacy in turn reflects users' beliefs about their capability to successfully perform IT-related tasks and overcome usage-related difficulties [52]. Personal innovativeness with IT captures a more general trait-like willingness to experiment with and adopt new technologies [53]. While these constructs are highly relevant for explaining IS adoption and use, they

predominantly address ability, confidence, or propensity to try rather than how users cognitively frame and interpret IS. In contrast to these traits, digital mindset emphasizes users' cognitive schemas and sense-making frames for engaging with digital technologies. Building on schema theory and sensemaking perspectives [54,55], a mindset captures patterns how individuals notice, interpret, and perceive environmental cues. The four dimensions of digital mindset describe how users habitually construe digital possibilities, recombine information, perceive generativity, and appraise uncertainty and risk in digital contexts. As such, digital mindset is not reducible to what users can do (e.g., skills), or what they believe they can do (e.g., self-efficacy), but rather to how they make sense of digital complexity [49].

This distinction is theoretically relevant for studies of digital interface nudging. Digital interface nudges do not primarily increase users' technical capabilities or confidence, but operate by directing attention, structuring decision spaces, and shaping the interpretation of interface cues [9,32]. Transactional and cognitive perspectives on stress and decision making suggest that such interventions exert their effects through appraisal processes that are sensitive to users' underlying schemas. Therefore, a schema-based construct such as digital mindset is particularly well suited for explaining heterogeneity in nudge effectiveness, as users with different digital mindsets may differ systematically in how they perceive, attend to, and benefit from subtle interface cues intended to reduce complexity and perceived stress [11].

In summary, the digital mindset offers a theoretically grounded and context-specific lens for understanding individual differences in IS interactions. Capturing how users think about and engage with digital technologies helps explain why digital design interventions such as digital interface nudges may have varying effects on perceived technostress across users.

3. Hypotheses development

Drawing on prior research on technostress, digital interface nudging, and digital mindset, in this section we depict our research model (Fig. 2) and develop our hypotheses.

Bad IS design often requires users to explore multiple options, compare alternatives, and interpret unclear information before completing a task. These activities require users to invest cognitive

effort, which contributes directly to perceived hindrance technostress [2,5]. For instance, when users must manually select each configuration option in a booking process, they repeatedly engage in comparison decisions, leading to heightened stress. Default-setting nudges preselect one option that is automatically applied unless users actively change it [33].

This design impacts interaction because users no longer need to evaluate every alternative to progress toward their goal [37]. According to cognitive effort theory, reducing processing demands during interaction reduces users' perceived cognitive effort during the decision making process, that is, the subjective effort users experience when locating, interpreting, and comparing information within the interface [40]. When cognitive effort is reduced, users perceive the IS as less obstructive and experience fewer hindrance technostressors, such as feelings of complexity or overload [1,2]. We hypothesize:

H1: The default-setting digital interface nudge mitigates perceived hindrance technostressors.

When information in an IS is presented without a clear structure, users must actively search for relevant details, compare multiple attributes, and decide which information is most relevant. Such unstructured presentations require users to locate, interpret, and evaluate dispersed information. Prior research shows that these processes heighten cognitive effort during IS interaction and increase the likelihood that IS demands are appraised as obstructive, thereby intensifying perceived hindrance technostressors [2,5]. For instance, in a digital booking process, users may need to read through multiple paragraphs of text and compare similar offers to determine differences in price or conditions, consuming working memory resources and creating frustration.

In contrast, framing nudges, conceptualized here as salience or highlighting cues embedded in the user interface, represent a form of digital interface nudging that alters the presentation of information rather than its content or the available choice set [9,33]. By visually or textually emphasizing task-relevant attributes, for example, through highlighting, color, layout, or concise structuring, such digital interface nudges restructure the decision environment and guide users' attention toward critical elements and make essential information more immediately accessible [10,33]. This corresponds to a core nudging mechanism of modifying choice architecture to reduce cognitive friction without restricting options [47].

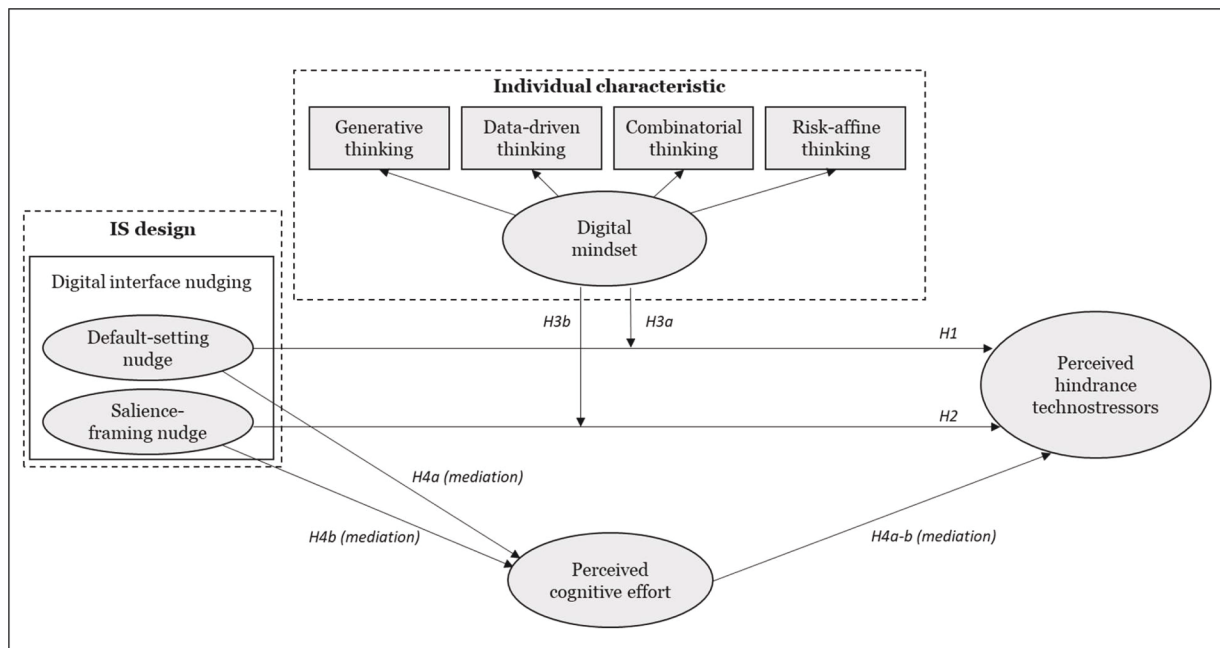


Fig. 2. Research model (Note: Rectangles are first order constructs, ellipses are second order constructs.).

From a cognitive processing perspective, salience-framing nudges reduce the effort required to locate and compare relevant information, thereby reducing search and comparison costs and conserving working-memory resources during interaction [56]. By decreasing this processing burden, salience-framing nudges make the IS easier to navigate and interpret, leading users to perceive the IS as more supportive rather than obstructive. Consequently, salience-framing nudges are expected to mitigate perceived hindrance technostressors. We propose:

H2: *The salience-framing digital interface nudge mitigates perceived hindrance technostressors.*

It is important to highlight that although both nudges are expected to reduce perceived hindrance technostressors, default-setting operates through choice simplification, whereas salience-framing operates through attentional guidance.

Mindsets describe different cognitive schemas that profoundly influence how individuals perceive and process information, shaping their responses to various stimuli [44]. In the realm of IS use, individuals with high digital mindset levels exhibit higher perception of possible actions and interactions with IS [18], increasing the complexity and cognitive effort involved when approaching tasks and making decisions with IS [2]. Through cognitive schemas concerning the generative and combinatorial properties of digital technologies, individuals' attention is directed toward various potential solutions when using IS, expanding their perceived problem solving space. While some of these solution pairs may appear unconventional and thus riskier than others, the cognitive schemas concerning these risks prompt the automatic inference of positive evaluations and the inclusion of these possibilities. Furthermore, data-driven thinking guides their focus toward accessing as much available data as possible and inferring its relevance, leading those individuals to include more optional data, aiming to precisely analyze as much available data as possible to solve a task [18,46]. As a result, the schemas of individuals' digital mindset lead them to perceive higher problem-solution space with more options and information that need to be compared when approaching tasks with IS [43], which potentially increases complexity and information overload. Consequently, default-setting nudge and salience-framing nudge, aiming to alleviate uncertainty and reduce required cognitive effort through pre-selected or highlighted information [10], may cause greater complexity reductions for those individuals, reducing higher amounts of complexity for them compared to individuals with low digital mindset levels. Therefore, individuals with a higher digital mindset tend to perceive a greater range of options and information affected by digital interface nudging and, thus, the associated reduction of cognitive effort also may be greater, leading to greater relief of hindrance technostress [57]. Hence, the effects of default-setting and salience-framing nudge on technostressors will be stronger for individuals with a higher digital mindset compared to those with a lower digital mindset, leading us to hypothesize:

H3a: Digital mindset moderates the effect of the default-setting digital interface nudge on hindrance technostressors, such that users with a higher digital mindset who are exposed to the default-setting digital interface nudge perceive lower hindrance technostressors.

H3b: Digital mindset moderates the effect of the salience-framing nudge on hindrance technostressors, such that users with a higher digital mindset who are exposed to the salience-framing nudge perceive lower hindrance technostressors.

Combining the foregoing arguments, we propose that default-setting and salience-framing nudge mitigate the perceived hindrance technostressors by reducing perceived cognitive effort required to search, compare, and integrate decision-relevant information [58]. This mechanism is consistent with IS evidence that interface structuring can reduce mental workload in decision tasks and with decision-aid findings that supportive design features reduce perceived cognitive effort under high information load [59]. Accordingly, we tested the indirect effects of both digital interface nudges on perceived hindrance technostressors via perceived cognitive effort:

H4a: *Perceived cognitive effort mediates the relationship between the default-setting digital interface nudge and perceived hindrance technostressors.*

H4b: *Perceived cognitive effort mediates the relationship between the salience-framing digital interface nudge and perceived hindrance technostressors.*

4. Method

In preparation for our main experiment, which revolves around a car booking task, we conducted a pre-experiment to identify potential IS design elements that cause hindrance technostressors. We chose a car booking task because it represents a broader class of information-rich, high-complexity, multi-attribute digital decision tasks in which users must integrate dispersed information under moderate accountability and uncertainty. Comparable interaction patterns occur in other information-rich decision environments, such as travel and expense portals, procurement systems, human resources self-services, and internal service platforms where users face many options, ambiguous conditions, and accountability for decision quality. These are precisely the conditions under which users are likely to experience such hindrance technostressors as overload, complexity, and unclear information presentation [2,22].

The insights gained from the pre-experiment informed the design of the main experiment, allowing us to effectively implement hindrance technostressors into the experiment. To validate the effectiveness of these implemented stressors, we conducted stress validation using both objective (skin conductance) and subjective (questionnaire) stress measurements, as illustrated in Fig. 3.

4.1. Pre-experiment, scenario development, and stress validation

In the pre-experiment, we interviewed 12 individuals (six women and six men, aged between 23 and 64 years) and developed several car booking tasks, each including different potential stressors elaborated from literature, such as unclear information display [1], complicated navigation [5], missing information [24], and complex interfaces [2], to elicit information about potential hindrance technostressors. The main causes of hindrance technostressors were unclear and complicated IS design, unclear information about insurance conditions or fees, and unclear or missing instructions of the car booking task. We adjusted the design of the main experiment according to the information gained from the pre-experiment and made sure the information provided was confusing and unstructured and that the scenario required the participants to compare complex options. We also solicited feedback from the pre-experiment participants regarding any other possible sources of technostress. For instance, participants indicated that certain factors, such as the presentation of a large amount of information on a single webpage and the complexity of different add-on options, lead to technostress. The insights of the pre-experiment informed the IS design of the car booking task for our main experiment, aiming to induce technostress.

During the stress validation, we aimed to ensure that our developed scenario effectively induced hindrance technostress. We conducted objective and subjective stress measurements [60] with 12 participants. For objective measurement, we analyzed electrodermal activity (EDA) using skin conductance (SC), a method previously used in technostress research [61]. EDA reflects physiological responses to stress, with higher SC indicating increased stress levels [62]. We used a MentalBioScreen K3 device to measure SC, capturing activity of the autonomic nervous system (ANS) linked to stress [63]. An activation of the ANS is especially expected when individuals encounter hindrance technostress [64]. For subjective measurement, we used validated scales to assess hindrance technostress [2].

The results show an increase in EDA during the experiment (mean = 10.64 μ S, mean highest value = 12.27 μ S, mean lowest value = 8.92 μ S)

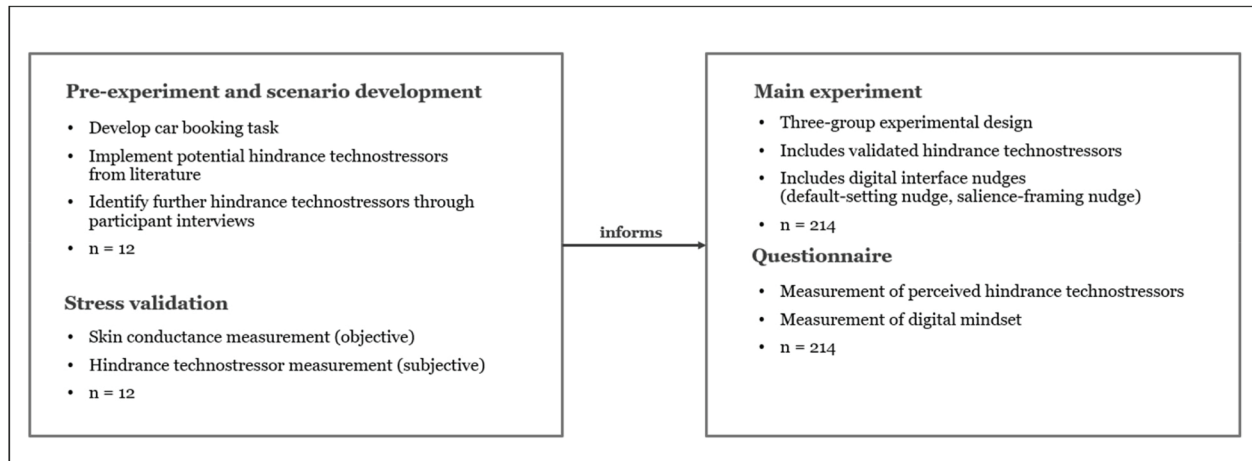


Fig. 3. Methodological approach.

compared to answering the questionnaire (mean = 6.46 μ S, mean highest value = 7.35 μ S, mean lowest value = 5.70 μ S) and a control booking website with no intentionally implemented stressors (mean = 8.99 μ S, mean highest value = 10.97 μ S, mean lowest value = 5.68 μ S). Subjective responses echoed these findings, with participants reporting higher perceived stress during the experiment (mean = 4.77) compared to the control website (mean = 3.74). These pretest results validate that our experimental design could induce technostress under controlled conditions.

The main experiment focused on established self-reported measures of hindrance technostressors, which have been validated in prior technostress research [2].

4.2. Main experiment and questionnaire

Our main experiment aimed to investigate the impact of digital interface nudging and digital mindset on perceived hindrance technostressors. To design suitable digital interface nudges for our main experiment, we drew on the digital nudge design method consisting of an analysis phase, design phase, and implementation and evaluation phase [65]. During the analysis phase, we defined the mitigation of perceived hindrance technostressors as the goal to be achieved with the digital interface nudges. During the design phase, we designed digital interface nudges that reduce the overall complexity of information the user needs to process when interacting with the IS, to structure the user interface, and to reduce information overload during the car booking task. These characteristics were all identified during the pre-experiment, are included in the definition of hindrance technostressors [2] and are suggested to mitigate hindrance technostressors [5]. We embedded these characteristics in the main experimental environment during the implementation and evaluation phase through default-setting and salience-framing nudges [10]. Besides being appropriate for mitigating perceived hindrance technostressors, default-setting and salience-framing nudges are essential drivers in car booking decision making [66], the experimental setting. The main experiment followed a three-group experimental design in which participants were assigned at random to a salience-framing nudge condition, a default-setting condition, or a condition with no digital interface nudges present.

We deliberately tested each digital interface nudge in isolation to maximize internal validity and to enable a clear attribution of observed effects to a specific interface design mechanism. Accordingly, we implemented separate experimental conditions for the default-setting nudge and the salience-framing nudge rather than combining multiple digital interface nudges within a single condition. While real-world systems frequently deploy bundles of digital interface nudges simultaneously, isolating individual mechanisms allows us to identify their

distinct stress-mitigating effects.

The main experiment was conducted online, and we designed an online car booking task to facilitate it. At the beginning of the experiment, participants were instructed to assume the role of an employee who was tasked by their supervisor to book a car and insurance for an upcoming business trip that best fit the supervisor's preferences. The supervisor expected a reliable car for a 10-day trip of approximately 200 miles per day and full coverage for potential damages and wanted to return it to a different location from where it was picked up. Participants were told that the supervisor would evaluate their choice afterward, emphasizing accuracy and diligence in their decision.

Participants had to choose one car and one insurance policy out of three alternatives each, considering six relevant attributes simultaneously. The website provided all necessary and additional non-essential information about each of the three car and insurance options. To intensify the perception of hindrance technostressors, the information was intentionally designed to be complex; for instance, it was left unclear whether specific additional fees applied, and different age restrictions or young driver surcharges were presented inconsistently, sometimes resulting in additional costs. Additional factors, such as varying mileage limits and costs for exceeding the limit, were included to further simulate a realistic and cognitively demanding decision environment. Moreover, all three car booking options were designed to be equally expensive when all six attributes were considered, ensuring that there was no objectively correct choice. This means there was no right or wrong decision, as the experiment aimed not to influence participants' decision making but rather to mitigate perceived hindrance technostressors through digital interface nudging. Fig. 4 illustrates the experimental design for the default-setting and salience-framing nudging conditions. In the control group, participants were presented with only the basic textual and visual information about each car, without any digital interface nudging elements.

To identify the impact of digital interface nudging on hindrance technostressors perceived by users during the car booking task, we designed digital interface nudges to counteract hindrance technostressors based on the insights of the pre-experiment. We created three conditions, two involving manipulating a specific option through default-setting and salience-framing nudges, and one representing a control group without manipulation (see Table 2). We deliberately examined the default-setting and salience-framing nudges in separate experimental conditions to ensure internal validity and to allow for a clear attribution of observed effects to specific interface mechanisms. While real-world IS often deploys multiple nudges simultaneously, this design choice prioritizes causal interpretability over ecological realism.

Subsequent to the main experiment, we surveyed the participants about perceived hindrance technostressors using an established 14-item

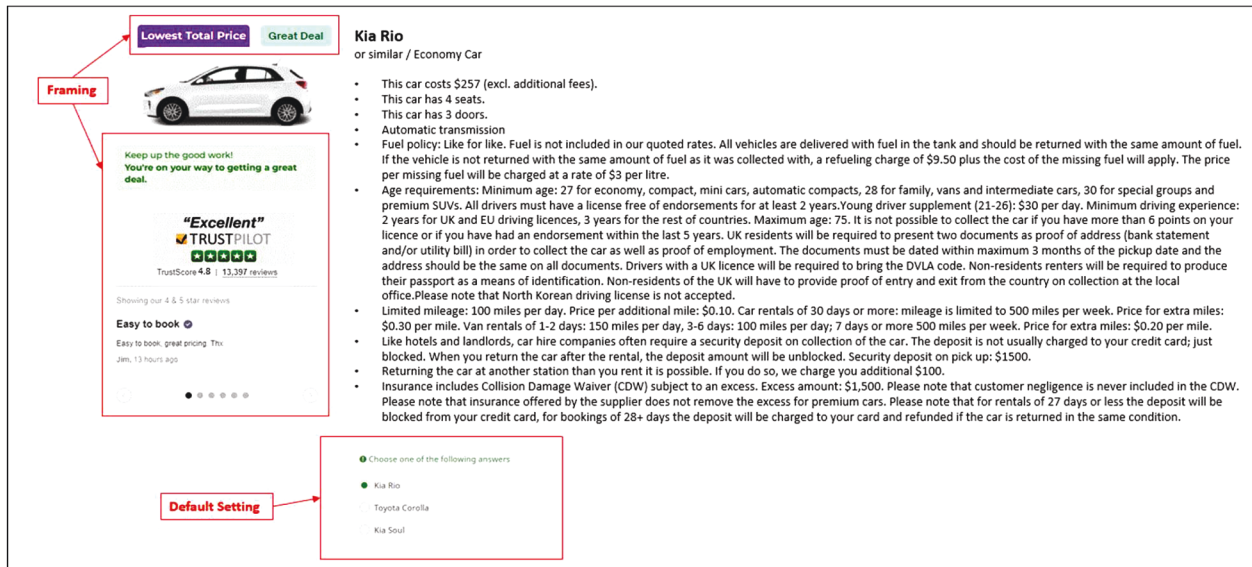


Fig. 4. Experimental design of default-setting and salience-framing nudge conditions.

Table 2
Overview of the three conditions.

Condition	Manipulation	Goal
Default-setting nudge	One option is pre-selected as the default option.	Reduce cognitive effort to identify and compare relevant information.
Salience-framing nudge	One option is highlighted through visual cues (e.g., icons and layout) to increase the salience of task-relevant information.	Reduce the load of information that users need to compare. Support through highlighting information.
No digital interface nudge	-	Control group

scale [2]. For measuring digital mindset, we used a validated 14-item scale [18]. Perceived cognitive effort was measured using a task-adapted 7-item scale capturing perceived mental effort, decision difficulty, and perceived information complexity experienced during the decision making process. This operationalization reflects perceived cognitive effort during decision making rather than isolating specific subtypes such as intrinsic or extraneous load. The items were adapted from established cognitive effort measures in decision research [67,68]. An overview of all items used in our research model is provided in the Appendix (see Appendix Table 5).

We used a 7-point Likert scale to measure the items, with 1 as “strongly disagree” and 7 as “strongly agree”. Before the main experiment, we used GPower 3.1 to estimate that for a sample size of approximately 150 and assuming a medium effect size, the power of the statistical test would exceed the recommended value of 0.8. We collected our data via Amazon Mechanical Turk (MTurk), consistent with prior technostress research [14]. To address common data quality concerns, we implemented multiple data quality screenings (see Appendix Table 6). We followed established guidelines, including only workers who have completed many tasks and a high acceptance rate (95%), did not follow a specific pattern during the questionnaire, and answered the trap questions correctly [69]. We included four attention traps that asked the participants in the question text to select specific answers and removed participants who answered identical or reverse questions inconsistently. Because the experiment laid the foundation for the questionnaire, we also removed participants who completed the experiment in an unrealistically short time and thus could neither be

stressed by embedded hindrance technostressors nor be manipulated by the implemented digital interface nudges. We also excluded participants who indicated implausible or disproportionate values to ensure that participants completed the entire experiment and read the questions carefully [69]. Participant distribution across the three conditions was even, with 70 participants in the default-setting nudge, 73 in the salience-framing nudge, and 71 in the no digital interface nudge condition. The characteristics of the 214 participants are summarized in Table 3.

5. Research results

We tested the theorized mechanism that digital interface nudges reduce perceived hindrance technostressors and that users’ digital mindset strengthens these reductions. Here, we provide details on validating the measurement and structural models, followed by the results of the experiment and questionnaire. We analyzed the questionnaire results following the structural equation modeling method using IBM SPSS Amos 28 and one-way analysis of variance (ANOVA) using IBM SPSS Statistics 28.0.

5.1. Validation of the measurement model and structural model

All constructs were measured reflectively using validated items from prior research [70] (see Appendix Table 5). Overall reliability and validity criteria were met: all item loadings exceeded 0.707 and were significant ($p < 0.01$) [71]. Composite reliability (CR > 0.7) and average variance extracted (AVE > 0.5) met recommended thresholds for all constructs [72,73] (see Appendix Table 7). Model fit indices indicated a

Table 3
Sample characteristics (N = 214, M = mean, SD = standard deviation, in percent).

Age (years)	< 21	0.0	Level of education	Less than High School	2.3
	21-30	42.5		High School	27.6
M = 35.75	31-40	31.3		Bachelor's Degree	58.4
SD = 11.55	41-50	11.7		Master's Degree	11.7
	51-60	9.3	IT usage	< 1	0.0
	> 60	5.2	(hours per day)		
Gender	Female	49.5	M = 6.36	1-3	12.1
			SD = 2.84	4-6	48.1
	Male	50.5		7-9	29.0
				> 9	10.8

good overall fit (RMSEA = 0.04, CFI = 0.95, TLI = 0.93), based on established goodness-of-fit guidelines [74]. Digital mindset was modeled as a reflective second-order construct. The loadings of the four first-order dimensions on the higher-order factor ranged from 0.787 to 0.882 (see Fig. 5), and all were significant ($p < 0.01$ for all), supporting the conceptualization of digital mindset as an overarching cognitive orientation reflected in these four dimensions. Overall, these results provide empirical support for treating digital mindset as a general higher-order construct in the subsequent structural analysis. The mean of digital mindset is comparable to that reported in prior IS research (e.g. [18]), supporting content validity. As expected, the mean of hindrance technostressors is higher than in prior studies (e.g., [2]), consistent with the experimental design intentionally inducing stress through complex IS conditions.

Because parts of the study relied on self-reported measures, we implemented several procedural remedies to reduce the likelihood of common method bias (CMB) [75]. Specifically, the focal independent variable, digital interface nudging, was experimentally manipulated and randomly assigned rather than self-reported, thereby reducing same-source bias. In addition, the survey design separated manipulated and perceptual constructs, used established scales with neutral wording, and assured participant anonymity.

To further assess potential CMB statistically, we conducted a common latent factor analysis [75]. The inclusion of the latent method factor did not substantially alter the standardized factor loadings, with differences remaining below the commonly suggested threshold of 0.20, suggesting that CMB is unlikely to materially affect the findings.

To address potential concerns regarding conceptual overlap between the interface manipulations, perceived cognitive effort, and perceived hindrance technostressors, we conducted an additional sensitivity analysis using a reduced hindrance-technostressor scale. Specifically, we excluded items directly related to information structure, information clarity, comparison effort, and information overload. The reduced scale retained items capturing broader perceptions of hindrance and task-related difficulties. Reliability and validity metrics remained

acceptable (Cronbach's $\alpha = 0.823$, CR = 0.866, AVE = 0.519). The substantive pattern of total, direct, and indirect effects remained consistent with the main analysis, although effect sizes were attenuated. These findings suggest that the observed effects are unlikely to be solely attributable to conceptual overlap between the manipulation, mediator, and outcome measures. Detailed results are reported in Appendix Tables 9 and 10.

5.2. Direct effects of digital interface nudging on hindrance technostressors

To test hypotheses H1 and H2, which assume lower perceived hindrance technostressors in conditions with default-setting and salience-framing nudges compared to conditions without present digital interface nudges, we conducted a one-way ANOVA to test the variance or differences between three or more groups having one independent variable, which in our study is digital interface nudging. The one-way ANOVA revealed significant differences across the three experimental conditions ($F(2, 211) = 8.57, p < 0.001$). Pairwise comparisons showed that participants exposed to the default-setting nudge ($M = 4.87, SD = 1.03, N = 70$) and salience-framing nudge ($M = 4.84, SD = 1.15, N = 73$) reported significantly lower hindrance technostressors compared to participants in the control condition ($M = 5.47, SD = 0.87, N = 71$). The corresponding effect sizes were moderate to large (Cohen's $d = -0.63$ for default-setting, -0.62 for salience-framing nudge). Post hoc pairwise comparisons indicated that both nudge conditions differed significantly from the control condition. Importantly, the default-setting and salience-framing conditions did not differ significantly from each other (mean difference = 0.03, $p = 0.87$, 95% confidence interval [CI], -0.33 to 0.39), suggesting that both nudges reduced perceived hindrance technostressors to a comparable extent in our experimental setting.

To formally test these effects while accounting for individual differences, we estimated a regression model including both digital interface nudges, digital mindset, and control variables. Aligning with mediation reporting conventions [76], we refer to the following

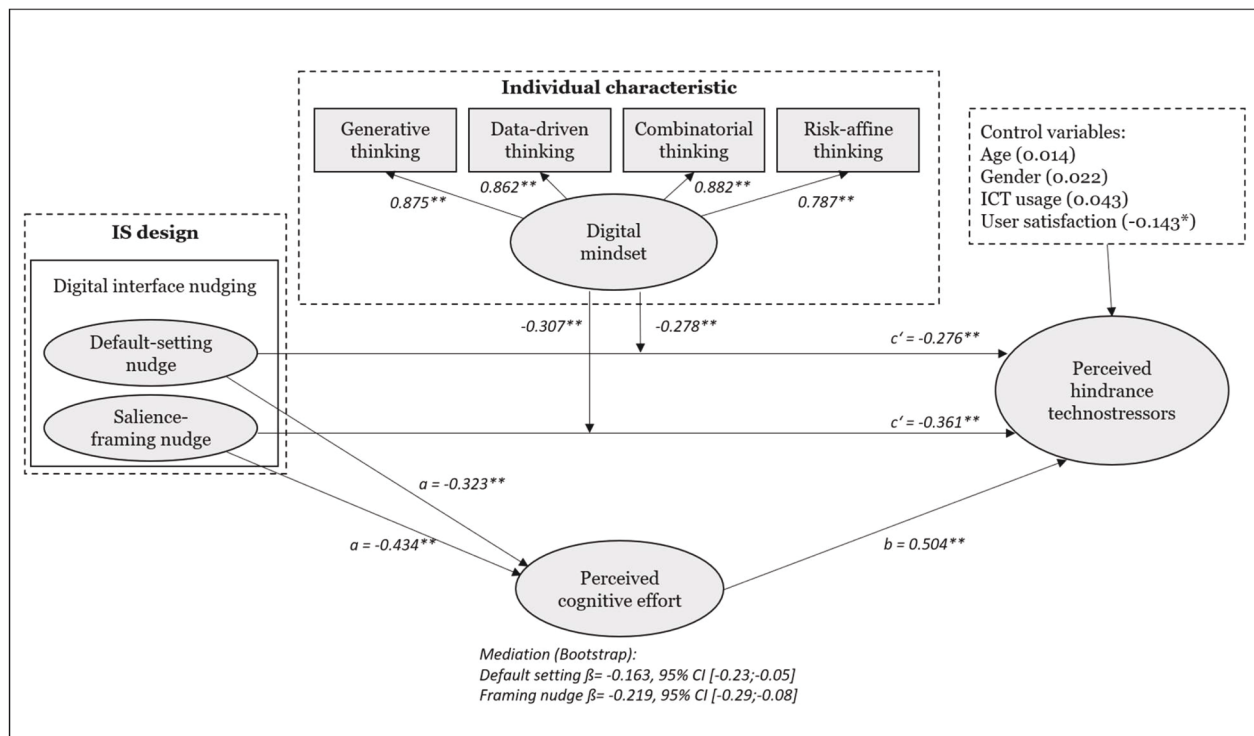


Fig. 5. Research results

(Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. Gender coded as male = 0, female = 1. ICT usage per day coded as 1 = < 1 h, 2 = 1–3 h, 3 = 4–6 h, 4 = 7–9 h, 5 = > 9 h.).

coefficients as total effects (c), estimated without mediator. Our results show significant negative effects for both default-setting nudge ($\beta = -0.439, p < 0.01$) and salience-framing nudge ($\beta = -0.580, p < 0.001$), indicating that both digital interface nudges substantially mitigate perceived hindrance technostressors (see Fig. 5). Although the salience-framing coefficients are descriptively larger, our study did not formally test superiority differences between the two nudges. Thus, the results should be interpreted as evidence that both digital interface nudges can mitigate perceived hindrance technostressors through interface structuring mechanisms. The findings confirm the results of the one-way ANOVA and support H1 and H2.

5.3. Moderating role of digital mindset

To examine H3a and H3b, we tested whether digital mindset moderates the relationship between digital interface nudges and hindrance technostressors. Digital mindset was modeled as a higher-order construct and mean-centered prior to computing interaction terms.

The results indicate significant effects for both digital interface nudges. The moderating effect of digital mindset on the relationship of default-setting nudge ($\beta = -0.278, p < 0.01$), respectively salience-framing nudge ($\beta = -0.307, p < 0.01$), on perceived hindrance technostressors is negative and significant (see Fig. 5). To interpret the interaction effects, we conducted simple slope analyses at low (-1 SD) and high ($+1$ SD) levels of digital mindset. For the default-setting nudge, the effect on hindrance technostressors is negative at both levels but substantially stronger for users with a high digital mindset ($\beta = -0.515, p < 0.001$) compared to users with a low digital mindset ($\beta = -0.195, p = 0.041$). A similar pattern emerged for the salience-framing nudge, with a stronger stress-reducing effect at a high digital mindset ($\beta = -0.645, p < 0.001$) compared to a low digital mindset ($\beta = -0.260, p = 0.012$).

Importantly, the simple slope analyses show that both digital interface nudges also significantly reduced perceived hindrance technostressors among users with a low digital mindset, although the effects are smaller than those among users with a high digital mindset. Thus, a lower digital mindset does not prevent users from benefiting from digital interface nudges – rather, digital mindset influences the magnitude of these benefits. Taken together, the results indicate that digital mindset

strengthens the stress-reducing effects of both digital interface nudges (see Fig. 6), supporting H3a and H3b.

Exploratory post hoc analyses examining the four digital mindset dimensions separately indicate that the moderation effects appear to be associated primarily with generative and combinatorial thinking. Specifically, both dimensions significantly strengthen the effects of default-setting and salience-framing nudges on hindrance technostressors, whereas data-driven and risk-affine thinking do not exhibit significant moderation effects. Complete results are reported in Appendix Table 8.

5.4. Mediation analysis: the role of perceived cognitive effort

To test H4a and H4b, we examined whether perceived cognitive effort mediates the effects of digital interface nudges on hindrance technostressors. Mediation analyses were conducted using 5000 bootstrap samples to estimate bias-corrected CIs for indirect effects, following established recommendations for mediation testing [76]. Results for the mediator model show that both the default-setting nudge ($\beta = -0.323, p < 0.01$) and the salience-framing nudge ($\beta = -0.434, p < 0.01$) significantly reduce perceived cognitive effort. These coefficients represent the a-paths from the digital interface nudges to the mediator. Perceived cognitive effort in turn is strongly positively associated with hindrance technostressors ($\beta = 0.504, p < 0.01$).

Bootstrap analyses revealed significant indirect effects for both digital interface nudges via perceived cognitive effort. The indirect effect of the default-setting nudge was $\beta = -0.163$ (95% CI $[-0.23, -0.05]$) and the indirect effect of the salience-framing nudge was $\beta = -0.219$ (95% CI $[-0.29, -0.08]$). Because zero was not contained in either bias-corrected 95% CI, the indirect effects are statistically significant [76], providing support for H4a and H4b.

When cognitive effort was included in the model, the direct effects with mediator of default-setting nudge and salience-framing nudge remained significant but decreased in magnitude (default-setting nudge: $\beta = -0.276, p < 0.01$, salience-framing nudge: $\beta = -0.361, p < 0.01$), indicating partial mediation. Together with the significant indirect effects, these findings suggest that digital interface nudges reduce hindrance technostressors both directly and indirectly by lowering perceived cognitive effort (see Table 4).

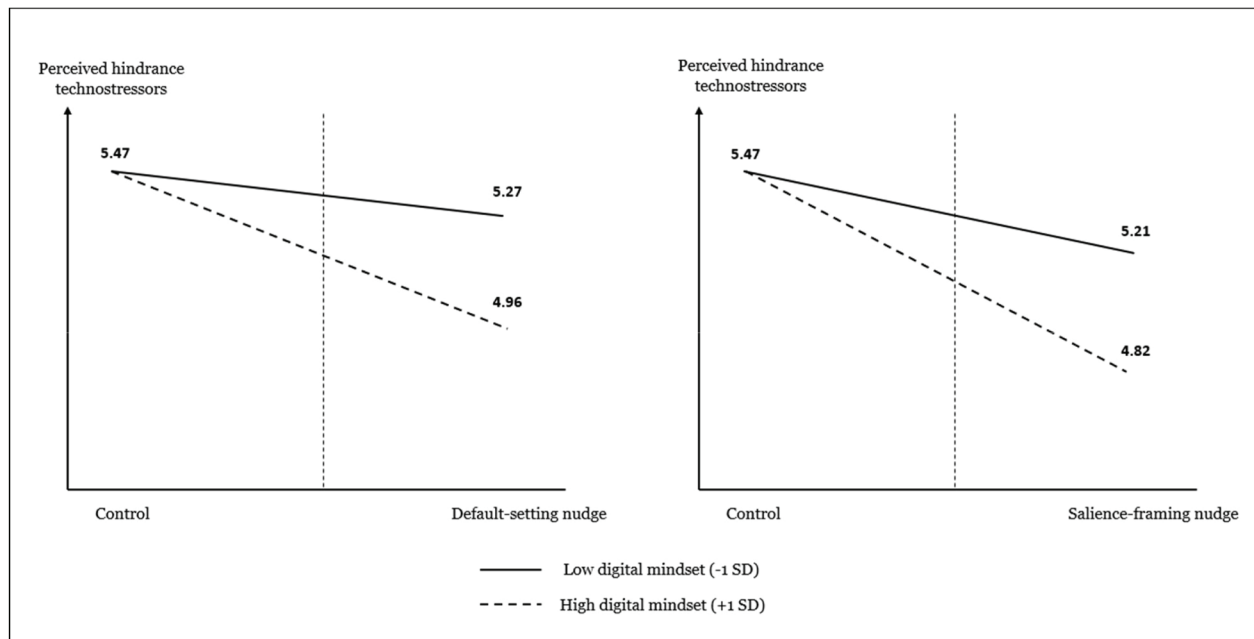


Fig. 6. Moderating effect of digital mindset on the relationship between digital interface nudges and hindrance technostressors (Note: Lines represent simple slopes at one standard deviation (SD) above and below the mean of digital mindset).

6. Discussion

This study shows that minimal choice architecture based interface interventions can reshape how users encounter and appraise complexity during digital decision making. Default-setting and salience-framing digital interface nudges reduced perceived hindrance technostressors in an information-rich, multi-attribute decision task, and these reductions were stronger among users with a higher digital mindset. Therefore, the central contribution is not that digital nudges generally reduce technostress, but that interface structuring can alter the appraisal-relevant structure of complex digital decision environments without removing objective task complexity.

6.1. Theoretical contributions

6.1.1. Structuring complexity through interface design

Technostress research has predominantly conceptualized stress as a reaction to technological demands, such as information overload, complexity, and constant connectivity [5]. While prior work highlights organizational policies and individual coping strategies as mitigation mechanisms [6,77], IS design itself has remained conceptually underspecified as an active lever within technostress theory.

Our findings complement existing technostress explanations by showing that technostress depends in part on how complexity is structured through interface design. Specifically, our findings suggest that minimal interface interventions can reshape how users cognitively encounter and appraise complexity during interaction. Rather than eliminating complexity from the underlying task, default-setting and salience-framing structure how complexity is presented and processed within the interface. This refines a common assumption that technostress follows primarily from complexity itself by demonstrating that stress appraisals also depend on how complexity is encountered through the interface.

The pairwise comparison revealed no significant difference between the default-setting and salience-framing conditions; therefore, we do not interpret salience-framing as superior to default-setting. Instead, our findings suggest that both nudges represent alternative forms of digital interface design that can reduce perceived hindrance technostressors. Default-setting appears to operate through choice simplification and preselection, whereas salience-framing operates through attentional guidance and information prominence as theoretically distinct forms of interface structuring rather than as empirically separated psychological pathways in this study.

By empirically identifying digital interface nudges as micro-level design mechanisms that reduce perceived cognitive effort during the decision making process, we refine existing technostress models and specify what Tarafdar et al. consider “appropriate IS design” ([5], p. 8). Our results suggest that perceived hindrance technostressors also can be mitigated through cognitive structuring within an otherwise unchanged IS. This interface-level intervention pathway complements, rather than replaces, established technostress mitigation approaches, including organizational support mechanisms, individual coping strategies, broad system simplification and system reduction [6,27]. At the same time, our findings do not allow us to disentangle whether perceived cognitive

effort stems primarily from task complexity, information characteristics, or interface-related processing demands. Accordingly, we interpret perceived cognitive effort as users’ subjective decision-effort perception during interaction, not as evidence for distinct cognitive-load components.

6.1.2. Extending digital nudging theory to perceptual outcomes

Digital nudging research has focused largely on behavioral outcomes, such as adoption, compliance, or purchase decisions [9,10,66]. This behavioral emphasis leaves underspecified whether digital interface nudges also shape how users experience the decision process itself, particularly when interface complexity creates cognitive effort and perceived obstruction.

Our study extends digital nudging theory by demonstrating that digital interface nudges also shape perceptual stress outcomes. In our setting, digital interface nudges structure the cognitive environment in which users process complexity and uncertainty. This broadens digital nudging’s theoretical scope from *what users choose* to *how users experience choice under complexity*, addressing a conceptual blind spot in prior work that focused primarily on decision outcomes, such as compliance or adoption, while giving limited attention to subjective cognitive states associated with cognitive strain and perceived stress [12,66]. By linking digital nudging with technostress and cognitive effort theory, we conceptualize nudges as cognitive structuring mechanisms that influence appraisal processes and stress perceptions during interaction.

This broader framing positions digital interface nudges as more than behavioral steering devices. It suggests that choice architecture can shape users’ perceptions of effort and obstructiveness during IS interaction, thereby extending digital interface nudging into the study of stress-related perceptual outcomes in complex digital decision environments.

6.1.3. The moderating role of digital mindset in technostress mitigation

Technostress research recognizes that individual differences, such as personal innovativeness in IT [14] and computer self-efficacy [28], shape how users perceive technostressors. These traits are often differentiated into stable traits and dynamic traits that can evolve through training and experience [16]. Prior work has examined broad personality traits [15], behavior-specific traits such as mindfulness [29], and IT-specific traits such as personal innovativeness in IT or computer self-efficacy [14,28].

We extend this stream by providing initial evidence that digital mindset is a user-level scope condition for how users translate digital interface nudges into reduced perceived hindrance technostressors. In our theorizing, digital mindset represents a broader cognitive framework that guides users’ sensemaking when engaging with IS across situations [18], rather than a narrow disposition tied to a single behavior or system.

Empirically, digital mindset moderates the effects of both the default-setting and salience-framing nudges on perceived hindrance technostressors. Digital interface nudges reduced perceived hindrance technostressors across users, but the reductions are stronger at higher levels of digital mindset, as reflected in our simple slope analyses. Mechanistically, our results are consistent with two plausible pathways whose relevance may vary across scope conditions [17].

The first pathway reflects a **scaffolding or compensatory resources logic**. Users with a lower digital mindset may lack established schemas for navigating complex digital environments and therefore benefit more strongly from system-provided structure and guidance [78]. This pathway is likely to become particularly relevant in unfamiliar systems, under high time pressure, or when users have limited prior digital experience.

The second pathway reflects a **decision space optimization logic**, which we emphasize in our theorizing. Users with a higher digital mindset tend to perceive broader action and information spaces in digital environments [19]. In complex multi-attribute decisions,

Table 4
Total, direct, indirect effects of digital interface nudging on hindrance technostress (Note: *** $p < 0.001$, ** $p < 0.01$).

Effect	Total effects (c) on HTS	Direct effects (c') on HTS	Indirect effects (Bootstrap) on HTS via cognitive effort
Default-setting nudge	−0.439**	−0.276**	−0.163 95% CI = [−0.23, −0.05]
Salience-framing nudge	−0.580***	−0.361**	−0.219 95% CI = [−0.29, −0.08]

particularly under accountability cues that increase perceived stakes, this broader perceived space increasingly requires the user to search for information and compare information. Under such conditions, default-setting and salience-framing nudges can reduce perceived cognitive effort by structuring the decision environment and limiting overprocessing [58]. This interpretation aligns with prior IS research showing that decision aids and interface design exert differential effects depending on users' expertise and information processing strategies [79].

Exploratory post hoc analyses further refine this account, as the moderation effects appear to be associated primarily with generative and combinatorial thinking, whereas data-driven and risk-affine thinking do not show significant interaction effects. This pattern is consistent with a decision space optimization interpretation in which digital interface nudges help digitally oriented users manage complex decision environments more efficiently (see Appendix Table 8). Given the exploratory nature of these analyses, however, the findings should be interpreted cautiously and viewed as initial evidence rather than as a core confirmatory result.

At the same time, alternative interpretations remain plausible. Users with a higher digital mindset may perceive digital interface nudges as less manipulative, more trustworthy, or more diagnostically useful during decision making. Similarly, higher digital mindset users may exhibit greater task engagement or recommendation confidence when interacting with structured interfaces. While our findings are consistent with the decision space optimization logic, future research should empirically disentangle these potential explanatory mechanisms.

Summing up, our findings suggest that individual cognitive dispositions can influence how users respond to digital design interventions. Technostress emerges at the interaction between interface-level design cues (here default-setting and salience-framing nudges) and users' cognitive filters that shape how those cues are interpreted (here digital mindset). This perspective highlights technostress mitigation as a joint outcome of IS design and user cognition. From an interface design perspective, the central implication is that technostress mitigation can begin before users cope with digital demands; it can begin in the interface structures that shape how those demands are cognitively encountered in the first place. This front-end design perspective complements established mitigation mechanisms, such as individual coping strategies and organizational support [6,61].

6.2. Practical implications

Our study provides provisional design guidance on how IS design and individual cognition may jointly contribute to reducing perceived technostress. Given the controlled experimental setting, these implications should be interpreted as indicative rather than prescriptive design recommendations.

IS Design Implications. Our findings suggest that digital interface nudging may offer a promising, design-based approach to mitigating perceived technostress. Specifically, default-setting and salience-framing nudges appear capable of reducing users' perceived cognitive effort during complex digital decision tasks. Default-setting nudges may be particularly suitable for repetitive and comparatively low-risk configuration decisions in which users repeatedly evaluate similar options. In such contexts, preselected defaults can reduce unnecessary comparison effort while preserving users' freedom to modify or override the recommendation. Potential examples include default report views in dashboards, standard approval paths in workflow systems, and preselected policy bundles in employee portals. In these situations, defaults may help reduce repetitive decision effort without restricting autonomy, provided that alternatives remain transparent and easily adjustable. In contrast, salience-framing nudges may be more suitable in information-rich comparison tasks where users must identify and integrate dispersed decision-relevant information. The increasing integration of AI-based recommendation systems and generative AI assistants may further

amplify the relevance of interface-based technostress mitigation. AI-augmented decision environments often confront users with dynamically generated recommendations, probabilistic outputs, and large volumes of synthesized information that may increase ambiguity, verification effort, and cognitive overload [80]. In such contexts, digital interface nudges may become increasingly important as structuring mechanisms that help users identify relevant information, prioritize attention, and navigate AI-supported decision processes more effectively. For example, salience-framing mechanisms could highlight confidence indicators, risk-relevant information, or source transparency cues in AI-assisted interfaces, while default-setting mechanisms may reduce repetitive configuration effort in AI-supported workflows. Accordingly, organizations implementing AI-supported systems should consider not only algorithmic capabilities, but also how interface-level choice architecture shapes users' stress perceptions and cognitive processing demands during interaction.

At the same time, our findings also suggest several boundary conditions. In higher-risk or high-accountability contexts, organizations may need to complement interface nudges with additional explanation and transparency mechanisms to avoid perceptions of oversimplification or manipulation. Similarly, tasks involving substantial financial, legal, or organizational consequences may require more extensive user control and information visibility than the present experimental setting captures.

The findings indicate that digital interface nudges may help reduce perceived cognitive effort during interaction, which in turn may lower perceived technostress. However, because this study examined a controlled experimental task, these implications should be interpreted as context-bound design heuristics that require adaptation and validation in real-world IS environments.

Importantly, digital interface nudges should be considered in light of heterogeneous user profiles. While our findings indicate stronger effects for users with a higher digital mindset, this does not imply that users with lower digital mindset do not benefit from interface support. Instead, these users may require more explicit guidance structures, such as step-by-step guidance or fewer simultaneous information cues, to ensure that interface interventions are experienced as supportive rather than overwhelming.

Individual Cognition Implications. Our findings further suggest that digital mindset influences how strongly users benefit from interface-based design interventions. Users with a higher digital mindset experienced stronger reductions in perceived technostress when interacting with digital interface nudges. This indicates that organizations may benefit from complementing interface design interventions with initiatives aimed at strengthening employees' digital mindset, such as digital literacy programs, training initiatives, or experiential learning formats [21].

Such initiatives may improve users' ability to recognize, interpret, and benefit from supportive interface structures during complex digital interactions. At the same time, our findings should not be interpreted as suggesting that organizations must first increase users' digital mindset before implementing supportive IS design. Instead, interface design and user capability development should be viewed as complementary approaches that may jointly contribute to reducing perceived technostress.

6.3. Limitations and future research

There remain limitations to our findings, which also offer possibilities for future research. To enable clear attribution to a specific interface design element, our experimental study tests default-setting and salience-framing nudge in isolation. Because real-world systems often deploy multiple digital interface nudges simultaneously, future research should use factorial designs to examine whether bundled digital interface nudges yield additive, synergistic, or conflicting effects on technostress perceptions. Furthermore, while our pretest used physiological indicators, such as skin conductance, to validate stress induction, the

main experiment relies on established subjective measures. Our measurement of perceived cognitive effort represents an additional limitation because the current items capture two related yet conceptually distinct perceptions: the degree of active cognitive engagement and perceived task difficulty. Thus, this measurement does not allow us to determine whether digital interface nudges reduce the cognitive demands that users experience when performing the task or primarily alter users' subjective perception of the effort they expend during interaction. Future research should use more differentiated scales to measure these dimensions separately and could complement them with behavioral or physiological process measures. Such research will provide a more fine-grained understanding of how digital interface nudges influence perceived cognitive effort and, in turn, perceived hindrance technostressors.

While our study identifies the digital mindset as a relevant individual characteristic in the context of technostress and digital interface nudging, future research could explore other frequently investigated concepts such as personal innovativeness with IT or computer self-efficacy [14,28]. We deliberately chose the digital mindset because of its changeability, enabling individuals and organizations to take action [18], and demonstrated its impact on the relationship between digital interface nudging and perceived hindrance technostressors; however, other traits may influence digital interface nudging and technostress differently or not at all. Thus, future research could identify and cluster traits to enhance our understanding of their characteristics and specific contexts that influence digital interface nudging and technostress.

While our study examines the broader phenomenon of technostress, its empirical setting is limited to a single, goal-directed decision task in the specific domain of car booking. Despite our deliberate experimental design and the inclusion of various checks and pre-experiments, further research is needed to determine the generalizability of our findings to different contexts. In particular, the effects observed in a one-time decision task may differ from those emerging during long-term, repetitive daily system use. Repeated exposure to the same digital interface nudges may lead to habituation or desensitization, potentially changing or reducing their effectiveness over time. Therefore, longitudinal and field-based studies should examine whether the effects of digital interface nudges persist, diminish, or change across repeated interactions. Moreover, while MTurk provides diverse and reliable samples, it does not fully represent organizational user populations. Participants did not face real financial consequences or organizational accountability, limiting the ecological validity of the findings.

Future research should further investigate digital interface nudging in AI-augmented decision environments. Generative AI systems increasingly confront users with dynamically generated, partially

opaque, and continuously evolving information structures that may create novel forms of technostress related to uncertainty and information overload [81]. At the same time, emerging work on AI nudging suggests that AI-supported recommendation systems can substantially shape users' decision processes and evaluations [80]. Building on our findings, future studies could examine whether digital interface nudges help users cognitively structure AI-generated information and reduce stress appraisals in increasingly complex AI-mediated work environments.

7. Conclusion

Technostress remains a critical challenge in digital decision environments because it can impair well-being and task performance. Our study identifies a concrete, design-centered mechanism for reducing perceived hindrance technostressors at the interface level. Specifically, default-setting and salience-framing digital interface nudges reduce perceived hindrance technostressors during complex, information-rich digital decision tasks, and the digital mindset conditions these reductions. Theoretically, we contribute to technostress research by specifying IS design as a changeable mitigation mechanism, extend digital interface nudging research by demonstrating effects on perceptual stress outcomes rather than on behavior only, and contribute to digital mindset research by clarifying its moderating role in design effectiveness. Practically, our results suggest that from an interface design perspective, technostress mitigation can begin with choice architecture based interface structuring and be strengthened through initiatives that enhance users' digital mindset. Overall, our findings add an interface design perspective to existing technostress mitigation research by showing that interface structures can shape how digital demands are encountered, interpreted, and appraised, alongside interventions directed at users and organizations.

CRedit authorship contribution statement

Maximilian Valta: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Christian Maier:** Writing – review & editing, Supervision. **Yannick Hildebrandt:** Writing – review & editing.

Declaration of competing interest

We declare that we do not have a conflict of interest with any of the Editors listed on the website.

Appendix

Table 5
Measurement items.
(GEN = generative thinking, DATA = data-driven thinking, COMB = combinatorial thinking, RISK = risk-affine thinking).

Construct (Cronbach's α)	Question	Loading
Hindrance technostressors (Maier et al., 2021) (0.931)	I had several hassles during the decision-making.	0.717
	I had constraints to find the best option.	0.708
	I had unclear instructions on how to find the best option.	0.759
	I had to deal with unclear information.	0.763
	The information of the individual options were unclear.	0.713
	The information of the individual options were confusing.	0.774
	It was stressful to identify relevant information for decision-making.	0.768
	I had hassles to identify relevant information for decision-making.	0.758
	I had to deal with unstructured information.	0.768
	I had conflicts during the decision-making.	0.772
	I had unclear information to find the best option.	0.719

(continued on next page)

Table 5 (continued)

Construct (Cronbach's α)	Question	Loading
Cognitive effort (Cooper-Martin, 1994; Heitmann et al., 2007) (0.711)	I had inadequate resources to find the best option.	0.732
	I had to deal with a lot of text and information.	0.712
	I had to deal with a high complexity of add-on options.	0.716
	I did take a lot of time to choose the rental car and insurance.	0.721
	I was careful about which rental car and insurance I chose.	0.740
	I thought very hard about which rental car and insurance to pick.	0.713
	I concentrated a lot while making this choice.	0.712
Digital mindset (Hildebrandt and Beimborn, 2024) (0.734)	It was difficult for me to make this choice.	0.746
	I had to make a decision based on unclear information.	0.798
	I had to make a decision based on complex information.	0.803
	GEN-1: If I developed a digital product, I would always make sure that it could be very variably used for different unanticipated use cases.	0.722
	GEN-2: If I developed a new digital product, I would always provide possibilities for alternative use cases.	0.786
	GEN-3: When using digital products, I always think about what else I could use them for besides their intended functions.	0.731
	GEN-4: I always see the generated data from new digital products or services as a main business resource.	0.796
	DATA-1: I always think of collecting as much data as possible to ground my decisions.	0.743
	DATA-2: When I think about new digital products, I always think of the data involved and its potentials.	0.794
	DATA-3: Looking at data, I always see the foundation of decision-making.	0.769
	COMB-1: I always think about combining different (digital) components when solving problems.	0.803
	COMB-2: When solving problems, I always consider combining different (digital) components rather than building something from scratch.	0.766
	COMB-3: When I tackle problems, I always think about combining existing (digital) solutions.	0.789
	RISK-1: I believe choosing risky options always helps to be successful.	0.788
	RISK-2: I would consider working on a high potential project, even if the probability of failure is high.	0.728
	RISK-3: I believe that the potential revenue of choosing a risky option is always worth it, even if the probability of loss is high.	0.804
	RISK-4: I always would consider risky options when making decisions in a professional context.	0.786

Table 6

Participant screening and data quality procedures.

Screening step	Criterion	Excluded (n)	Remaining Sample (n)
Initial MTurk responses	Participants with approval rate $\geq 95\%$.	-	655
Attention checks (trap questions)	Failure of any of four attention checks (two explicit instruction items, two consistency checks via repeated questions)	233	422
Completion time	Completion time < 3 min (unrealistically fast)	163	259
Response pattern screening	Low response variance (SD < 0.80) or systematic response patterns (e.g., straight-lining or alternating extreme responses)	39	220
Outlier screening	Implausible or disproportionate values (e.g., reported rental costs[20;5000])	6	214 (final sample)

Table 7

Descriptive statistics and bivariate correlations.

(Note: square root of AVE is included on the diagonal of bivariate correlations.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$).

#	Construct	Mean	SD	CR	AVE	1	2	3	4	5	6
1	Hindrance technostressors	5.06	1.06	0.945	0.550	0.742					
2	Generative thinking	5.50	0.77	0.845	0.577	0.374***	0.759				
3	Data-driven thinking	5.58	0.75	0.813	0.591	0.218**	0.739***	0.769			
4	Combinatorial thinking	5.48	0.82	0.829	0.618	0.313***	0.758***	0.768***	0.786		
5	Risk-affine thinking	5.45	0.87	0.859	0.604	0.430***	0.516***	0.547***	0.557***	0.777	
6	Cognitive effort	5.30	1.23	0.899	0.560	0.569***	0.449***	0.361***	0.352***	0.391***	0.748

Table 8

Exploratory moderation analyses of digital mindset dimensions.

(Note: β = standardized regression coefficient. Exploratory post-hoc analyses.*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$).

#	Digital mindset dimension	β (default-setting nudge x digital mindset)	p	β (salience-framing nudge x digital mindset)	p
1	Generative thinking	-0.238	0.039*	-0.336	0.016*
2	Data-driven thinking	-0.164	0.215	-0.057	0.401

(continued on next page)

Table 8 (continued)

#	Digital mindset dimension	β (default-setting nudge x digital mindset)	p	β (salience-framing nudge x digital mindset)	p
3	Combinatorial thinking	−0.270	0.028*	−0.252	0.048*
4	Risk-affine thinking	−0.016	0.632	−0.046	0.487

Table 9
Reduced hindrance technostressor scale used for sensitivity analysis.

Construct (Cronbach's α)	Question	Loading
Hindrance technostressors (Maier et al., 2021) (Cronbach's α = 0.823)	I had several hassles during the decision-making.	0.702
	I had constraints to find the best option.	0.682
	I had unclear instructions on how to find the best option.	0.751
	I had conflicts during the decision-making.	0.755
	I had inadequate resources to find the best option.	0.720
	I had to deal with a high complexity of add-on options.	0.711

Table 10
Sensitivity analysis results using reduced hindrance technostressor scale.
(Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$).

Effect	Total effects (c) on HTS	Direct effects (c') on HTS	Indirect effects (Bootstrap) on HTS via cognitive effort
Default-setting nudge	−0.291**	−0.184*	−0.107, 95% CI = [−0.17, −0.03]
Salience-framing nudge	−0.387***	−0.241**	−0.146, 95% CI = [−0.21, −0.05]

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