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SUSTAINABLE ADAPTABILITY AT WORK: A QUALITATIVE EXPLORATORY STUDY OF INDIVIDUAL PSYCHOSOCIAL COMPETENCIES IN THE FRENCH NUCLEAR INDUSTRY

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Abstract

Sustainable adaptability represents a critical issue in high-reliability organizations characterized by stringent safety requirements, complex socio-technical systems, and continuous regulatory and organizational changes, such as the nuclear industry. In this context, employees must continuously adjust their activity while ensuring both safety and operational performance under conditions of uncertainty and high responsibility.

Drawing on work and career psychology, sustainable adaptability can be conceptualized as a dynamic process involving the long-term mobilization and regulation of psychosocial resources (Savickas, 1997, 2013; Hobfoll, 1989; Luthans et al., 2007). However, little is known about how these processes are concretely enacted in safety-critical environments.

This qualitative exploratory study aims to identify the individual psychosocial competencies that support sustainable adaptability among employees in EDF's Nuclear Generation Division. Seventeen semi-structured interviews were conducted across diverse occupational roles and analyzed using inductive thematic analysis (Braun & Clarke, 2006).

The results highlight three interrelated families of competencies — cognitive, emotional, and interactional — which enable employees to manage uncertainty, regulate pressure, and coordinate effectively within complex work systems. These competencies support what participants describe as a process of sustainable professional adjustment.

This study contributes to a contextualized understanding of sustainable adaptability in high-reliability environments and identifies specific psychosocial mechanisms underpinning long-term adjustment in the nuclear sector.

Keywords: *Sustainable adaptability, psychosocial adaptative competencies, nuclear industry, individual adjustment at work.*

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1. Introduction

Contemporary transformations of work, characterized by increasing demands, growing complexity, and heightened uncertainty, have placed employees' adaptability at the center of research on sustainable work and organizational functioning. In this context, workers' adaptability cannot be understood as a one-time response to change, but rather understood as a dynamic and sustainable adjustment process that enables individuals to preserve effective performance, well-being and long-term professional viability.

In this study, sustainable adaptability is defined as a dynamic and ongoing process through which individuals regulate their cognitive, emotional, and interactional resources in order to maintain effective functioning, well-being, and professional viability over time, in the face of sustained and evolving work demands. This definition extends existing conceptualizations of adaptability (Savickas, 2013) by explicitly integrating temporal sustainability and the regulation of psychosocial resources under high-demand conditions (Hobfoll, 1989). Sustainable adaptability should not be reduced to a set of stable competencies but rather understood as a regulatory process through which individuals dynamically mobilize and articulate psychosocial resources in response to sustained work demands.

Research in work and career psychology has contributed extensively to the conceptualization of adaptability as a set of individual resources mobilized in response to transitions and work-related demands, notably through models of career adaptability (Savickas, 1997, 2013), psychological capital (Luthans et al., 2007), and conservation of resources (Hobfoll, 1989). However, these approaches have largely been developed in general occupational contexts (i.e., work settings not characterized by high-reliability or safety-critical demands), and often rely on quantitative methodologies, thus leaving partly unexplored the psychosocial dimensions on which individuals rely to adapt to demanding and evolving work environments This issue is particularly salient in high-reliability and safety-critical work settings, such as the nuclear industry. In these environments, employees are exposed to high levels of responsibility, stringent safety requirements, and continuous regulatory constraints, making sustainable adaptability a central condition for maintaining effective and sustainable professional functioning. The nuclear industry can be conceptualized as a high-reliability organization, in which error prevention, anticipation, and coordination are critical for ensuring safety in complex socio-technical systems (Weick & Sutcliffe, 2007).

For this reason, the present study adopted a qualitative exploratory approach aimed at identifying the individual psychosocial competencies that support sustainable adaptability among employees of EDF's Nuclear Generation Division in France. By analyzing employees' accounts across a range of occupational roles, the study sought to gain an in-depth understanding of the individual adjustment processes mobilized over time within a highly demanding work environment.

2. Method

This study adopted a qualitative exploratory design. Seventeen semi-structured interviews were conducted with employees of EDF's Nuclear Generation Division holding a variety of occupational roles, in order to explore their perceptions of work demands and the resources mobilized to sustain adjustment over time. Participants were recruited on a voluntary basis, in accordance with ethical principles governing research in work and organizational psychology.

The interviews focused on participants' experience of working in the nuclear context, characterized by recurrent organizational and technical changes, situations perceived as particularly demanding, and the competencies mobilized to cope with these constraints and maintain sustainable professional functioning. All interviews were audio-recorded and fully transcribed.

The semi-structured interview guide was designed to explore three main dimensions: (1) participants' perceptions of work demands and changes in the nuclear context, (2) situations perceived as particularly challenging or requiring adjustment, (3) the individual resources and competencies mobilized to maintain effective and sustainable functioning over time. Participants were also invited to reflect specifically on what could be described as "sustainable professional adjustment", through questions such as: "Can you describe situations in which you had to adapt over time to maintain your work performance?" and "What helps you continue functioning effectively despite repeated constraints or changes?".

The data were analyzed using an inductive thematic analysis, following the approach proposed by Braun and Clarke (2006). This analytic process made it possible to identify recurrent themes related to individual adjustment processes and psychosocial competencies mobilized in everyday work situations. The analysis followed an iterative process, involving multiple readings of the data and progressive refinement of themes. Coding decisions were discussed between the researchers to enhance analytical rigor and ensure the consistency of theme identification.

3. Results

The analysis of the interviews indicates that sustainable adaptability in the nuclear context relies on a coherent set of psychosocial competencies mobilized in work activity. These competencies were organized into three main families: cognitive, emotional, and interactional, which were recurrently described by participants as central to their ability to cope with demanding work situations.

Cognitive competencies referred to employees' ability to analyze work situations, distance themselves from immediate constraints, and anticipate potential developments. Participants described the cognitive management of unexpected situations, the prioritization and hierarchical organization of actions, and the capacity to maintain a global, systems-oriented understanding of work activity. This included integrating multiple constraints simultaneously, such as safety requirements, operational demands, time pressure, and coordination with other actors. Participants emphasized that adaptability often involved making trade-offs between competing priorities rather than applying predefined solutions, particularly in complex or unstable situations.

Emotional competencies were described as essential for coping with sustained and frequently changing work demands. Participants emphasized their ability to identify, regulate, and, when necessary, contain their emotional reactions, especially in situations involving pressure, uncertainty, or high responsibility. Emotional regulation was described as a means of preserving cognitive availability, maintaining vigilance, and sustaining professional engagement. Several participants highlighted that managing emotional load was perceived as a condition for remaining effective in their work activity and avoiding overload in demanding contexts.

Interactional competencies referred to employees' capacity to mobilize their relational environment in an appropriate and targeted manner. Participants highlighted the importance of clear and functional communication, cooperation with relevant actors, and the selective use of social and professional support. Beyond general collaboration, employees described the ability to identify appropriate interlocutors depending on the situation, to activate support at the right moment, and to coordinate effectively across professional boundaries as critical elements of their adaptive functioning in everyday work situations.

Differences were also observed according to occupational status and professional seniority. Managers holding direct hierarchical responsibilities more frequently referred to competencies related to coordination, collective anticipation, and emotional regulation associated with responsibility. In contrast, non-managerial employees emphasized competencies related to the operational management of work activity and the handling of concrete task-related constraints.

In addition, employees with more than ten years of tenure within the organization described a more integrated and stabilized mobilization of psychosocial competencies. Their accounts emphasized experience-based adjustments and consolidated ways of managing demanding situations. Conversely, less experienced employees more frequently referred to learning processes, ongoing cognitive adjustments, and the search for reference points to guide their action in unfamiliar or evolving situations.

4. Discussion

Taken together, these findings suggest that sustainable adaptability is not reducible to the possession of isolated competencies, but relies on their situated articulation within concrete work activity. The originality of this study lies in the contextualized conceptualization of psychosocial adaptive competencies within a high-reliability and safety-critical environment. While previous models of adaptability (e.g., Savickas, 2013; Luthans et al., 2007) identify general adaptive resources, the present findings specify how these competencies are concretely mobilized under conditions of high responsibility, safety constraints, and system complexity.

In contrast to general work contexts, adaptability in the nuclear industry appears to rely less on flexibility or improvisation and more on controlled adjustment processes, involving anticipation, regulation, and coordination within tightly constrained socio-technical systems. This highlights a form of "regulated adaptability", specific to safety-critical environments. This contribution lies not only in identifying adaptive competencies, but also in showing how they are regulated, combined, and sustained over time in a safety-critical environment.

The findings of this qualitative exploratory study indicate that sustainable adaptability in high-demand work environments primarily relies on individual adjustment processes mobilizing cognitive, emotional, and interactional psychosocial competencies. Rather than isolated skills, these competencies appear to be dynamically articulated within work activity and to function as interdependent components of a broader regulatory process supporting continuous adjustment over time.

From a theoretical perspective, this conception of sustainable adaptability is consistent with developmental models of career adaptability, which conceptualize adaptability as a dynamic and evolving process enabling individuals to respond to work-related demands across time and contexts (Savickas, 1997, 2013). The identification of distinct but interrelated families of competencies echoes this process-oriented view, emphasizing how individuals continuously adjust their ways of thinking, regulating emotions, and interacting with others in response to situational constraints.

The use of a qualitative approach makes it possible to access employees' lived experiences and to capture the dynamic and situated nature of adaptive processes, which are difficult to apprehend through standardized quantitative measures (Blustein, 2011).

The results also resonate with theoretical approaches focusing on the mobilization and preservation of individual resources at work. Cognitive analysis of work situations, emotional regulation under pressure, and selective mobilization of relational support can be understood as psychosocial resources contributing to the maintenance of professional functioning under demanding conditions. In this regard, the findings are coherent with the conservation of resources framework (Hobfoll, 1989), which emphasizes individuals' efforts to protect and mobilize valued resources when facing high demands. Similarly, the articulation of these competencies aligns with perspectives on psychological capital (Luthans, Youssef, & Avolio, 2007) and resilience at work (Sutcliffe & Vogus, 2003), which highlight the role of integrated resource mobilization in sustaining performance and engagement, without implying a direct validation of these models. However, while psychological capital primarily emphasizes positive psychological states, the present findings suggest that adaptability in safety-critical environments also involves constraint management, emotional containment, and regulated action, which are less explicitly addressed in these models.

Importantly, the variations observed according to occupational status and professional seniority suggest that psychosocial adaptive competencies are embedded in a developmental dynamic. Managers holding direct hierarchical responsibilities emphasized competencies related to coordination, anticipation, and emotional regulation associated with responsibility, whereas non-managerial employees focused more strongly on competencies linked to the operational management of work activity. These differences do not reflect distinct or fixed profiles but rather variations in the demands encountered and the forms of adjustment required by different roles.

Similarly, employees with greater professional seniority described a more integrated and stabilized mobilization of psychosocial competencies, while less experienced employees emphasized learning processes, cognitive adjustments, and the search for reference points. This observation is consistent with career development approaches highlighting the progressive construction and consolidation of adaptive resources across career trajectories (Super, 1957; Savickas, 2013). It suggests that sustainable adaptability may be supported by experience-based regulation processes that evolve through exposure to demanding work situations.

Finally, the nuclear industry constitutes a particularly relevant context for examining sustainable adaptability, as high reliability and safety requirements place strong constraints on individual work activity. In such safety-critical environments, adaptability relies less on improvisation than on the controlled and regulated adjustment of cognitive, emotional, and interactional resources. By focusing on employees' lived experiences in this demanding context, the present study contributes to a contextualized understanding of the psychological mechanisms supporting sustainable adaptability at work.

5. Conclusion and limitations

The present study contributes to research on sustainable adaptability by proposing a qualitative and contextualized examination of individual psychosocial adaptive competencies within a safety-critical work environment. By grounding the analysis in employees' lived experiences, it provides an empirically informed articulation of cognitive, emotional, and interactional competencies as they are mobilized in everyday work activity, rather than as abstract or decontextualized constructs.

Beyond identifying these competencies, the study highlights the importance of considering sustainable adaptability as a process embedded in work situations and professional trajectories. The variations observed according to occupational role and professional seniority suggest that adaptive competencies are shaped by the nature of work demands and evolve through experience, supporting a process-oriented and developmental understanding of adaptability at work.

Several limitations should nevertheless be acknowledged. First, the relatively small sample size and the reliance on self-reported data call for caution regarding the generalization of the findings. Although the nuclear context offers a particularly relevant setting for studying sustainable adaptability, its specificity may limit the direct transferability of the results to other occupational environments. Second, the cross-sectional design does not allow for the examination of how psychosocial adaptive competencies evolve longitudinally over time.

Furthermore, the focus on a single organization may limit the transferability of the findings. However, this choice allows for an in-depth analysis of a highly specific and theoretically relevant context, which is particularly appropriate for exploratory qualitative research aiming at conceptual refinement rather than statistical generalization (Yin, 2018).

Despite these limitations, this study highlights the value of a qualitative, process-oriented approach for advancing the understanding of the mechanisms that support sustainable adaptability at work, particularly in environments characterized by high levels of complexity, responsibility, and safety requirements.

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