

Job Crafting and Intellectually Stimulating Industrial Factory Floor Work

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ABSTRACT

The nature of industrial work is shifting from tasks carried out by humans to those executed or aided by intelligent technology. An important step for achieving these kinds of well-functioning joint cognitive systems is to understand how job crafting manifest in the daily experiences of industrial workers. To explore this question, we conducted a qualitative empirical study focused on the experiences of competence related job crafting and intellectually stimulating work among Finnish industrial factory workers. The findings indicate that despite the routine nature of these jobs, participants often engage in mentally stimulating tasks, such as problem solving. Workers generally value having variation in their tasks, the ability to craft their jobs, and to contribute to the overall quality of work processes or end products using their own creative ideas and knowledge. These findings contribute to the design of industrial work, especially when implementing emerging technologies, so that technology enhances human wellbeing and flourishing.

Keywords: Job crafting, Intellectually stimulating work, Psychologically rich life, Meaningful work, Industrial work design, Joint cognitive systems, Industry 5.0

INTRODUCTION

The nature of industrial work is shifting from tasks carried out by humans to those executed or aided by intelligent technology, including artificial intelligence, industrial robots or process automation (Antonaci et al., 2024; Aromaa et al., 2025; Ghobakhloo et al., 2023). Work will take place within joint cognitive systems where humans and intelligent machines cooperate to achieve shared objectives (Woods & Hollnagel, 2006). At the same time, advancements in technology and hybrid forms of work allow for the adaptation of organisations, work processes, tasks, and tools to accommodate different people, enhancing their well-being and thriving — essential in transforming from Industry 4.0 to Industry 5.0 world (Cimino et al., 2025; Viljakainen et al., 2026).

An important step in fostering transformation to Industry 5.0 is to understand how emerging technologies, new ways of working, and job

design could empower employees in *job crafting*. Job design means an organisational top-down process to define what are the activities, conditions, structures, and schedules that are needed for employees to do their work (Daniels, Le Blanc & Davis, 2013; Demerouti & Bakker, 2013). Job crafting refers to workers *themselves* making adjustments to working conditions and work quality (De Bloom et al., 2024; Demerouti, 2014; Le Blanc, Demerouti & Bakker, 2017; Napier et al., 2024). Fundamentally, job crafting allows people to fulfil their psychological needs such as sense of meaning, relatedness, autonomy and competence building (Napier et al., 2024). From these, competence involves utilising one's knowledge and capabilities to their fullest, while continuously developing understanding, intellectual faculty and creative skills. Thus, having the possibility to craft one's own job with a focus on competence sustains interest in work, promotes continuous learning, and prevents boredom.

Consequently, competence related job crafting is associated with a psychologically enriching work environment and working life (Zacher & Baumeister, 2025), which can also be referred to with the concept *intellectually stimulating work*. Intellectually stimulating work is characterized by complexity, novelty, and perspective shifts that render work interesting, mentally stimulating, and engaging (Besser & Oishi, 2021; Oishi & Westgate, 2021). Moreover, psychologically rich life, happiness, and meaningfulness are distinct yet interrelated elements that together constitute a tripartite framework of human wellbeing and good life, also in professional contexts (Oishi & Westgate, 2021; Zacher & Baumeister, 2025; Viljakainen et al., 2025).

However, there is lack of research on how job crafting and intellectually stimulating work relate to each other and to the meaningfulness of work in different work domains (e.g., Zacher & Baumeister, 2025). Additionally, studying industrial factory floor work from this perspective is especially timely due to anticipated increase of intelligent technology adoption which affects job environments, tasks and interactions on the factory floor (Viljakainen et al., 2025). Therefore, we examine how competence related job crafting and intellectually stimulating work play out in industrial factory floor workers' daily experiences, as presumably, technology and job design can support or hinder their realization.

Job Crafting and Intellectually Stimulating Working Life

Job crafting refers to motivated, goal-focused processes whereby individuals proactively initiate actions to change their job demands, improve job engagement and satisfaction, and fulfil their psychological needs (De Bloom et al., 2024; Demerouti, 2014). The three facets of job crafting are removing obstacles, enhancing or acquiring resources, and exploring new intellectual challenges—the latter closely tied to competence (Blanc, Demerouti & Bakker, 2017; Demerouti, 2014; Demerouti et al., 2015). Exploration of new challenges, i.e., challenge-seeking job crafting, considers taking on new demanding tasks, staying occupied at work, and requesting additional responsibilities upon finishing tasks (Demerouti, 2014). Parallely, research

indicates that strengthening competences—using and expanding one’s skills—contributes to perceived work meaningfulness (e.g., Bailey et al., 2019; Smids et al., 2024). Such competence-enhancing job crafting is realized through mechanisms such as receiving feedback, being engaged, utilizing strengths, solving problems, and building self-confidence of one’s mastery. Feelings of competence and mastery often act as antecedents that empower positive change towards fulfilling person’s psychological needs. At its core, job crafting involves proactively stretching one’s capabilities in line with core values, which can, in turn, promote greater wellbeing and quality of life. (Napier et al., 2024)

Challenge-seeking behaviour is related to having a psychologically rich and intellectually stimulating working life. Besser & Oishi (2021, p. 3) define the concept of “...a psychologically rich life as a life full of experiences which generate a state of mental engagement and arousal.” Psychologically rich working life is characterized by a diverse array of experiences that offer variety, mental challenges, interest, depth, and unexpectedness, where novelty and/or complexity leads to meaningful changes in perspective (Besser & Oishi, 2021; Oishi & Westgate, 2021). A life filled with psychologically rich experiences is believed to foster wisdom—understood as deep, broad knowledge, and mental flexibility about life’s matters (Oishi & Westgate, 2021). In this paper, we specifically examine *challenge-seeking* and *competence-enhancing* forms of job crafting and their connection to psychologically rich working life.

A psychologically enriching work setting is seen to intellectually stimulate workers (Zacher & Baumeister, 2025). In such environments, the perception of work meaningfulness is drawn from the use and development of knowledge and skills (e.g., Saari et al., 2021; Smids et al., 2024), sense of autonomy to effect positive change in the work environment, processes and tools (e.g., Rosso et al., 2010; Martela & Riekkilä, 2018), ability to shape work related activities (e.g., Smids et al., 2024; Zacher & Baumeister, 2025), resilience to navigate work-related changes (e.g., Viljakainen et al., 2026), and positive social interactions that support personal development (e.g., Pratt & Ashforth, 2003; Viljakainen et al., 2026) while creating sense of unity and belongingness (e.g., Lips-Wiersma & Morris, 2009; Rosso et al., 2010). Yet, a psychologically rich work life may come with costs, including stress caused by increased interruptions and workloads, perceived instability of employment, and induced physical or mental health problems (Zacher & Baumeister, 2025).

Thus, job crafting and intellectually stimulating work are both related to having a sense of competence and perceiving work as meaningful. In competence-enhancing job crafting, people may modify their work so that they could better utilise their own mental capabilities such as their *knowledge*, *intelligence* and *creativity*. In challenge-seeking job crafting, workers look for intellectual challenges that seem *interesting*, *engaging*, require *problem solving*, and that may increase their skills and wisdom through *learning*. Our research question is how competence-enhancing and challenge-seeking job crafting and intellectually stimulating work emerge in industrial workers’ daily experiences.

MATERIALS AND METHODS

We explored the question by conducting a qualitative study. Data was collected with in person, approximately 60-minute semi-structured interviews during autumn 2024 and spring 2025. The technique allows dialogue on pre-defined themes like content of work as well as on spontaneously emerging themes like daily challenges or inspirations (Bryman & Bell, 2011).

Participants. Interviews were conducted in 9 Finnish industrial companies of various fields, ranging from high-value investment product assembly to fabrication of infrastructure materials. Participants included 20 factory floor workers who conduct tasks such as general material handling, machine supervising, process monitoring, component assembling, repair work and maintenance of the machines. All participants were male, and their age ranged from 21 to 55 years, with a mean age of 38,15 years.

Data analysis. Data was analysed using a combination of content analysis (Krippendorff, 2019) and abductive analysis (Tavory & Timmermans, 2014). We used content analysis to categorise interview data into meaningful themes (Krippendorff, 2019). With abductive analysis, the data was interpreted simultaneously as contextually detailed as well as theoretically broad (Grodal et al., 2021). Abductive analysis relates empirical data with existing theories and concepts, but it also allows the creation of new hypotheses and models (Tavory & Timmermans, 2014). We focused on the comments in which participants talked about competence-enhancing job crafting (modifying the work processes or environments for utilising one's knowledge, capabilities, intellectual and creative skills, support interest and learning) or challenge-seeking job crafting (having intellectually arousing or mentally engaging work tasks). The qualitatively analysed data was then reflected and categorised against known work-related psychological needs.

RESULTS

We found plentiful elements of job crafting and intellectually stimulating work reflected in Table 1. These elements can be categorized into three main categories of job crafting that fulfil psychological needs: (1) Versatility of work; (2) Agency and embeddedness, and (3) Competence building. Additionally, we found tensions between pursuing psychological needs from the *position of the self* and considering needs and interdependencies reflected on others – i.e. *position of others* (see e.g., Abele & Wojciszke, 2007; Lips-Wiersma & Wright, 2012; Ryan & Deci, 2017). These positions enable further categorization of the elements as seen in Table 1.

In respect to needs of the self, our analysis on *autonomy* discusses the capacity to organize one's work in a manner that allows individuals to utilize their thinking, judgement and decision-making skills, thereby recognizing the significance of these abilities (Rosso et al., 2010; Smids et al., 2022). *Relatedness* refers to the building of a shared sense of agency and purpose in relationships with others (Lysova et al., 2019; Rosso et al., 2010).

Table 1: Job crafting and intellectually stimulating work categories and related psychological needs. References in parenthesis refer to earlier literature on the concepts.

Job-Crafting Categories	Psychological Need and Position	
	Autonomy, Self	Relatedness, Others
Versatility of work	Self-worth (sense of accomplishment from commanding and executing tasks; Bailey et al., 2019; Rosso et al., 2010) Self-efficacy (sense of free choice to shape work related activities; Smids et al., 2022; Rosso et al., 2010)	Contribution to community (effect positive change; Martela & Riekkki, 2018; Rosso et al., 2010; Ryan & Deci, 2017) Solidarity (shared sense of agency; Lips-Wiersma & Morris, 2009; Smids et al., 2022; Viljakainen et al., 2026)
Agency and embeddedness	Self-guidance (independence in job crafting; Saari et al., 2021; Smids et al., 2022) Self-connection (consistency to own values; Bailey et al., 2019; Pratt & Ashforth, 2003)	Recognition (feedback from others; Lips-Wiersma & Morris, 2009; Saari et al., 2021) Social, i.e. intersubjective sensemaking (constructing a perception of a collectively meaningful environment; Pratt & Ashforth, 2003; Rosso et al. 2010)
Competence building	Self-development (developing new skills and competences; Bailey et al., 2019; Saari et al., 2021) Creativity (utilizing one's skills to solve challenging tasks; Rosso et al., 2010; Smids et al., 2022)	Resilience at work (adaptation and flexibility to changing work demands; Viljakainen et al., 2026) Joint problem solving and learning (engaging the work community; Kaasinen et al., 2020; Viljakainen et al., 2026)

Versatility of Work

According to our findings on autonomy, a sense of *self-worth* frequently develops from being able to impact one's work and see the tangible results from one's efforts. When workers can adjust tasks and practices to ease their work, it leads to a profound sense of achievement. Seeing the direct outcomes of one's labour fuels motivation by confirming the value of one's work. Additionally, demonstrating how changes in task execution influences the subsequent work tasks and final outcomes can deepen understanding and appreciation for one's role, thereby enhancing self-worth, as suggested by an electrician: "I really want to see the product I'm working on and understand how it changes if I approach the task differently." *Self-efficacy* on the other hand is reflected in the freedom to shape one's work-related activities and exercise personal choice regarding how tasks are executed. As an assembler noted: "While the final product must be consistent, workers have the autonomy to determine the order and method they use to complete tasks, showcasing their unique styles." In other words, self-efficacy emphasizes the

influence employees have over how they approach their work, apply their skills, and use their problem-solving skills.

Apart from directing the needs of oneself, self-efficacy also manifests as a *contribution to community* through the ability to effect positive change in the work practices for others. Discovering that a method is effective beyond individual needs gives a strong sense of personal fulfilment and accomplishment, as expressed by a welder: “It’s gratifying to realize that your own method is actually good, efficient, and effective. And even more so, if someone else also benefits from it.” Influencing others through communal learning highlights the dynamic nature of self-efficacy in collaborative work settings, fostering intellectual stimulation. *Solidarity* emerges from this shared sense of agency and collective support among colleagues where workers are encouraged to find and pursue methods that feel most natural to them. As an assembler notes: “There isn’t a single “right” way to do things—instead, employees are invited to explore different approaches and make choices that align with their personal style.” Here, communication and a culture of mutual aid play a crucial role, reinforcing a network of support and collaboration.

Agency and Embeddedness

Self-guidance in job crafting relates to the autonomy employees exercise to shape their work. This relates to workers taking initiative to adapt their work tools in a way that suits their preferences and managing their work tasks based on situational demands coming from the outside working environment. It allows them to better navigate their roles and duties, as described by an installer: “These [basic tools] are expanded according to one’s own taste, what is needed... Everyone does the same job, but everyone has their own areas of expertise, so it affects the tools. So the tools are pretty important in the sense that it makes things go smoothly.” *Self-connection* enables workers to align their work with personal values, thereby fostering a greater sense of work meaningfulness. When work connects with personal interests, workers can utilize a wider range of their knowledge, enriching the work experience, as expressed by an assembler: “I’m interested in all sorts of installation and repair work because I can apply the knowledge gained from my hobbies here as well.” This connection between personal values and work tasks not only enhances the work experience, but also reinforces workers’ identities, as the assembler continues: “I have to think a lot independently, which allows me to express myself, and that suits me very well.”

Receiving *recognition* from successfully achieving the desired results enhances work meaningfulness, because this sense of accomplishment reinforces one’s belief in their capabilities. Feedback functions as a sign of trust, which not only validates one’s expertise, but also fosters a supportive environment where workers feel valued and motivated to excel, as expressed by a process operator: “I’ve realized that my supervisor has significant trust in me and my decisions. If I explain how I’ll handle a task, he has confidence in my approach. This [trust] is a key reason I enjoy working here.” The trust is further elevated by *social sensemaking*, which takes place when workers share their thoughts and expertise, constructing an environment with collective

meaning and mutual understanding. This creates a supportive work culture where people are able to excel, as expressed by a warehouse operator: “We frequently exchange ideas and knowledge, which helps everyone work more efficiently. I make it my a point to offer tips for improving tasks and always welcome suggestions from others.”

Competence Building

Self-development through the acquisition of skills fulfils the psychological need behind intellectually stimulating work: fostering personal growth and autonomy. Facing challenging tasks amplifies the sense of satisfaction through competence building, as expressed by an assembler: “The difficulty of tasks adds to their appeal, as learning something new enhances their meaningfulness. Acquiring new knowledge is highly motivational.” When workers are encouraged to use *creativity* in finding innovative ways to tackle challenging tasks, routine practices are transformed into engaging activities. This is elaborated by a mechanic: “When dealing with tasks that aren’t straightforward and require some effort to solve, successfully completing them gives a satisfying sense of accomplishment.” This creative autonomy not only disrupts the monotony of repetitive work tasks but also encourages workers to embrace critical thinking for finding alternative solutions to current processes and practices.

Finally, *resilience* at work is demonstrated through adaptation in response to changing demands and pressures in the operational environment. This necessitates that workers can rely on their understanding of personal and collective capabilities to reallocate responsibilities and adjust project timelines when needed, as suggested by an electrician: “When urgent tasks arise, we are aware of each other’s strengths [...] This enables us to coordinate with co-workers to see if they can delay a less critical project.” This flexibility ensures that members of the work community can navigate the pressures without sacrificing their well-being or compromising the quality of the output. The establishment of collective capabilities allows individuals to acknowledge their personal limitations, reinforcing trust and interdependence among team members, as expressed by an assembler: “When you recognize you’re lacking the insight, you call on a colleague to confirm [a task] with you.” This *joint-problem solving and learning* plays a vital role in cultivating a shared sense of agency and responsibility at work, fostering an environment where diverse viewpoints are valued and the synergy of combined efforts lead to more effective solutions.

We also noted few comments on how routine and clear tasks can make work enjoyable. To be able to do more simple, repetitive and predefined tasks is a good option especially in situations where the person feels that they need to have a break and rest between more intense and challenging periods in work, or, for instance, if they have a lot going on in other parts of their lives.

To conclude, results of our analysis indicate that despite the seemingly routine nature of their jobs, factory floor workers often engage in mentally stimulating tasks, such as problem solving even on daily basis. Workers generally value having variation and versatility in their tasks, the

ability to craft their jobs, and to contribute to the overall quality of work processes or end products using their own creative ideas and knowledge. Interviewees modified their work and solved intellectually challenging tasks both individually and together, to improve their own or their colleagues' performance of single tasks or the quality of their work or products, and to strengthen support and collaboration between workers.

DISCUSSION

We investigated how competence related job-crafting and intellectually stimulating work unfold in the experiences of industrial factory floor workers, and how the findings relate to the broader context of research on the meaningfulness of work. Our results indicate that job crafting and intellectually stimulating working life are highly connected concepts.

Even in seemingly routine factory work, people daily perform tasks that are intellectually complex and varied and that require competence and creative problem-solving skills. To perform the tasks, people must be able to modify their own ways of working and working environments to make work smoother or easier for themselves, but also to promote the productivity and quality of work carried out by their own team or the larger organization. Our findings are parallel to previous psychological research which suggest that the improvement of workers' productivity, engagement, satisfaction, motivation, sense of meaningfulness and wellbeing is linked to having socially and cognitively supportive and rich working environments, opportunities to solve problems, to be creative and to learn, and to have control over one's own work (Daniels, Le Blanc & Davis, 2013; Ryan & Deci, 2017; Zacher & Baumeister, 2025).

Having enough interesting challenges, variation and autonomy in tasks were considered important and motivating factors by our interviewees. However, people need to be able to find balance between tasks that challenge and enable personal growth and the possibility for recovery and fostering social relationships. This can be supported, for example, by considering both working and leisure activities in job design (Napier et al., 2024), or by designing work processes, tasks and roles so that they can be modified according to changes in employees' capabilities, needs and situations.

In the future people and intelligent technologies, such as artificial intelligence and industrial robots, will collaborate even more in different forms of joint cognitive systems. This poses challenges on how different jobs and tasks should be designed or supported by technology, while also enabling job-crafting possibilities that support human wellbeing. Due to inadequately designed jobs and their practices, companies may miss opportunities to utilize workers' potential, such as their ideas and expertise for developing higher-quality products or work processes. Possibilities for autonomously modifiable, enough psychologically rich work are important factors also in terms of employment and job attractiveness.

CONCLUSIONS

According to our investigation in the domain of industrial factory floor work, competence-enhancing and challenge-seeking job crafting and intellectually stimulating work emerge in a plethora of interrelated elements, which however, can be classified into three main categories: versatility of the work, agency and embeddedness, and competence building. Further, we identified how these categories can be differentiated based on two different viewpoints: from pursuing the psychological need of autonomy from the position of the self, or when fulfilling the need of relatedness that considers also the situations of others. These elements are important for having a meaningful, motivating and engaging industrial work.

Considering our findings, implementing intelligent technologies in industry and work life should be considered as an emerging social challenge. To meet the necessary renovation process, it makes sense to get workers, designers and managers alike actively involved in designing new work processes. Correspondingly, job crafting skills enable people to improve their work environment and work processes, which should make the development of intelligent technologies more accurate and more relevantly focussed.

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