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How designed work environment and enacted work interactions impact creativity and work–life balance

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Abstract

Purpose – This paper investigates how (1) a work environment designed to sustain creativity (i.e. through flexible arrangements and elements of the social-organizational work environment) and (2) the amount of enacted work interactions among employees, interpreted as facilitators of new idea generation (i.e. outdegree centrality in instrumental networks), differently impact creativity and work–life balance.

Design/methodology/approach – The authors conducted a quantitative study in a knowledge-intensive multinational company and collected data through a survey on a sample of 207 workers.

Findings – Findings highlight that flexible work arrangements are positively related to increased work–life balance but not to creativity, whereas having access to a social-organizational work environment designed to foster creativity is associated to an increased level of idea generation, but to a reduction in work–life balance. In addition, centrality in instrumental social networks is also associated to a reduction of work–life balance. Findings thus point to a potential trade-off between structures aimed at increasing creativity and initiatives aimed at engendering work–life balance.

Originality/value – The research contributes to the current debate on new organizational practices for innovation and creativity, highlighting their unexpected implications for workers. The research also contributes to the literature on work–life balance by unraveling previously unexplored antecedents, i.e. social networks and the social-organizational work environment designed for creativity.

Keywords Cross-creativity, Work–life balance, Work environment, Social networks, Structural equation modeling

Paper type Research paper

1. Introduction

Promoting and sustaining idea generation in the workplace and harnessing the creative potential of employees has become an important goal for many knowledge-intensive organizations. To favor creativity in the workplace, organizations provide knowledge workers with work practices and approaches that aim at accommodating individual needs and capabilities while fostering the generation of new ideas (e.g. Agarwal and Farndale, 2017; Annosi *et al.*, 2020; Caniëls and Rietzschel, 2015; Elsbach and Stigliani, 2018). One the most recurrent practices is the formal *design of new organizational work environments* based on flexible work arrangements and the setup of a work environment expected to facilitate the creation, exchange and dissemination of new ideas. For example, knowledge workers are often offered the flexibility to work from different work locations and to control the scheduling of their tasks in the hope that such flexibility will act as a motivational source of creativity (Allen *et al.*, 2013; Gonsalves, 2020; Kelly *et al.*, 2008; Liu *et al.*, 2011). In addition, through organizational practices such as teamwork, the assignment of complex tasks, task rotation and the design of specific incentives for

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creative outcomes, workers are exposed to social-organizational environments designed to stimulate creativity (Agarwal and Farndale, 2017; Dul *et al.*, 2011; Dul and Ceylan, 2011, 2014; Möldner *et al.*, 2020; Theurer *et al.*, 2018).

Besides organizations' attempts to promote creativity through designed organizational structures, relational perspectives on creative processes in the workplace (e.g. Perry-Smith and Shalley, 2003) suggest that individual creativity relies on the employees' ability to build interpersonal relationships and leverage social networks at the workplace, beyond what is formally designed – or prescribed – by organizations. For example, creativity is enhanced when individuals spontaneously engage in interfunctional collaboration and co-creation and thus "enact" work-related interactions (Leavy, 2012). In this regard, research on *work-related social networks* demonstrates that individual centrality in instrumental networks can favor creativity, by facilitating idea generation, elaboration and implementation (e.g. Ibarra, 1993; Kim *et al.*, 2018; Perry-Smith and Shalley, 2003).

Both the designed work environment and the enacted work interactions are often implicitly expected to empower individuals and enrich their jobs, with the naïve assumption that improving job conditions must lead to positive implications for the "whole self" of employees (Agarwal and Farndale, 2017; Kelly *et al.*, 2008; Thompson and Prottas, 2006; Valcour, 2007). However, while a work environment designed to foster creativity and characterized by rich work interactions can be expected to positively relate to the generation of new ideas, we know little about if and how designed elements of the work environment and enacted work interactions also have a positive spillover to the personal life domain of employees and how, more specifically, they impact on work–life balance. Given the recognized interdependence between the work and life spheres (e.g. Greenhaus and Powell, 2006), scholars have paid attention to how experiences in the work domain may affect positively or negatively the other domain. From this perspective, a better ability to manage the work–life interface reduces stress and overload and can increase individual creativity, generating in this way a self-sustaining virtuous cycle (Florida and Goodnight, 2005; Tang *et al.*, 2017).

However, environments designed to foster creativity have been shown to produce higher-commitment workers and to promote integration between work and life domains, e.g. workers taking their work at home or extending the working hours (e.g. Törnquist Agosti *et al.*, 2017). Yet, studies do not agree upon whether highly committed workers manifest higher or lower levels of overall well-being (see, e.g. Mkamwa, 2020). Also, work–life balance, which is a main component of overall well-being (Greenhaus *et al.*, 2003; Törnquist Agosti *et al.*, 2017), has rarely been studied in relation to organizational practices that aim at fostering creativity at work. While some studies argue that there may be a positive spillover to other domains of an employee's life (e.g. Straub *et al.*, 2019), other studies seem to suggest that high-commitment environments may lower the overall quality of an employee's life if a worker is not given enough autonomy to organize life outside of work (Abstein and Spieth, 2014). Relatedly, theories on the use of individual resources (e.g. psychological, affective, time) argue that demands in one domain (e.g. work) can deplete personal resources and impede accomplishments in the other domain (e.g. family) (Ten Brummelhuis and Bakker, 2012). Following this line of arguments and adopting a resource perspective (Ten Brummelhuis and Bakker, 2012), our question becomes, does designing work environments for creativity and promoting the enactment of rich work interactions among employees have a different impact on creativity and work–life balance? Answering this question is important because knowledge-intensive organizations are significantly investing in programs that foster creativity in the workplace, but the consequences of these programs beyond an increase in idea generation are not well understood. Our research aims at disentangling the different impacts of designed and enacted organizational structures on creativity and work–life balance.

To address our research question, we developed hypotheses on the influence of perceptions of the designed work environment (flexible work arrangements and other elements of the social-organizational work environment) and perceptions of enacted work interactions (centrality in instrumental networks) on creativity and work–life balance. We hypothesize that some designed elements of the work environment and enacted work interactions expected to promote creativity may have negative consequences in terms of work–life balance. We conducted a survey study in a multinational knowledge-intensive company that designs innovative automated solutions for consumer goods companies. Our analyses show that flexible work arrangements are positively related to increased work–life balance, but not to creativity, whereas the social-organizational environment designed to promote creativity is associated to an increased level of idea generation, but to a reduced work–life balance. We also found that the enacted work interactions, which we measure as the amount of advice a person receives through the instrumental social network (network centrality), are negatively associated to work–life balance.

Therefore, our results point to an interesting tension between practices to increase creativity and experiences of work–life balance. Overall, our work contributes to the current debate on new practices for innovation and creativity, highlighting their unexpected implications for workers' ability to reach work–life balance (Annosi *et al.*, 2020; White *et al.*, 2003; Wood and De Menezes, 2011). We also contribute to the literature on work–life balance (e.g. Beauregard and Henry, 2009; Hirschi *et al.*, 2019) by unraveling previously unexplored antecedents such as enacted social networks and social-organizational work environments designed for creativity.

2. Theoretical background and hypotheses development

Organizations have a long tradition of investing in the formal design of work environments which aim at fostering creativity (Amabile *et al.*, 1996; Annosi *et al.*, 2020; Caniëls and Rietzschel, 2015; Elsbach and Stigliani, 2018; Shalley and Gilson, 2004). In addition, recent approaches to innovation in organizations, e.g. design thinking and agile methodologies, place increasing attention to the importance of informal interactions across teams, functions, occupations and organizations (Annosi *et al.*, 2020; Leavy, 2012). The social relationships which employees enact above and beyond the formal organizational design have been associated with unexpected combinations of ideas which can lead to innovation (Perry-Smith and Mannucci, 2017; Perry-Smith and Shalley, 2003). In the case of knowledge-intensive companies for which the management of knowledge and intellectual capital is a strategic source of competitive advantage, getting employees involved in either formally designed or informal practices of production, exchange and creative recombination of knowledge is often a key concern (Kremer *et al.*, 2019; Alvesson, 2004). However, how the formally designed work environment and the enacted work interactions impact individual well-being in general, and work–life balance in particular, is still underexplored. This is surprising, given that anecdotical evidence suggests that the pursuit of innovation in knowledge-intensive environments is often characterized by high levels of stress and overload and by extended working hours (Reid and Ramarajan, 2016). The literature on work–life balance recognizes that there is a spillover between work and life and *vice versa* (Hill *et al.*, 2001; Tang *et al.*, 2017). Examples of negative spillovers from work to life, due to high level of work overload and stress, are withdrawal from family interaction, marriage conflict and depression (e.g. Grzywacz and Marks, 2000). Following a resource perspective, negative states experienced in the life domain, can, in turn, deplete psychological resources in the work domain, thus affecting job satisfaction, absenteeism and the long-term ability to maintain high levels of work performance (Cochis *et al.*, 2021; Ten Brummelhuis and Bakker, 2012).

In the following sections, we investigate how perceptions of designed work environment and enacted work interactions simultaneously impact creativity and work–life balance and the potential trade-off between initiatives that foster creativity and those that foster work–life balance. Rather than focusing on the *existence* of specific elements of the work environment, we will focus on how individuals *perceive* work environments. Indeed, previous literature has shown how individual perceptions about specific organizational elements, rather than the existence of those elements, impact creativity and work–life balance (Dul *et al.*, 2011; Hill *et al.*, 2001). Figure 1 anticipates our model and hypotheses, that we discuss next.

2.1 The effect of the designed work environment on creativity and work–life balance

2.1.1 The effect of flexible work arrangement on creativity and work–life balance.

Organizations offer flexible work arrangements to their employees in terms of timing (flextime) and location (flexplace) of work, now more than ever, also in response to the COVID-19 pandemic (SHRM Foundation, 2020; Gonsalves, 2020). Flextime refers to the "ability of rearranging one's working hours within certain guidelines offered by the company" (Hill *et al.*, 2001, p. 50), while flexplace reflects the degree of control given to employees over where to work (Shockley and Allen, 2007). Although literature has generally focused on the relation between work flexibility and work performance (Eaton, 2003) a few studies have empirically explored the link between flexible work arrangements and creativity (e.g. Wang *et al.*, 2018) and between flexible work arrangements and work life balance (e.g. Hill *et al.*, 2001). These studies have developed in two parallel streams of literature.

The literature on individual creativity suggests that knowledge workers *should* be given more flexibility to develop more and better ideas (Boschma, 2005). Some studies have shown that individual perceptions of autonomy in setting schedules and defining work practices are associated to higher creativity through increased individual work motivation and "passion" (Liu *et al.*, 2011). In addition, flexible work arrangements can promote creativity by developing a sense of creative self-efficacy, i.e. the extent to which individuals believe they

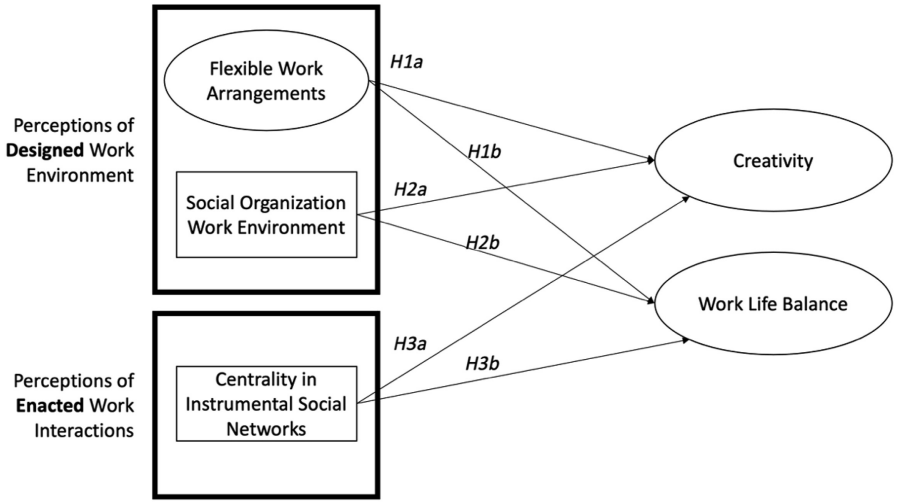

Figure 1.
Hypotheses

have the ability to produce novel ideas or the extent to which they perceive themselves to be creative (Wang *et al.*, 2018).

The human resource management (HRM) literature underscores how flexible work arrangements programs (e.g. smart working, telecommuting, homeworking) are usually offered with the hope of improving employees' work–life balance (Beauregard and Henry, 2009). For instance, previous research (e.g. Hammer *et al.*, 1997; Hill *et al.*, 2001) found that the perceived flexibility in terms of time and space is associated to higher levels of work–family balance, especially for minority and under-represented groups (Chung and Van der Horst, 2018). Providing employees with tools to enhance flexibility may lower negative emotions, and, by increasing workers' perception of control over the resources of their work environment, may promote a better work–life balance (Anderson *et al.*, 2002; Hill *et al.*, 2001; Kossek and Ozeki, 1999). Following a resource perspective, flexible work arrangements enable employees to allocate time, attention and energy in more individually efficient ways.

Since the aim of our study is to understand the simultaneous effect of flexibility on both creativity and work file balance, we integrate the results from previous studies and hypothesize that the perception of flexible work arrangements has a positive impact on both creativity and work–life balance.

H1. Flexible work arrangements have a similar positive impact on both creativity and work family balance.

H1a. Flexible work arrangements are positively associated to creativity.

H1b. Flexible work arrangements are positively associated to work–life balance.

2.1.2 The effect of the social-organizational work environment on creativity and work–life balance. Dul *et al.* (2011) define the social-organizational work environment as the designed social-organizational "elements" of the work environment that motivate people to be more creative. These elements consist of job design methods and human resources practices, such as designing challenging jobs, promoting teamwork and multi-teaming, formalizing task rotation, allowing for "thinking time", formally recognizing creative ideas and establishing incentives for creative results (Dul and Ceylan, 2011; Amabile *et al.*, 1996; Oldham and Cummings, 1996; Shalley and Gilson, 2004). For example, assigning challenging tasks to individuals requires more creative problem-solving. Working in teams prompts individuals to share and discuss ideas, which integration can result in more creative outcomes for individuals and teams. Interestingly, according to Dul and Ceylan (2011) these elements are not to be understood as separate or alterative paths to creativity, but as integral parts of an overall social-organizational work environment designed to support creativity and thus should be considered as a cumulative predictor of creative performance. Based on these arguments, the authors define the "degree of support from the overall social-organizational environment as the total perceived presence of creativity-supporting elements in that environment" (Dul *et al.*, 2011, p. 719). It is when individuals perceive that the various elements of the social-organizational work environment are relevant in their organizational context that they tend to be more creative (Amabile *et al.*, 1996; Mahmood *et al.*, 2019). Dul and Ceylan (2011), for instance, show that creativity-supporting work environments positively impact both workers' self-appraisals of creativity and supervisors' assessments of the creativity of their team, and Zhang and Bartol (2010) show that the more experienced the workers, the greater the impact of creative environments on their creative performance.

Research on the role of designed social-organizational work environments has produced contrasting findings and contradictory debates in relation to work life balance (Shockley and Allen, 2007; Thompson *et al.*, 1999). Many scholars presume that the positive relationship between social-organizational work environment and creativity is explained by more positive

individual work attitudes such as commitment and engagement (Amabile *et al.*, 1996) and that, in turn, positive work attitudes can have positive spillovers to the life domain (Choo *et al.*, 2016; Clark, 2000). However, it is also acknowledged that work commitment can have a two-sided effect: increased creativity, on the one hand, and decreased perceived work–life balance, on the other. For example, the high-commitment entrepreneurs studied by McDowell *et al.* (2019) were successful in terms of creative initiatives, but experienced increased work family conflict. From such standpoint, setting up a work environment which is focused on creativity could drive people to invest extra time and effort in the work domain, e.g. increase commitment to get rewards for innovative ideas or work longer hours and overtime to achieve peers' or managers' recognition, with the likely consequence of blurring the line between work and family domains (e.g. Abstein and Spieth, 2014). From a resource perspective (Ten Brummelhuis and Bakker, 2012), these mechanisms may lead to increased job overload, especially when workers are involved in multiple teams simultaneously (e.g. Reid and Ramarajan, 2016), with potentially negative implications for workers' life domain. For instance, some studies have shown that when high-commitment environments provide too many stimuli for workers to manage, they lower workers' perceived autonomy in their work–life management, triggering intense emotional labor that can lead to burnout and anxiety (Mkamwa, 2020; Jackson, 1989). Abstein and Spieth (2014) further suggest that, when organizations offer creativity-designed environments, but workers experience high work–life conflict, individuals may conclude that the company does not genuinely care about their well-being which further deepens the perception of a trade-off (see also Ungureanu *et al.*, 2019).

We thus argue that the perception of a creative social-organizational work environment has a different effect on creativity and work–life balance. We argue that it has a positive effect over creativity, but a negative effect over work–life balance.

H2. A social-organizational work environment designed to promote creativity differently impacts creativity and work–life balance.

H2a. A social-organizational work environment designed to promote creativity is positively associated to creativity.

H2b. A social-organizational work environment designed to promote creativity is negatively associated to work–life balance.

2.2 The effect of enacted work interactions on creativity and work–life balance

Knowledge-intensive work settings are often associated with the presence of proactive and helping norms (see for example the norms of "Googliness", Meiert, 2013) and workers are exposed to a large percentage of interactive activities that occur spontaneously, i.e. without formal planning (Bertolotti *et al.*, 2019; Perlow, 1999). Research on social networks in the workplace has investigated different types of instrumental interactions such as communication, advice, knowledge transfer (e.g. Cross and Cummings, 2004; Sykes *et al.*, 2014) and the important role of individuals who occupy central network positions (Ahuja *et al.*, 2003; Ibarra, 1993; Sparrowe *et al.*, 2001). By centrality in instrumental networks, we here refer to the number of different people a person can reach for advice and help, above and beyond the formal requirements of the organization. Centrality in instrumental networks has been associated to positive outcomes for individuals' ability to leverage work-related resources, including task quality and quantity of strategic information (Cross and Cummings, 2004; Fang *et al.*, 2015; Sparrowe *et al.*, 2001; Sykes *et al.*, 2014), which often result in creative outcomes (Perry-Smith and Mannucci, 2017; Tang *et al.*, 2017). Receiving advice from a large set of colleagues gives access to diverse sources of knowledge that can be combined in novel ideas (Perry-Smith and Mannucci, 2017). Research on social networks and creativity suggests that centrality in advice networks can lead to generating more creative ideas. Being exposed

to knowledge and perspectives coming from multiple sources not only expands individuals' own knowledge base but also enables them to envision creative knowledge combinations, e.g. Fleming *et al.* (2007) and Shah *et al.* (2018).

Unfortunately, managing a large instrumental network does not only bring about benefits but also requires significant investments of energy (Day and Kilduff, 2003; Landis, 2016). The resource perspective (Ten Brummelhuis and Bakker, 2012) suggests that maintaining and sustaining a large number of instrumental relationships in the workplace requires time and effort, and, as a consequence, can tax a person's cognitive resources. Therefore, while we acknowledge that extant literature has documented a positive relationship between social support, i.e. *collegial* relationships with coworkers and supervisors, and work–family spillover (e.g. Russo *et al.*, 2016; Wayne *et al.*, 2007), we propose a negative relationship between centrality in *instrumental* advice networks and work–life balance. We base our argument on the following reasons. In knowledge-intensive contexts, individuals continuously look for colleagues' help and advice (Ashford and Cummings, 1985) and face the risk of being overwhelmed by the need to reach out to others for completing their work. In addition to handling multiple colleagues' requests, individuals high in centrality need to attend to their own individual tasks. This, in turn, may lead to lower levels of work–family balance, especially when the daunting task of network management leads the individual to extend working hours (Perlow, 1999) and create an unhealthy overlap (or integration) across the two domains (Wepfer *et al.*, 2018). Conversely, peripheral individuals who are less dependent on others and manage a lower number of relationships may be better at separating work and family domains and abler to pursue a balance between the two (see also Bulger and Hoffman, 2018).

Overall, we argue that centrality in instrumental networks has positive implications for creativity, but is detrimental for work–life balance:

H3. Receiving advice from a large number of colleagues (i.e. centrality in instrumental social networks) differently impacts creativity and work family balance.

H3a. Receiving advice from a large number of colleagues (i.e. centrality in instrumental social networks) is positively associated to creativity.

H3b. Receiving advice from a large number of colleagues (i.e. centrality instrumental social networks) is negatively associated to work–life balance.

3. Data and methods

3.1 Context and data collection

We conducted a survey study in a multinational company, headquartered in Italy and specializing in the design and engineering of robotic systems for industrial plant logistics. Specifically, the company creates automated solutions for consumer goods in the food, beverage and tissue industries. Thanks to highly innovative hardware and software solutions, it was one of the first players to anticipate the industry 4.0 revolution in the early 1990s, becoming widely known as a market leader of integrated automation solutions. The company maintains its leadership position thanks to continuous investments in R&D and innovation projects, as well as in organizational practices for attracting and valuing talented professionals. At the time of our study, it counted around 800 employees, mainly engineers, technicians and highly specialized equipment operators, and was experiencing continuous growth. In 2019, the company counted for an 150% increase in revenues and opened 90 new job positions. In 2017, it won the international Gulfood Manufacturing Industry Excellence Award for the best practices and innovation in the food manufacturing industry value chain, and in 2020 it was included in the annual innovation report of the Symbola Foundation as one of the 100 Italian Excellence companies for robotics and automation technologies. Given these

characteristics, this company well exemplifies the innovative fast-growing technological companies in Europe and beyond (e.g. Avigdor and Wintjes, 2015).

The company is organized in different functional units, most of which are knowledge-intensive, such as electro-mechanic design, system engineering, PLC (Programmable Logic Controller), supply chain, LGV (Laser Guided Vehicles). Therefore, it largely carries out knowledge-intensive engineering activities that rely on the design of an organizational work environment that enhances and supports creative processes, such as incentivizing employees to take responsibilities and risks, promoting a problem-solving focus (i.e. encouraging individuals to discuss ideas and work on new problems) and constantly assigning knowledge workers to multi-functional project teams.

In order to get access to and have a rich understanding of our context, we availed ourselves of the help of a research assistant who did a 6 months internship in the company collecting data and maintaining regular interactions with managers and employees. We developed a multi-section online questionnaire that we submitted to 401 members of the functional units engaged in knowledge-intensive work. We assured respondents that their individual responses would be used only for research purposes and asked them to return the completed questionnaires directly to us instead of routing them through the organization. Given the organizational support for our survey and the insider role performed by the research assistant, 62% of the questionnaires, i.e. 249, were returned. After the data cleaning process, our dataset consists of 207 questionnaires. The response rate of 52% is considered acceptable in both survey-based and SNA studies (see, e.g. Grosser *et al.*, 2018). Respondents had worked with the organization for an average of nine years (mean = 8.90, s.d. = 7.57); 74.4% of them were based at the headquarters; 12.6% held a managerial position. Finally, 92.7% of respondents were male. This represents a typical feature of Italian and Western firms where people in technical/engineering roles are often men.

3.2 Measures and analyses

3.2.1 Dependent variables. We measured creativity with the three items of the self-perceived creativity scale used by Dul *et al.* (2011) and Dul and Ceylan (2011), adapted from George and Zhou (2001), on a 5-point Likert scale. The three items are: "In my work, I often have new and innovative ideas", "In my work, I often come up with creative solutions to problems," and "In my work I often suggest new ways of performing work tasks". We performed confirmatory factor analysis (CFA) for the creativity measure. The resulting one-factor model showed acceptable fit ($\chi^2 = 4.54$, $p > 0.03$; RMSEA = 0.13; TIL = 0.92; CFI = 0.97 SRMR = 0.04; Coefficient of determination = 0.78). Composite reliability was 0.71, which is beyond the recommended level of 0.70. The average of variance extracted (AVE) was 0.47 [1]. Cronbach alpha was 0.70.

We measured work–life balance with the composite measure used by Hill *et al.* (2001), consisting of five questions about the ability of employees to balance the demands of work and life. Two exemplar items are: "How easy or difficult is it for you to balance the demands of your work and your personal and family life" (responses on a 5-point scale: from very difficult to very easy) and "I have sufficient time away from my job at [company name] to maintain adequate work and personal/family life balance" (responses on a 5-point scale: from strongly disagree to strongly agree). The confirmatory factor analysis on one-factor model showed good fit ($\chi^2 = 5.55$ $p > 0.162$; RMSEA = 0.56; TIL = 0.98; CFI = 0.99 SRMR = 0.03; Coefficient of determination = 0.86). Composite reliability was 0.78. The average of variance extracted (AVE) was 0.45[1]. Cronbach alpha was 0.77.

3.2.2 Independent variables. Flexible work arrangements were measured with the four items proposed by Hill *et al.* (2001). The four items are related to the respondent's perception of the degree of flexibility in the timing and location of work and were assessed on a 5- point

Likert scale. The factorial confirmatory analysis on the flexible work arrangements variable had excellent fit results ($\chi^2 = 0.01$ $p > 0.932$; RMSEA = 0.00; TIL = 1.04; CFI = 1.00 SRMR = 0.00; Coefficient of determination = 0.81). Composite reliability was 0.74. The average of variance extracted (AVE) was 0.42[1]. Cronbach alpha was 0.70.

The social-organizational work environment was measured using the Creativity Development Quick Scan (CDQS) (Dul and Ceylan, 2011; Dul *et al.*, 2011), where informants are asked to rate, on a Likert scale, how much they perceive that nine creative supportive elements of the social-organizational environment are present. Given the nature of the specific work context, we removed two items. The seven remaining items are: challenging job, teamwork, task rotation, autonomy in job, time for thinking, recognition of creative ideas and incentives for creative results. Following Dul *et al.* (2011) we computed a "formative" index to obtain the overall measure of the social-organizational work environment. Given that the elements of the scale do not need to correlate with each other, test methods for computing reliability, or latent variable construct, do not apply for this measure. For the same reason, we have considered the social-organizational work environment index as one observable variable in SEM analysis (explained in section 3.2.4), computed as the mean of the seven items.

To measure the centrality in the instrumental network, we collected data on a work-related network that has been frequently investigated in the social network literature: the advice network (Fang *et al.*, 2015). The advice network includes relations through which individuals share specific assistance and guidance related to the completion of work (Sparrowe *et al.*, 2001). We asked our informants: "if you have a question or problem at work, to whom would you go for help or advice?". We asked them to fill in the name of the colleagues to whom they ask for work-related help and advice, above and beyond the formal organizational structure. We computed the respondents' centrality in terms of their outdegree scores (Borgatti *et al.*, 2002; Wasserman and Faust, 1994). The outdegree in the advice network represents the number of colleagues a person declared he/she could count on for work-related advice. We also conducted post-hoc analyses using the indegree centrality. The indegree in the advice network represents the number of colleagues who declared they could count on a focal actor for work-related advice (that is an objective measure of the amount of advice offered by a focal actor).

3.2.3 Control variables. As other variables may act as predictors of creativity and/or work–life balance, we included the following controls: location, gender, tenure, position and education. We controlled for the location, i.e. whether the person was based in the headquarters (1) or in one of the international offices (0). Being in the headquarters may give access to resources (e.g. access to top management, financial resources) that facilitate the enactment of creative processes.

Gender is typically used as a control variable both in studies on creativity and on work–life balance (Dul *et al.*, 2011), as multiple studies have reported differences in terms of gender role enactment and creativity (see, e.g. Baer and Kaufman, 2008) as well as differences in terms of gender role enactment and work–life balance assessment (Scandura and Lankau, 1997). We coded female respondents with 0 and male respondents with 1.

Tenure captures how many years an individual has been an employee of the organization. The longer a person has been part of the organization, the better he/she knows how to actively participate in the generation of ideas (Gilson *et al.*, 2013). Also, according to tenure and life-cycle stage, workers' perceptions of work–life balance may be different (Sturges and Guest, 2004).

We also included the organizational position as a control variable because it may have implications for one's work demands and, as a consequence, for the work–family interface (Kossek *et al.*, 2006). Position can also affect the control over resources, thus influencing creative processes. We coded position as 1 if the person held a managerial position (e.g. unit head) and 0 otherwise.

Finally, we controlled for the education level using a scale from 1 to 7 where 1 = middle school; 2 = high school; 3 = associate's degree; 4 = bachelor's degree; 5 = master's degree; 6 = master post degree; 7 = doctoral degree.

3.2.4 Data analysis. To assess the factor structure of the latent construct, we performed a confirmatory factor analysis (CFA). We calculated the ICCs for all latent variables in our model to check the degree of interdependence within the group in our data. None of the variables had significant ICC (all ICCs were less than 0.01). These results indicate that there is no significant group-level variance in the variables. Thus, even if the employees were nested in functional units, their membership in the units did not count for a significant variation in the variables. In such a case, single-level analysis is recommended (Cohen, 1988).

We tested our hypotheses through structural equation modeling (SEM) using STATA 16 software. SEM allowed us to correct the multi-item study measures for eventual unreliability and to test the hypothesized relationships simultaneously (Kline, 2015). We used maximum-likelihood estimation for all models.

Given that dependent and independent variables are computed from a single source of data, we recognize that common method bias could be a problem. However, it is important to underscore that in previous studies on individual creativity researchers have extensively tested models in which dependent and independent variables come from the same source, i.e. employees (e.g. Dul *et al.*, 2011), as "employees are best suited to self-report creativity because they are the ones who are aware of the subtle things they do in their jobs that make them creative" (Shalley *et al.*, 2009, p. 495). Therefore, the presence of individual and /or contextual factors may make creative self-assessment appropriate, particularly when creative changes and creative outputs may not be captured by a third person (Ng and Feldman, 2012), or when research conditions make it necessary (Kaufman, 2019). Nevertheless, we took a set of actions to make sure that common method bias did not represent an issue for our study. First, when preparing the questionnaire, we followed the prescriptions suggested in the relevant literature, such as guaranteeing anonymity, emphasizing that the questions did not imply right or wrong answers and separating the questionnaire sections with questions for dependent and independent variables (Podsakoff *et al.*, 2003). We also performed Harman's single factor test to examine whether common method variance was pervasive in our dataset (Podsakoff *et al.*, 2003). This technique involves inserting all elements of the survey into a principal components' analysis. Thus, if a single factor emerges, or if a factor represents more than 50% of the variance in the variables, common method bias is likely to be present (Harman, 1967). Three factors emerged from the unrotated factorial solution, and the first factor explained only 21% of the variance, suggesting that the common method variance is not problematic in the present research.

4. Results

Table 1 presents descriptive statistics and correlations between study variables. The correlation is built with aggregate variable values for the model's latent variables. Flexible work arrangements and the social-organizational work environment are positively related to each other. This is not surprising because, from a theoretical perspective, the two variables, although different, are two aspects of the same "designed work environment" (see Figure 1). However, the correlation does not underscore a multicollinearity problem in the analysis. First, we have built a saturated structure equation model including all the three components of the model: definition of the latent variable, specification of the regressions and specification of the residual correlation (Kline, 2015). According to Kline (2015) having a saturated model is enough to exclude multicollinearity. To further rule out the possibility of multicollinearity, we also ran OLS regression models having work life balance and creativity as dependent variables and all the other variables as predictors. In both models VIF scores were below 2.

Table 1.
Descriptive statistics

Variable	Mean	SKI. Dev.	Mill	Max	1	2	3	4	5	6	7	8	*9*	10	11
1. Location	0.74	0.44	0.00	1.00	1.00										
2. Gender	0.93	0.26	0.00	1.00	−0.04	1.00									
3. Tenure	8.90	7.57	1.00	40.00	0.15*	0.06	1.00								
4. Position	0.13	0.33	0.00	1.00	−0.04	−0.06	0.03	1.00							
5. Education	3.06	1.42	1.00	7.00	0.03	0.06	−0.02	−0.05	1.00						
6. Flexible Work Arrangements	3.23	0.64	1.00	4.50	−0.01	−0.03	−0.02	0.02	−0.03	1.00	*(0.70)*				
7. Social Org. Work Environment	2.84	0.65	1.57	4.71	0.00	−0.02	−0.01	0.14*	−0.14*	0.38**	1.00				
8. Work–Life Balance	3.11	0.68	1.40	4.60	−0.01	0.08	−0.05	−0.17*	−0.12	−0.23**	−0.06	1.00	*(0.77)*		
9. Creativity	3.14	0.75	1.00	4.67	−0.07	0.00	0.01	0.11	−0.04	0.17*	0.48**	−0.26**	1.00	*(0.70)*	
10. InDegree	1.55	2.90	0.00	20.00	−0.07	−0.06	0.02	0.64**	−0.09	0.13	0.27**	−0.10	0.14*	1.00	
11. OutDegree	2.83	2.69	0.00	15.00	−0.01	0.11	−0.04	0.03	0.01	−0.03	−0.09	−0.21**	0.06	0.05	1.00

Note(s): *Correlation is significant at 0.05 level (2-tailed); **Correlation is significant at the 0.01 level (2-tailed); In parentheses Cronbach alpha's value

Table 2 shows the fit indices of CFA. With a sample size of 207, there are convergence problems that can occur when the number of estimated parameters approaches the sample size, and this entails a difficulty in estimating the fit model through the chi-square analysis only (the significance p-value tends to be around 0.00, not allowing to reject the null hypothesis). For this reason, we evaluated the CFA model and then the SEM models through all the main good-of-fit parameters. The fit indices of the CFA model are acceptable and indicate a good adaptation of the model to the latent construct. This CFA included 3 latent variables made up of 12 items in total (see figure in appendix).

To determine if all latent constructs have discriminant validity, we have performed the chi-square difference test (Segars, 1997). All the difference test results were significant ($p = 0 < 0.05$), which means that all constructs present discriminant validity (see Table 3).

We have tested the structural model of Figure 2. Table 4 describes structural model fit indices. The good-of-fit indices indicate a good fit of our model.

Table 5 summarizes our coefficients values of structural model analysis (regression equations) for hypotheses 1, 2 and 3 related to creativity and work–life balance. We included the main effect of flexible work arrangements, which was not a significant predictor of creativity ($\beta = 0.03$; $p < 0.77$), thus not providing support to hypothesis 1a. The main effect of Social-Organizational Work Environment was a significant predictor of creativity ($\beta = 0.60$; $p < 0.00$), thus providing support to hypothesis 2a. The measure of instrumental social network centrality, i.e. Outdegree Centrality ($\beta = 0.03$; $p < 0.08$) was not a significant predictor of creativity, thus not providing support to hypothesis 3a.

Flexible work arrangements were a significant predictor of Work–Life Balance ($\beta = 0.59$; $p < 0.00$), thus providing support to hypothesis 1b. Social-Organizational Work Environment

Goodness-of-fit	Estimates	Cutoff values based on model characteristics
Chi-square (χ^2)	79.81	
Degrees of freedom	48	
Probability level	0.003	Not significant p-values can be expected[a]
X2/d. f. ratio	1.66	<2.00 excellent
CFI	0.95	>0.90
TLI	0.94	>0.90
RMSEA	0.06	<0.07 with CFI of 0.90 or higher
AIC	5977.78	Akaike's information criterion
BIC	6117.76	Bayesian information criterion
SRMR	0.05	

Note(s): CFI – comparative fit tndex; TLI – Tucker–Lewis index; RMSEA – root mean square of approximation; SRMR – standardized root mean square residual; [a]In "Chi-square" (CMIN) statistic its associated p-value should not be statistically significant if there is a good model fit. However, the χ^2 statistic is very sensitive to sample size and is no longer relied upon as a basis for acceptance or rejection (Schermelleh-Engel *et al.*, 2003)

Table 2.
CFA model fit indices

Construct variable 1	Construct variable 2	χ^2	χ^2 differences	Df difference	p-value
Work-Life Balance	Flexible Work Arrangements	202.42	90.65	1.00	0.00
Work-Life Balance	Creativity	210.89	99.13	1.00	0.00
Flexible Work Arrangements	Creativity	210.38	98.62	1.00	0.00

Table 3.
Discriminant validity analysis

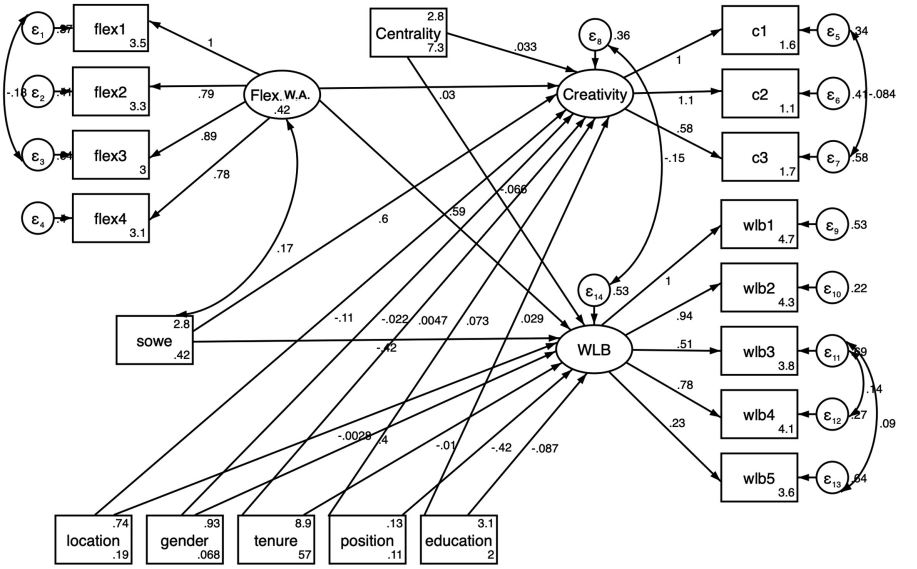

Figure 2.
Structural equations model with estimation

Goodness-of-fit	Estimates	Cutoff values based on model characteristics
Chi-square (χ^2)	157.65	
Degrees of freedom	116	
Probability level	0.006	Not significant p-values can be expected[a]
X2/d. f. Ratio	1.36	<2.00 excellent
CFI	0.95	>0.90
TLI	0.93	>0.90
RMSEA	0.04	<0.07 with CFI of 0.90 or higher
AIC	9848.35	Akaike's information criterion
BIC	10,041.65	Bayesian information criterion
SRMR	0.05	<0.08 good
CD	0.87	Coefficient of determination (R^2)

Note(s): [a]In "Chi-square" (CMIN) statistic its associated p-value should not be statistically significant if there is a good model fit. However, the χ^2 statistic is very sensitive to sample size and is no longer relied upon as a basis for acceptance or rejection (Schermelleh-Engel *et al.*, 2003)

Table 4.
SEM model fit indices

was negatively associated to Work–Life Balance ($\beta = -0.42$; $p < 0.00$), thus providing support to hypothesis 2b. Outdegree Centrality was negatively and significantly associated to Work–Life Balance ($\beta = -0.07$; $p < 0.00$), thus providing support to hypothesis 3b.

We conducted post-hoc analyses using the indegree as a measure of network centrality, but we did not find a statistically significant association between indegree centrality and neither work life balance nor creativity.

5. Discussion

We started our research with an interest in investigating the different effects that work environments designed to increase employees' creativity and enacted instrumental social

Variables	Coef.	Std. Err.	z	$P>\|z\|$	[95% conf. interval]	
Creativity ($R^2 = 0.31$)						
Location	−0.11	0.12	−0.98	0.33	−0.34	0.11
Gender	0.02	0.19	−0.12	0.91	−0.40	0.35
Tenure	0.00	0.01	0.70	0.48	−0.01	0.02
Education	0.03	0.04	0.82	0.41	−0.04	0.10
Position	0.07	0.15	0.49	0.62	−0.22	0.37
Flexible Work Arrangements	0.03	0.10	0.29	0.77	−0.17	0.23
Social org. Work Environment	0.60	0.09	6.49	0.00***	0.42	0.78
OutDegree	0.03	0.02	1.77	0.08	0.00	0.07
Work–Life Balance ($R^2 = 0.28$)						
Location	0.00	0.13	−0.02	0.98	−0.26	0.26
Gender	0.40	0.22	1.78	0.08	−0.04	0.84
Tenure	−0.01	0.01	−1.34	0.18	−0.03	0.00
Education	−0.09	0.04	−2.11	0.04*	−0.17	−0.00
Position	−0.42	0.18	−2.38	0.02*	−0.77	−0.07
Flexible Work Arrangements	0.59	0.14	4.45	0.00***	0.32	0.87
Social org. Work Environment	−0.42	0.11	−3.91	0.00***	−0.63	−0.21
OutDegree	−0.07	0.02	−2.99	0.00***	−0.11	−0.02

Note(s): *Significant at the 0.05 level, **Significant at the 0.01 level, *** Significant at the 0.00 level

Table 5. Structural parameters values

networks might have on knowledge workers' creativity on the one hand and their ability to manage the interface between work and family on the other hand. We found that flexible work arrangements, such as perceived freedom in choosing time and place to work, is related to a better ability to manage the interface between work and family, but not to creativity. We found that while social-organizational work environments designed to support creativity are indeed related to greater idea generation, they are negatively related to experiences of work–life balance. Finally, the amount of advice received in the workplace (that we measured as the outdegree centrality in instrumental networks) – is also negatively related to work–life balance. The novelty of our study lies in the explicit comparison of the joint, but different, effects of the designed work environment and enacted work interactions on both creativity and work life balance. Our study provides several contributions to the innovation and creativity and to the work–life balance literature, as well as practical implications.

5.1 Theoretical implications

While existing literature supports an optimistic view that organizational work environments designed to enhance creativity may improve both employees' creativity at work and quality of life (Agarwal and Farndale, 2017; Kelly *et al.*, 2008; Thompson and Prottas, 2006; Valcour, 2007), we caution that a trade-off perspective should be carefully considered, given that the very the same organizational elements of the work environment can affect positively workers' ability of generate ideas but negatively their perceived work–life balance. We contribute to this debate by highlighting the need for organizations interested in fostering workplace creativity to consider the relationship between designed and enacted organizational practices intended to foster creativity and the perceptions that workers have of these practices, especially in terms of the autonomy/control that these afford. In particular, some studies suggest that to the extent to which organizational practices give workers greater control over their jobs, by promoting work involvement and commitment, they can reduce work–life stress and thus promote better work–life balance (Mackie *et al.*, 2001; Wood and De Menezes, 2011). Our findings about the positive impact of flexible work

arrangements on work–life balance confirm this statement. However, in our analysis these arrangements do not have a positive impact on creativity. In other words, flexibility is not enough to guarantee creative outcomes.

Conversely, the multiple elements of a social-organizational environment designed to increase creativity, e.g. the organizational focus on teamwork, the systematic assignment of challenging tasks, the provision of specific incentives for creativity, are found to foster more idea generation. However, we also show that if employees are embedded in an over-committing relational structure, they may perceive the inability to set clear boundaries between life and work commitments. Two mechanisms may be related with this tendency, we argue. First, by eliciting aspects such as proactivity and interdependency, organizational practices designed to support creativity may walk a thin line between commitment and overcommitment to work tasks. Embedding employees in dense webs of social interactions and knowledge exchanges engenders perceptions of work commitment, but can also push employees towards overcommitment (perceptions of control loss and work–life conflict) (Kinman and Jones, 2008; Meijerink *et al.*, 2018). Second, more recent research has shown that HR initiatives intended to facilitate multiple employee outcomes across different spheres (in our case, well-being and creativity) may fail when employees are not able to fully understand the strategic importance of these initiatives and to appreciate the consistency across initiatives (see Ungureanu *et al.*, 2019; Wang and Verma, 2012). Indeed, many knowledge-intensive organizations promote values related both to well-being and to creativity and actively implement programs to foster both. However, if workers perceive to be supported in their creative efforts, but at the same time perceive low levels of work life balance, they may experience an uncomfortable inconsistency. We further argue that, if employees refer to designed workplace practices for creativity as part of a unitary whole (i.e. organizational design consistency), they may also perceive them as less encroaching on their autonomy or personal lives (Ehrhardt *et al.*, 2011; Shalley and Gilson, 2004; Abstein and Spieth, 2014).

As far as enacted interactions are concerned, we did not find a significant positive effect of the outdegree centrality in advice networks on creativity. This may be due to the fact that our measure of enacted interactions captures the amount of advice received and not the diversity of inputs and suggestions from others, which may be more directly related to creativity. In addition, as recent research suggests, the creative journey is a process composed of different stages (idea generation, idea elaboration, idea championing and idea implementation, Perry-Smith and Mannucci, 2017). Receiving advice at different stages can have different impacts on the quality and quantity of idea generated, elaborated, or implemented. Capturing the different stages of the idea journey was beyond the scope of our research but is a promising avenue for future research (see section 5.2).

Our findings highlight that centrality in instrumental social networks can have undesirable effects on work–life balance. We found that outdegree centrality in advice networks is negatively related to work–life balance. Outdegree centrality measures how much a person relies on others for work-related help or advice. Thus, it also captures how much employees perceive themselves to be dependent on others for carrying out their tasks, which could negatively affect perceived autonomy and, therefore, also work–life balance.

Our finding makes a specific contribution to the literature on work–life balance by proposing a new antecedent to work–life balance perceptions: the centrality in instrumental social networks. While previous research has already testified to the role of a supportive organizational environment (e.g. supervisors' or coworkers' affective support for enhancing employees' ability to better balance work and life domains, Beauregard and Henry, 2009; Smith and Gardner, 2007), the effect of individuals' position in the enacted social structures represents a novel perspective. Work–family scholars have called for more research on contextual antecedents of the work–family pathways, such as work–family conflict and enrichment (Chan *et al.*, 2016; Greenhaus and Powell, 2006; Wayne *et al.*, 2006). While such

literature has been mostly limited to the individual level of analysis (Casper *et al.*, 2007), focusing on social networks provides a contextual variable (Greenhaus and Powell, 2006) that focuses on interactions among work colleagues and thus also provides a novel method of analysis for the work–family literature. Importantly, the negative effect of outdegree centrality on work–life balance offers a new interesting perspective on the interplay between the work context and other life domains, such that the higher the number of people a person feels he/she to be dependent, the higher the perception that resources in one domain can drain the other domain. This conclusion may appear inconsistent with previous studies on the relationship between social support and work–life balance. Specifically, social support can be defined as any interpersonal transaction that involves an affective component, e.g. emotional concern, personal support, or an instrumental component, e.g. instrumental aid, information, or appraisal (House, 1983; Carlson and Perrewé, 1999). Yet, while existing literature has mainly focused on affective components of social support such as collegial relationships with colleagues and supervisors and has found a positive relation between social support and work life balance (Carlson and Perrewé, 1999), our study focused on the instrumental components of social support – more specifically on the amount of work-related task advice a person can receive – and found that centrality in the advice network is negatively related to work life balance. As highlighted above, we propose that a possible explanation of this apparently counterintuitive finding may be related to the increased perception of dependency on others (i.e. seeking information from others) and the likely associated perception of reduced autonomy.

5.2 Practical implications, limitations and future research directions

Our considerations also pave the way for a relevant managerial reflection: when designing contexts for creativity, managers should be aware of the trade-offs they may entail. HR managers and employers in general should pay attention to the meanings that workers attribute to organizational environments designed to enhance creativity, as well as to their perceptions regarding the degree of autonomy that they have in organizational advice networks. Especially in the context of knowledge-intensive companies where creativity is sought and pursued as a primary source of competitive advantage, reflections on the degree of perceived coherence and consistency of a company's initiatives for its employees can avoid a paradoxical situation by which tools given to employees to increase their autonomy at work and at home and spontaneous processes considered beneficial for both domains (i.e. help and advice networks), end up by reinforcing one domain at the expense of the other. To this purpose, managers could precede the actual introduction of designed organizational structures with a prototyping phase aimed at assessing the impact of such structures on workers' perceptions, as well as on a variety of attitudes and abilities related to workplace performance and creativity within and beyond the working sphere (high-commitment work environment, work–life conflict and perception of conflict versus enrichment). Second, surveys like the one here conducted could help managers identify even very early perceptions regarding the potential trade-offs of designed employee initiatives across life spheres and use participatory methods for discussion to encourage employee involvement via problem-solving and co-design of work practices (Holland *et al.*, 2011; Ungureanu *et al.*, 2019; Wood and Wall, 2007). Third, if organizations truly value both creativity and employee well-being, such double-ended priority should be communicated to employees coherently and strategically. Future research may investigate whether different HRM strategies at the company level can contribute to reducing the perceived trade-off. For instance, Abstein and Spieth (2014) suggest that incorporating specific "metafeatures" or messages about company expectations within designed HRM (i.e. individual-centrism, discretion, effort rather than results orientation and predictable expectations), may promote coherence by increasing

employees' perceptions of a creative environment and diminishing feelings of work–life balance conflict. This may sometimes even imply anticipating and warning employees that creative task approaches may generate high levels of commitment which, if not managed properly, may cross the overcommitment line. While such anticipations may sometimes cause undesired reactions, such as employees' lack to commit or self-fulfilling prophecies, they can also testify to the organization's authentic concern to make creativity a participatory organizational process.

This work, of course, is not without limitations. First, our data were collected in one single knowledge-intensive context and our evidence cannot be generalized to other settings. As with all cross-sectional studies, the test of our hypotheses precludes making definitive causal statements. Clearly, longitudinal research or laboratory studies are required to assess with greater confidence the paths in our proposed model. In addition, a limitation that is common in survey research design is that although we controlled for education, tenure, gender, position and location, there may be other uncontrolled variables that affect our dependent variables in the workplace.

Interestingly, our study did not support the existence of a positive relationship between instrumental network centrality and creativity. Studies that distinguish between the different stages of the creative process, i.e. idea generation, elaboration, championing and implementation (Perry-Smith and Mannucci, 2017), could tell a more refined story about the trade-offs of creativity and work–life balance. Relatedly, future studies could further explore the relationship between the different elements of the social-organizational work environment during the different stages of the idea journey. For example, it would be interesting to study the different role that incentives and rewards recognized to workers for creative ideas play in the idea generation stage versus later stages.

In addition, in our conceptualization and measure of instrumental network centrality, we did not distinguish between formal advice, i.e. advice received by supervisors and immediate colleagues such as team members, from informal advice, i.e. advice received by peers or other colleagues in other units or teams. Another fruitful avenue for future research is to explore how centrality within the formal versus informal instrumental network affects creativity and work–life balance.

It is also noteworthy that due to the nature of the industry in which our knowledge-intensive company operated, nearly 93% of the respondents in our study were male. Therefore, we could not fully appreciate whether the implementation of a work environment designed to promote innovation and the amount of enacted work interactions among employees act differently on creativity and work–life balance depending on gender. Future studies could investigate the different perceptions between male and female workers on the model we propose, by collecting data in a context with greater equality in terms of gender distribution.

Finally, in this study we do not focus on how managers and leaders influence workers' perceptions of the designed work environment and the importance of instrumental interactions for creativity. We suspect that the extent to which managers communicate the "acceptability" of flexible arrangements (e.g. communicate that it is ok not to be always in the office) and the importance of the elements of the social-organizational environment (e.g. the importance of teamwork) may positively moderate the relationship between our independent and dependent variables.

In spite of these limitations, we believe that this work offers a novel perspective on the "dark side" of new managerial and human resources practices for creativity, in terms of the potential negative long-term implications for the well-being of employees. In line with the boundary-breaching nature of our study with respect to different research traditions, we encourage HR and innovation scholars to further investigate the nuanced, complex and unexpected trade-offs entailed by innovative organizational contexts.

Notes

1. The AVE value can be considered acceptable under 0.5 when composite reliability is above 0.70 (Fornell and Larcker, 1981)

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Appendix

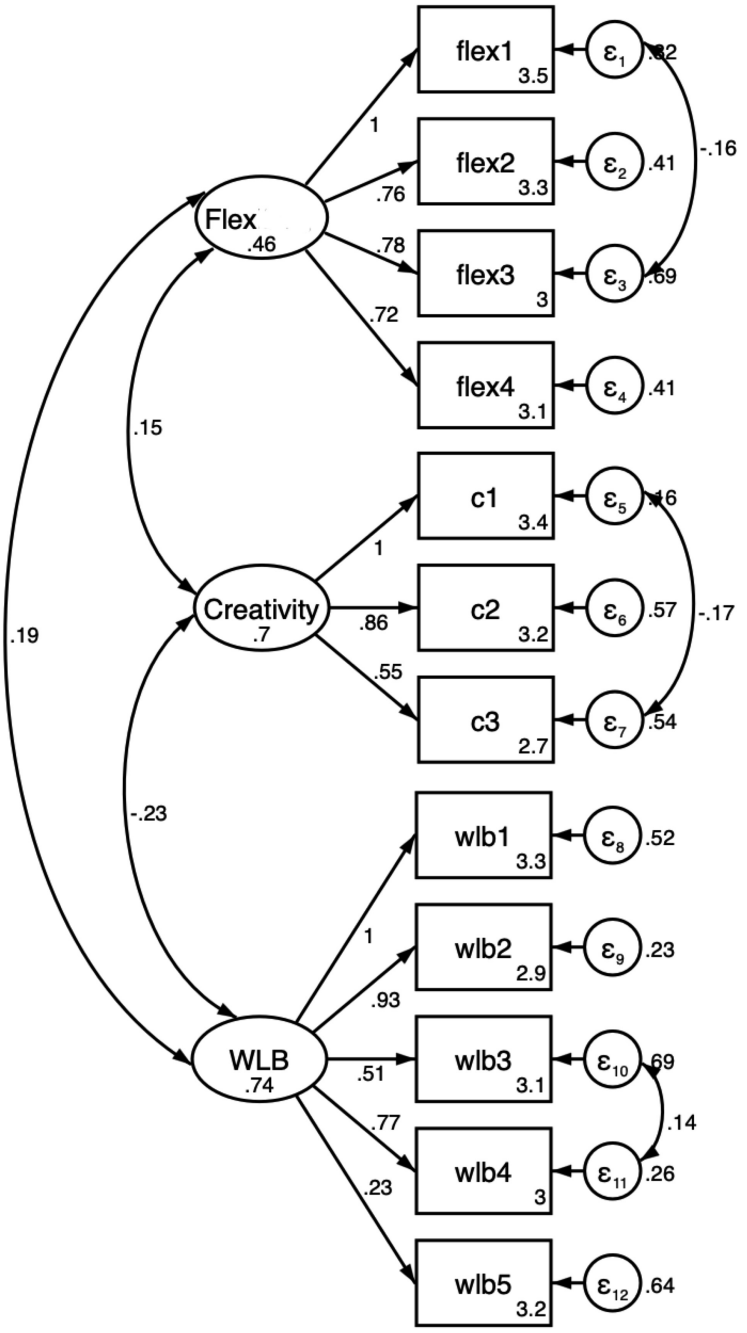

Figure A1.
CFA estimation