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Nisula Anna-Maija, Olander Heidi

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# The role of creativity in knowledge workers' entrepreneurial intentions: The moderating effect of general self-efficacy

**Anna-Maija Nisula** \*)

Associate professor

*School of Business and Management, LUT University, Lahti, Finland*

[anna-maija.nisula@lut.fi](mailto:anna-maija.nisula@lut.fi)

**Heidi Olander**

Associate professor

*School of Business and Management, LUT University, Lahti, Finland*

[heidi.olander@lut.fi](mailto:heidi.olander@lut.fi)

\*) Corresponding author

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## Abstract

This study investigated the role of creativity and general self-efficacy as factors that give rise to organizational knowledge workers' entrepreneurial intentions. It also examined the interaction effect of creativity and general self-efficacy in relation to entrepreneurial intention. The research model was tested by applying partial least squares structural equation modeling (PLS-SEM) to a dataset collected from 303 knowledge workers in Finland. The empirical results supported our hypothesis and showed that creativity was significantly and positively related to knowledge workers' entrepreneurial intentions, whereas the impact of general self-efficacy on entrepreneurial intentions was not supported in the main model. In addition, our findings revealed that general self-efficacy moderated the relationship between creativity and entrepreneurial intention. The moderation was positive, meaning that

the higher the general self-efficacy, the stronger the relationship between creativity and entrepreneurial intention.

**Keywords:** creativity, entrepreneurial intention, knowledge worker, general self-efficacy,

## **Introduction**

The attractiveness of entrepreneurial careers (Gorgievski et al., 2010; Laguna, 2013; van Praag & Versloot, 2007) and independent professional careers (McKeown & Pichault, 2020) is increasing, which is due not only to the variety of options for self-employment in contemporary working life but also to the desire of individuals to self-realize and manage their workloads, and work-life balance. However, the decision to engage in entrepreneurial process (Laguna, 2013; van der Zwan et al., 2010) seldom occurs suddenly; rather, it matures through entrepreneurial intention (EI) and frequently actualizes in a particular business venture (Ajzen, 1991; Fishbein & Ajzen, 1975; Krueger et al., 2000; Thompson, 2009).

Knowledge workers (Drucker, 1999), or knowledge-intensive workers (Alvesson, 1995), are the key users and producers of knowledge in organizations and societies (Drucker 1999; Kelloway & Barling, 2000). They also represent potential entrepreneurs for whom contemporary working life provides various ways to pursue opportunities. For organizational knowledge workers (hereafter, we use the term “knowledge worker” to mean a knowledge worker employed by an organization), EI refers to their intention to transition from an organizational (employee) career to entrepreneurship, that is, to ultimately start and run their own business (see start up behavior by Saeed et al., 2015). Given that entrepreneurship among knowledge workers is increasing and that people engage in different types of entrepreneurship for various economic or non-economic reasons (Jayawarna et al., 2013), it is important to extend our understanding of the drivers of knowledge workers’ EIs. Specifically, we have identified the following gaps in the current understanding of knowledge workers’ EIs.

First, while acknowledging the research that has explained EI among students, that is, people entering their careers (e.g., Krueger et al., 2000; Kolvereid, 1996; Zampetakis, 2008;

Zampetakis et al., 2011; Liñán & Chen, 2009) and research that has investigated EI among the unemployed (Laguna, 2013), IT professionals (Lee et al., 2011), late-career employees (Hatak et al., 2015), working-age individuals (Kautonen et al., 2013), and hobbyists (Biraglia & Kadile, 2017), we found a clear research gap in the current understanding of knowledge workers' EIs. This is important to note, because the needs, values, and beliefs central to EI (Bird, 1988; Liñán & Chen, 2009), may differentiate between knowledge workers and other types of respondents. We assume that subjective reasons (Baron, 2007; Shane et al., 2003; Veccio, 2003; Shapero, 1982), which derive from knowledge workers' work experience (Liñán, 2004; Boyd & Vozikis, 1994; Elfing et al., 2009) and likely broaden their awareness of career opportunities, play a central role in knowledge workers' EIs. Studies from other than knowledge worker context support our assumption by indicating that the desire to increase self-realization (Furtner et al., 2010; Neck & Houghton, 2006), utilize creative potential (Carsrud & Brännback, 2011; Elfving, 2008; Biraglia & Kadile, 2017), enhance professional and entrepreneurial identities (Ashford et al., 2007), and work-life balance (Lee et al., 2011), and develop a job that fits with personal meanings and values (Anderson & Bidwell, 2019; Bateman & Barry, 2012; Hackman & Oldman, 1975; Hatak et al., 2015), likely act as a stimuli for EIs. In other words, knowledge workers may value subjective noneconomic reasons, which, under certain conditions, lead them to consider entrepreneurship. Since subjective reasons are strong predictors of EI (Block & Koellinger, 2009; Hamilton, 2000; Kolvereid, 1996) and actualized entrepreneurship (Kautonen et al., 2017), exploring them as antecedents of knowledge workers' EIs deserve more attention.

Second, one central subjective and personally meaningful factor is creativity, which reflects an individual's innate need to apply their creative potential to a variety of problems and contexts. In motivation theories, creativity is seen as an expression of an individual's highest psychological need for self-realization and personal fulfillment (Deci & Ryan, 1985; Maslow et al., 1987). In knowledge work, creativity is both an inherent characteristic and a job demand (Alvesson, 2001, 2004; Starbuck, 1992), and, thus, to pursue creativity in day-to-day work is a subjective demand for creative knowledge workers. Even though some scholars have linked creativity with EI (Biraglia & Kadile, 2017; Zampetakis et al., 2011; Hmieleski & Corbett, 2006), it can be argued that creativity is an under-studied driver of EI, although it is a central driver in knowledge work (Alvesson, 2001, 2004; Starbuck, 1992), in the pursuit of entrepreneurial opportunities (Hansen et al., 2011; Ko & Butler, 2007; Krueger & Brazeal, 1994), and in entrepreneurship itself (Lee et al.,

2004; Miller & Le Breton-Miller, 2017; Weinberger et al., 2018; Zhou, 2008). Since creativity is embedded in knowledge work, knowledge workers' desire to pursue creativity is likely to develop over time as they accumulate work experience and expertise (e.g., Boyd & Vozikis, 1994; Elfing et al., 2009; Hatak et al, 2015; Liñán and Chen, 2009). When creative knowledge workers feel their current job is not meeting their potential and personal desires, the likelihood of their searching for alternative work options increases. Thus, entrepreneurship might appear as an attractive opportunity to balance personal desires and work.

The above-identified research gaps and the surprisingly limited research on knowledge workers' EIs confirmed the need to further understand the predictors of EI. Building on Krueger's (1993) EI model and the related body of research (Brännback et al., 2006; Fitzsimmons & Douglas, 2011; Krueger et al., 2000; Saeed et al., 2015; Shapero, 1982; Elfing et. al., 2009), we proposed a research model to link creativity with EI. Specifically, we investigated creativity as a factor giving rise to knowledge workers' EIs, because one's desire to pursue novelty, underpinning an individual's intense interest (Deci & Ryan, 1985), is likely to prompt EIs (Ward, 2004; Biraglia & Kadile, 2017). Likewise, in accordance with the theory (Krueger, 1993; Shapero, 1975; Saeed et al., 2015), we investigated general self-efficacy (GSE), that is, knowledge workers' perceptions that they can execute the actions necessary to engage in entrepreneurship, which, in turn, affects their EI. In addition, we investigated the interaction effect of creativity and GSE in relation to knowledge workers' EIs. We therefore asked: *What is the role of creativity in knowledge workers' EIs?* We employed partial least squares structural equation (PLS-SEM) modeling and related procedures to test the proposed research models, using data collected from 303 knowledge workers in the fields of technology and architecture.

Our study contributes to the entrepreneurship literature as follows: First, by shedding light on knowledge workers' EI as an intentional shift from organizational knowledge worker (employee) to entrepreneurship, our study extends the understanding of EI that has mainly addressed EI among subject groups other than knowledge workers. Second, by investigating creativity as an antecedent of EI, our study moves the focus from entrepreneurial attitudes to the subjective and personally meaningful predictors of knowledge workers' EIs, which have received little attention in the EI literature. Third, our study contributes to the literature on EI by showing that creativity is an important predictor of knowledge workers' EIs and that the impact of creativity on EI is strengthened by GSE.

## **Theoretical Framework**

### ***Knowledge Workers***

It is difficult to define knowledge workers, because they are not a specific group, and more and more worker in contemporary working life can be classified as knowledge worker. In this study, we understand knowledge workers as highly-educated professionals and the key users, producers, and orchestrators of knowledge (Drucker, 1999; Davenport, Thomas & Cantrell, 2002; Dul et al., 2011), who take responsibility for knowledge-intensive and tasks and processes—from knowledge search and creation to application and situation-specific integration (Bosch-Sijtsema et al., 2009; Davenport et al., 2002; Drucker, 1999). The knowledge workers in this study are university graduate engineers and architects who are members of the trade union of the Academic Engineers and Architects in Finland (TEK). As knowledge work is grounded in creativity (Alvesson, 2001, 2004; Florida, 2005; Starbuck, 1992), autonomy, control, and flexibility (Kelloway & Barling, 2000; Södergren, 2002) knowledge workers are often in entrepreneurial roles in organizations, in which they not only use and produce knowledge but also comprehensively adjust their work and contexts (Kelloway & Barling, 2000; Davenport, 2008). They also highly value the personal meaning of their work (Parker, 2002), which reflects the degree to which their psychological needs and life aspirations are satisfied (Deci & Ryan, 1985).

### ***Entrepreneurial Intentions***

EI refers to a state of mind (Bird 1988) and the degree to which an individual directs motivation and attention to execute a desired behavior or objective, such as starting a business venture (Saeed et al., 2015). Thompson (2009, p. 679) defined EI as “a self-acknowledged conviction by a person that they intend to set up a new business venture and consciously plan to do so at some point in the future.” For a knowledge worker, EI is a decisive initiator (Lee & Wong, 2004; Liao & Welsch, 2008) of the entrepreneurial process (Baron, 2007; Bullough & Renko, 2013;

Holley & Watson, 2017; Linan & Chen, 2009; Mosey & Wright, 2007). In such a pre-entrepreneurial stage (Holley & Watson 2017; Mosey and Wright 2007; Ucbasaran et al., 2003), an individual directs attention toward the future course of action—starting a business venture (Shook, Priem & McGee; 2003)—and begins to process it by developing ideas for an entrepreneurial career, exploring entrepreneurial opportunities, constructing an entrepreneurial identity, and thereby becoming engaged in an entrepreneurial process (Laguna, 2013; Liao & Welsch, 2008). Prior research also widely acknowledges that EI is a strong predictor of actualized entrepreneurship (Ajzen, 1991; Fishbein & Ajzen, 1980; Bagozzi et al., 1989; Kautonen et. al., 2013; Krueger et al., 2000; Lee et al., 2011; Thompson, 2009).

In addition to financial success (Dul et al., 2011; Kautonen et al., 2017), the prior literature has identified various antecedents giving rise to EI, such as entrepreneurial passion (Cardon et al., 2005; Shane et al., 2003; Biraglia & Kadile, 2017), innovation (Feldman & Bolino, 2000), independence (Carter et al., 2003; Saeed et al., 2015), and creativity (Biraglia & Kadile, 2017; Zampetakis et al., 2011). The findings by Biraglia and Kadile (2017) showed that creativity and entrepreneurial passion were strong drivers of EI among hobbyist homebrewers and that self-efficacy mediated the link between creativity and EI. Similarly, Lee and associates (2011) identified IT professionals' desire for innovation (comparable to creativity), together with an unfavorable environment, as drivers of their EI, suggesting that an imbalance between these factors leads to an increase their EI. Saeed and co-authors (2015) found self-realization, conceptualized as the desire to achieve self-directed goals and accomplish something novel (Carter et al., 2003; Mueller & Thomas, 2001), as a component that was positively and significantly related with EI among students.

Conceptually, two main theories have led the debate on EI: the theory of planned behavior (TBP) (Ajzen, 1991; Ajzen & Fishbein, 1980) and the entrepreneurial event theory (EET) (Shapero, 1982). Some scholars (Biraglia & Kadile, 2017; Kautonen et al., 2017) have based their theorizing on the social cognitive theory (e.g. Bandura, 2001). Krueger (Krueger, 1993; Krueger et al., 2000, Elfving et. al., 2009) built upon the TBP (Ajzen & Fishbein, 1980) and EET (Shapero, 1982) to explain EI through the components of perceived desirability (relative to attitude in the TPB) and the perceived feasibility or capacity to execute the actions at hand (relative to perceived control in the TPB) (see also Carsrud & Brännback, 2011), which together reflected an individual's attitudes toward entrepreneurship. The formation of EI results of the degree how desirable and feasible an

entrepreneurship appears to an individual, which perceptions are influenced by individual's earlier experiences related with entrepreneurship (Shapero, 1982; Krueger, 1993). Thereafter, several scholars (Brännback et al., 2006; Fitzsimmons & Douglas, 2011; Krueger et al., 2000; Lee et al., 2011; Saeed et al., 2015) have applied this model in explaining EI.

### ***Conceptual Model and Hypotheses***

Drawing from Krueger's model (Krueger, 1993; Elfing et al. 2009), we investigated creativity as a factor representing the degree to which knowledge workers perceive entrepreneurship as being personally attractive (desirability perceptions), thus giving rise to their EIs. Our theorizing was supported by several scholars on EI (Lee et al., 2011; Saeed et al., 2015; Biraglia & Kadile, 2017; Kolvereid; 1996). In contrast, the feasibility perceptions reflected the degree to which knowledge workers believed themselves capable to take the actions necessary to become entrepreneurs (Krueger, 1993; Krueger et al., 2000; Shapero, 1982), which is often conceptualized as domain-specific entrepreneurial self-efficacy (e.g., Biraglia & Kadile, 2017; Fitzsimmons & Douglas, 2011; Saeed et al., 2015; Zhao et al., 2005). However, in this study, we use the term general self-efficacy (GSE), which we will discuss in more detail in the following sections. Theory has implied that a sufficient level of desirability and feasibility can explain EI (Shapero, 1982; Krueger, 1993), meaning that the desired entrepreneurial behavior (EI) needs to be both desirable and feasible (Krueger & Brezeal, 1994), but which one dominates is situational. In the following sections, we present our theorizing on knowledge workers' EI in more detail.

### ***Creativity and Knowledge Workers' Entrepreneurial Intentions***

Creativity has been defined as an individual's intrinsic demand and desire to pursue novelty by creating new ideas and then applying those ideas to demonstrate originality in their work and solve a variety of problems (Ettlie & O'Keefe, 1982; Tierney et al., 1999). As creativity is central in knowledge work (Dul et al., 2011; Alvesson, 2001, 2004; Starbuck, 1992) and knowledge intensive careers (Parker, 2002; Södergren, 2002), the need to pursue creativity in a personally rewarding way is inherent to knowledge work and a knowledge- intensive career, and thus an important subjective driver of creative knowledge workers' careers. Evidence has also shown that creativity predicted the EI of students (Hmieleski & Corbett, 2006; Zampetakis, 2008; Zampetakis

et al., 2011) and hobbyists (Biraglia & Kadile, 2017), indicating that creative individuals were more likely to pursue EI. Creativity was also central in capturing entrepreneurial opportunities (Ko & Butler, 2007) and in self-employment (Feldman & Bolino, 2000).

Based on Krueger (Krueger, 1993; Shapero, 1982), we suggest that the perceived desirability or attractiveness of entrepreneurship is derived from the balance/imbalance between the degree of knowledge workers' creativity (intrinsic demand for pursuing novelty) and the opportunity to actualize it in their current job. This idea aligns with the creativity theories (Amabile et al., 1996; Woodman et al., 1993), which suggest that an individual's creativity at work is influenced by individual (intrinsic) factors and perceived work environment factors. Hence, knowledge workers may perceive their current work environment or circumstances as too limited to satisfy their creative potential and personal self-realization needs, which, under specific circumstances, is likely to increase the attractiveness of entrepreneurship (i.e., their intentions to shift from employment to entrepreneurship) to fulfill their psychological needs (Deci & Ryan, 1985). This argument is supported by the EET (Shapero (1975, 1982), which suggests that the specific life incidents that alter an individual's perceptions, either of their conditions at work (e.g., unemployment) or their subjective circumstances, are likely to increase their EI (Krueger 1993; Krueger et al., 2000; Shapero, 1982). For knowledge workers, such an altering event might be caused by the limited opportunities to pursue creativity in their current employment.

Since creativity is an intrinsic and self-determined drive for creative individuals (Barron & Harrington, 1981), starting up a firm may appear to them an attractive career opportunity (Gorgievski et al., 2010; van Praag & Versloot, 2007), offering stimulation and challenge (DeTienne & Chandler, 2004; Shane & Nicolaou, 2015; Ward, 2004) and promising to satisfy their psychological needs and life aspirations (Deci & Ryan, 2008). This, in turn, implies an intention to transition from being a knowledge worker (employee) to becoming an entrepreneur. Specifically, the higher the knowledge workers' creativity, i.e. desire to pursue creativity is, the more attractive the entrepreneurship is likely to appear, which positively affects knowledge workers' EIs. On this basis, we posited the following hypothesis:

*Hypothesis 1: Creativity is positively related to knowledge workers' entrepreneurial intentions.*

### ***General Self-Efficacy and Knowledge Workers' Entrepreneurial Intentions***

As with the theory (Krueger, 1993; Krueger et al., 2000; Shapero, 1982) and prior research on EI (Ajzen, 1991; Ajzen & Fishbein, 1980), the desirability or attractiveness of entrepreneurship also requires an individual's belief that she/he can execute the necessary actions to support the actual EI. In this study, we use the term general self-efficacy (GSE), which is defined as the "belief in one's overall competence to effect requisite performances across a wide variety of achievement situations" (Chen et al., 2001, p. 63), as a feasibility factor. GSE is a trait-like dimension of self-efficacy, which accumulates across a person's life span in different task domains (Chen et al., 2001; Eden, 1988; Gardner & Pierce, 1988; Judge et al., 1998). For example, Laguna (2013) highlighted the need to study GSE in relation to entrepreneurship, because entrepreneurs differ from non-entrepreneurs in this area (see also Markman et al., 2005). In this regard, entrepreneurial knowledge workers can be associated with entrepreneurs in general. In earlier research also, GSE was associated with EI (Wang et al., 2016), career choices (Johnson et al., 2008), and entrepreneurial behavior (Markman et al., 2002; Markman et al., 2005).

As entrepreneurship may appear not only as a desired career but also as a remarkable challenge for organizational knowledge workers who intend to transition to entrepreneurship, knowledge workers with high levels of GSE are the most likely to develop EIs because they view themselves as capable of taking action in a variety of task domains (Bandura, 1993) and challenging circumstances (Chen et al., 2001; Jerusalem & Schwarzer, 1992; Stajkovic & Luthans, 1998). In other words, the entrepreneurship appears feasible to the knowledge workers. GSE is an appropriate self-efficacy concept to associate with knowledge workers, who have accumulated their work experience in organizational work roles, and thus have also developed GSE (Chen et al., 2001; Judge et al., 1998). Therefore, the knowledge workers who hold a high level of GSE are more likely to consider entrepreneurship. On this basis, we posited the following hypothesis:

*Hypothesis 2: General self-efficacy is positively related to knowledge workers' entrepreneurial intentions.*

#### ***Moderation Effect Model: General Self-efficacy as a Moderating Variable***

As scholars have noted, the relationship between the antecedents and EI is complex (Shapero, 1982; Krueger, 1993; Krueger et al., 2000; Elfing et al., 2009) and contextual (Elfing et al., 2009).

Shapero (1982) presented the idea that desirability perceptions and feasibility perceptions most likely interact. Fitzsimmons and Douglas (2011) empirically showed that entrepreneurial attitudes (desirability) and entrepreneurial self-efficacy (feasibility) interact. Likewise, Lee and associates (2011) found that self-efficacy positively moderates between IT professionals' satisfaction and EI. Further, Elfing and associates (2009) suggested that desirability and feasibility perceptions are reciprocally related (e.g. Elfing et al., 2009; Brännback et al., 2006), implying that they affect each other. Likewise, Bandura (1986) postulated that individuals' self-efficacy beliefs play a role in their formation of interests and related expectations. Given that individuals' beliefs around their capability develop with accumulated knowledge and expertise (Liñán & Chen, 2009; Shapero, 1982), it can be assumed that desirability and feasibility perceptions interact (Elfing et al., 2009).

On the above basis, we theorized that GSE would moderate the relationship between knowledge workers' creativity and EI and that the moderation effect would be positive. Specifically, GSE would strengthen the link between creativity and EI. Since knowledge workers differ in their levels of confidence (perceived feasibility), the link between creativity and EI would depend on GSE, in the sense that a high degree of GSE would strengthen the effect of creativity on EI. Conversely, a low degree of GSE would weaken the impact of creativity on EI. We therefore posited the following hypothesis:

*Hypothesis 3: General self-efficacy moderates the relationship between knowledge workers' creativity and entrepreneurial intention: The higher the general self-efficacy, the stronger the positive relationship between creativity and entrepreneurial intention.*

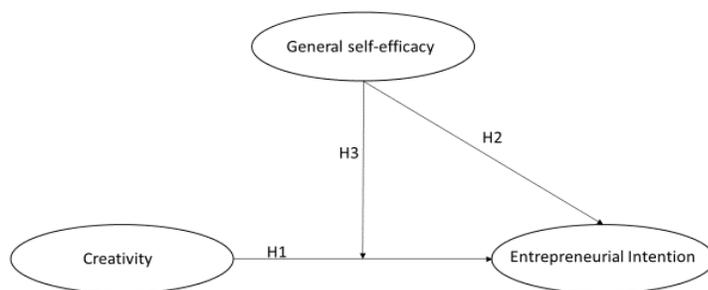


Figure 1 depicts this conceptual model.

## Methods

### *Data and Descriptive Statistics*

We obtained our data from Finnish organizational knowledge workers who were members of the trade union of Academic Engineers and Architects in Finland (TEK), via a web-based questionnaire from March to May 2016. The respondents were university graduate knowledge workers (Atkins, 1999; Rüdiger & McVerry, 2007), who often held expert and leading positions in the fields of technology and architecture. After distributing 4,940 questionnaires, we received 423 responses, resulting in a response rate of 8.6%, which was typical for external web-based surveys involving TEK members. The sample of the present study (N = 303) involved respondents who were both organizational knowledge workers and employees (we excluded entrepreneurs and student respondents). We also excluded responses with missing values.

The descriptive statistics were as follows: of the respondents (N = 303), 29.0% (88) were female and 71.0% (215) were male. In terms of education, the proportions of respondents were as follows: 4.0% (12) held a bachelor’s degree, 81.8% (248) held a master’s degree, and 14.2% (43) held a doctoral degree. In relation to age, the proportions of respondents were as follows: 12.6%

(38) were 29 years old or younger, 23.8% (72) were 30–39, 26.7% (81) were 40–49, 21.1% (64) were 50–59, and 15.8% (48) were 60 years or older.

### *Assessment of Bias*

Our research design justified the appropriateness of self-reported measures, since our focus was on the subjective and nonmonetary predictors of EI, and the respondents themselves were the best people to assess these. Specifically, creativity, self-realization demands, intentions, and satisfaction are subjective issues, and only the respondents were aware of what they experienced, felt, thought, and intended in these respects (Conway & Lance, 2010; Shalley et al., 2009). Nevertheless, in the design and administration of the survey, we considered the risk of common method bias (CMB) in various ways. We insured that the respondents' answers were confidential (Tsai & Ghoshal, 1998), which was likely to reduce the possibility that they would alter their answers to align with others' expectations. In addition, as members of the TEK, the respondents represented a variety of organizations, which was also likely to mitigate the risk of CMB. The scale items used in the survey were improved with the help of practitioners in the field, which enabled us to incorporate clear and proper grammar and keep the survey compact (MacKenzie & Podsakoff, 2012). Furthermore, the respondents assessing the concrete constructs were highly educated experts and experienced in the topic, which reduced the possibility of CMB (MacKenzie & Podsakoff, 2012). The possibility of CMB was further reduced by varying the anchoring of the scales for the independent variables (creativity and GSE) and the dependent variable (EI) (MacKenzie & Podsakoff, 2012). Finally, the empirical collinearity- tests (Kock, 2015) in PLS indicated the absence of CMB, as all the VIF (Variance Inflation Factor) values at factor level (Appendix B) undercut the threshold value of 3.3 (Kock, 2015).

In accordance with Rogelberg et al. (2003), we assessed non-response bias by considering later respondents as active non-respondents and comparing the means of key variables between early and late respondents. The independent samples t-test showed no differences between early and late respondents (the first and the last 30% to take the survey) in any of the constructs.

## *Measures*

We used multi-item measures for each construct and constructs that were based on existing measures in the literature (assessing them with a 7-point Likert scale). Appendix A displays the wording, items, and scales of the key variables.

To assess EI, we used two items adapted from the scale developed by Saeed and colleagues (2015). In line with Thompson (2009), we used a continuous scale. These items assessed implementation intention regarding entrepreneurial goals, that is, the intention to become an entrepreneur (Gollwitzer & Brandstätter, 1997).

We measured creativity using a seven-item scale adapted from Tierney et al.'s (1999) study. We excluded one item to improve the construct reliability and validity. The scale addressed the respondents' desire to generate novel and useful ideas, capture opportunities to develop novel products and processes, solve problems, demonstrate originality in their work, and take risks in applying their ideas at work.

We assessed GSE using the seven-item scale developed by Chen and colleagues (2001) to measure the respondents' confidence regarding a variety of challenges and situations in their working life.

Regarding demographic variables, we controlled for education, which is an important human capital factor that has been shown to influence EI (Davidsson & Honig, 2003; Fitzsimmons & Douglas, 2011). The education level assessment contained three categories: 1 = bachelor's degree, 2 = master's degree, and 3 = doctoral degree. We also controlled for the respondents' age using five age categories: 1 = 29 years or younger, 2 = 30–39, 3 = 40–49, 4 = 50–59, and 5 = 60 years or older. We also assessed gender (1 = female, 2 = male) because it could influence EI; for example, men have tended to consider entrepreneurship more often than women (Laguna, 2013).

In addition, we controlled for knowledge workers' career satisfaction, by using three items adapted from the scales developed by Greenhaus and colleagues (1990), Heslin (2005), and van den Born and van Witteloostuijn (2013), because low satisfaction was a likely reason for job shift (Griffeth et al., 2000; Lee et al., 2011; Nauta et al., 2009). We also controlled for the subjective norms variable that was associated with EI (Ajzen, 1991; Ajzen & Fishbein, 1980) by adapting two items from Astuti and Martdianty's (2012) scale: "My family would support me as an entrepreneur"

and “My friends would support me as an entrepreneur.” Finally, we controlled for the respondents’ family background, that is, the respondents’ entrepreneurial family experience, which may have affected their EI (Jayawarna et al., 2013; Nauta et al., 2009; Zellweger et al., 2011). This was addressed with one item: “My family (parents, siblings) has experience of entrepreneurship,” for which respondents could choose either “yes” or “no.”

## **Results**

The descriptive statistics and the results of the correlation analysis are presented in Table 1. To test the hypotheses, we used PLS-SEM (version 3.2.7 of SmartPLS; see Ringle et al., 2015) and the processes suggested in the literature (Hair et al., 2014). The PLS is an appropriate method for non-normally distributed data (Hair et al., 2014), such as ours, which is often the case when subjective and attitudinal variables are under investigation. The results of the Kolmogorov-Smirnov tests confirmed our decision. To assess the model’s predictive accuracy ( $R^2$ ) and the significance of the structural paths, we employed the PLS bootstrapping procedure. First, we assessed the reliability and validity of the measurement model, and thereafter we used the structural model to test our hypotheses.

### ***Measurement Model***

We assessed both internal consistency and discriminant validity to test the measurement model. After a series of tests, we found that the model demonstrated good validity and reliability for the operationalization of the selected concepts.

The construct reliability (CR) and convergent validity for all constructs had high internal consistency (see Appendix A). All constructs had CR values above the 0.7 threshold (Bagozzi & Yi, 1988), and all the average variance extracted (AVE) values exceeded the 0.5 cut-off (Fornell & Larcker, 1981). Likewise, the loadings of all the items were sufficiently high and statistically significant, which meant that they all related to the specific constructs they were intended to measure (Appendix A).

To test for discriminant validity, we used the heterotrait-monotrait (HTMT) ratio and the related procedure suggested in the methodological literature (Henseler et al., 2016; Hair et al., 2017). The results showed that the HTMT values for all constructs were below the threshold value of 0.90. The computed bootstrapping procedure also showed that all HTMT values were significantly different from 1. These results indicated that the constructs in the model differed from each other. See Appendix A for the factor loadings, CRs, and AVEs.

Given the above tests, the measures demonstrated validity and reliability in operationalizing the study's variables.

Table 1: Means, Standard Deviation and correlations of the studied variables

	Mean	SD	1.	2.
1. Creativity	4.8766	.94678		
2. Entrepreneurial intention	2.5941	1.61386	.324**	
3. General self-efficacy, GSE	5.8062	.71766	.464**	.237**

\*\* Correlation is significant at the 0.01 level (2-tailed)

### ***Research Model***

As Table 2 below illustrates, the main effect model was able to explain 26.7% of the variance in EI. First, we found that creativity significantly and positively related to EI ( $B = 0.260$ ;  $p = 0.001$ ), which supported Hypothesis 1. By contrast, GSE did not significantly relate to EI, and therefore Hypothesis 2 was rejected. Of the control variables, age ( $B = -0.139$ ,  $p = 0.004$ ) significantly and negatively related to EI. Likewise, knowledge worker satisfaction ( $B = -0.201$ ,  $p = 0.002$ ) significantly and negatively related to EI, and subjective norms ( $B = 0.294$ ,  $p = 0.001$ ) significantly and positively related to EI. Finally, the effect of entrepreneurial family experience ( $B = 0.091$ ,  $p = 0.054$ ) was insignificant. See Table 2 for the results of the statistical analysis.

Table 2: Results of the Hypothesised Model

Path	Main effect model	Moderation model
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Creativity à Entrepreneurial intention	0.260 (0.001)	0.247 (0.001)
<b>Independent variables</b>		
General self-efficacy à Entrepreneurial intention	0.100 (0.109)	0.183 (0.002)
Creativity * GSE à Entrepreneurial intention	-	0.128 (0.004)
<b>Control variables</b>		
Age à Entrepreneurial intention	-0.139 (0.004)	-0.141(0.003)
Education à Entrepreneurial intention	0.034 ((0.467)	0.022 (0.653)
Gender à Entrepreneurial intention	0.086 (0.099)	0.091 (0.073)
Satisfaction à Entrepreneurial intention	-0.201(0.002)	-0.217(0.001)
Subjective norm à Entrepreneurial intention	0.294 (0.001)	0.281(0.001)
Entrepreneurial family experience à Entrepreneurial intention	0.091(0.054)	-0.099(0.037)
<i>R</i> <sup>2</sup> for Creativity	0.267	0.295

Notes: P value for statistical significance is reported in parentheses

The moderation model was able to explain 29.5% of the variance in EI. Regarding the interaction effect model, we found that the interaction term ( $B = 0.128$ ,  $p = 0.004$ ) significantly and positively related to EI, supporting Hypothesis 3. Of the control variables, age ( $B = -0.141$ ,  $p = 0.003$ ) significantly and negatively related to EI, whereas the effect of gender was insignificant. Likewise, knowledge worker satisfaction ( $B = -0.217$ ,  $p = 0.001$ ) significantly and negatively related to EI, whereas subjective norms ( $B = 0.281$ ,  $p = 0.001$ ) significantly and positively related to EI. In addition, entrepreneurial family experience ( $B = -0.099$ ,  $p = 0.037$ ) significantly and negatively related to EI.

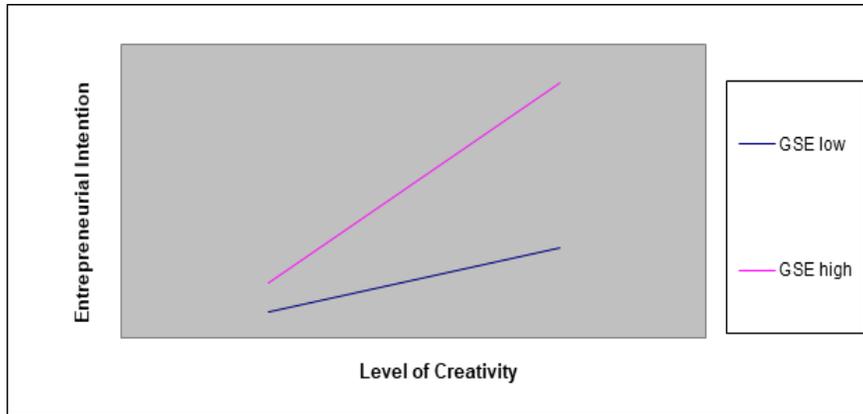


Figure 2: Moderation effect

The interaction term was significant ( $B = 0.128$ ,  $p = 0.004$ ), which was our primary interest in the moderation effect model (Hair et al., 2017). We also found that the coefficients of determination ( $R^2$ ) were higher in the moderation model (29.5) compared to the main effect model (26.7), thus implying the moderately stronger model.

The interpretation of the moderating effect is illustrated in Figure 2 below. Specifically, the influence of GSE on the relationship between creativity and EI made positive relationships even stronger when the GSE was high. The influence was lower when the GSE was low; in other words, with low levels of GSE, increases in creativity had less influence on EI compared to situations with high levels of GSE.

## Discussion and Conclusions

While the value of entrepreneurship to individuals and economies is undeniable, and the EI of individuals has often been the subject of previous research, our study generated a new perspective by examining organizational knowledge workers' EIs and the role of creativity in the formation of their EIs. This is a perspective that has been rather overlooked in current research on EI and, to the best of our understanding, this study was among the first attempts on this topic. Our results demonstrated that creativity is indeed an important predictor of knowledge workers' EI,

whereas we found no direct link between GSE and EI. However, the results of the moderation effect model demonstrated that the relationship between creativity and EI is dependent on GSE. Although the moderation effect of GSE is an important finding, we can also conclude that creativity is an important predictor of EI. In the following, we discuss theoretical and managerial implications of the study in more detail.

### ***Theoretical Implications***

First, by shedding light on knowledge workers' EIs, our research adds to the increasing stream of research that has already moved from student samples to investigate other groups of subjects, such as employees (Hatak et al., 2015; Kautonen et al., 2013; Lee et al., 2011), the unemployed (Laguna, 2013), and hobbyists (Biraglia & Kadile, 2017). With our findings from subjects in organizational knowledge-intensive careers, we extended the understanding of knowledge workers' EIs and thus addressed the central research void in the EI area. Our findings are topical, as knowledge workers are potential entrepreneurs for whom the opportunities for entrepreneurship are increasingly varied in the contemporary economy.

Second, by investigating creativity as a predictor of knowledge workers' EI and empirically showing this to be true, our study adds to the research on EI (Krueger, 1993; Brännback et al., 2006; Fitzsimmons & Douglas, 2011; Krueger et al., 2000; Shapero & Sokol, 1982; Saeed et al., 2015). Specifically, while earlier studies focused on entrepreneurial attitude as a factor affecting EI (e.g., Fitzsimmons & Douglas, 2011; Krueger et al., 2000), our findings provided support for the hypothesis that creativity is an important predictor of knowledge workers' EIs. As creativity is a personally meaningful and subjective demand, it can be understood as reflecting the attractiveness of entrepreneurship in the formation of knowledge workers' EIs. Indeed, pursuing creativity is central in knowledge work and a subjective and intrinsic demand for creative knowledge workers. By focusing on creativity as an important subjective and nonmonetary predictor of EI, we highlight that the subjective reasons for EI are especially important in the context of knowledge work in contemporary working life. As the opportunities for entrepreneurship are increasingly varied, and people engage in different types of entrepreneurship for different reasons (Jayawarna et al., 2013; Kautonen et al., 2017), it is important to broaden the view on the antecedents of EI and consider also the subject-related and contextual aspects (e.g., Elfing et al., 2009). Given that creative

knowledge workers accumulate their professional experience across their entrepreneurial roles in organizations, which broadens their awareness of entrepreneurial career opportunities (Liñán & Chen, 2009) and possibilities to develop work that satisfies their personal self-realization needs, the antecedents for EI are likely subjective and diverse. Finally, our findings are consistent with studies from contexts other than knowledge workers, which showed that the high level of creativity predicted EI (Biraglia & Kadile, 2017; Zampetakis et al., 2011; Ward, 2004).

Third, our finding that there was no direct link between GSE and EI suggests that creativity in the main effect model explained EI. This, in turn, indicated the likeliness of the moderation effect (e.g., Baron & Kenny, 1986), suggesting that interaction is effective only for some people. Therefore, our finding that GSE significantly and positively moderated the relationship between creativity and EI demonstrated that the highly creative knowledge workers, who hold strong beliefs that they can take the intended action to engage in entrepreneurship (feasibility perceptions), are the most likely to take initiative on their EIs. Our findings also showed that the strengthening effect of GSE is much stronger when it is high, whereas the strengthening effect is weaker when GSE is low. This finding contributes and adds to the research on EI suggesting that the relationship between feasibility and desirability is complex (Shapero, 1982; Elfing et al., 2009), by shedding light on the interaction effect of creativity and GSE on knowledge workers' EIs. Even though we used the GSE dimension instead of the domain-specific entrepreneurial dimension, our results contribute to the literature that has started to investigate more complex models, such as the mediation (Biraglia & Kadile, 2017; Lee et al., 2011) and moderation (Fizimmons & Douglas, 2010; Lee et al., 2011) effect models as well as reciprocal models (Elfing et al., 2009), by providing empirical evidence of the interaction of creativity and GSE in relation to EI among knowledge workers.

By investigating GSE as a feasibility factor, we suggested that GSE is an appropriate concept in the context of knowledge workers, who accumulate not only their knowledge and expertise but also their confidence (feasibility) across their organizational careers. Thus, GSE might be a prominent feasibility factor for explaining knowledge workers' EIs in the contemporary, rapidly changing work environment. This is particularly relevant for knowledge workers intending to move from organizational careers to more challenging entrepreneurial ones because this shift represents a step into the unknown and demands belief in one's overall competency to take actions

across a variety of situations and circumstances (Chen et al., 2001). In this regard, our contribution is an important extension to the literature on EI.

### *Managerial Implications*

While our study importantly expands the research on EI among knowledge workers intending to transition from organizational employment to self-employment, it also has managerial implications for such knowledge workers.

Since creativity is an intrinsic and subjective drive and a significant determinant of knowledge workers' EIs, knowledge workers typically demand sufficient autonomy, flexibility, and challenge to fulfill their self-realization needs. Therefore, organizations employing knowledge workers should be aware of the individual competencies, knowledge, experience, and subjective demands of these employees to fully utilize their potential and enhance organizational performance. Moreover, for organizations aiming to avoid high turnover of their most creative employees, who are perhaps critical talents, our study suggests that managers should develop practices and support mechanisms that channel the creative potential of these key employees in order to foster overall organizational goals. In this respect, various talent management practices (Vaiman et al., 2021) could be applied in organizations.

For creative knowledge workers, our finding that GSE is a central individual determinant that strengthens the impact of creativity on EI is important. This suggests that the more feasible the knowledge workers envision entrepreneurship to be for them, the more strongly their desire to pursue creativity leads to EI. Specifically, the GSE is an essential characteristic of creative knowledge workers intending to engage in entrepreneurship. As the previous studies have shown, it is a central personal resource for dealing with changing and stressful career demands and circumstances (Chen et al., 2001; Markman et al., 2005). Hence, on the basis of our findings, we suggest that the conscious development of such a personal resource, not only through training, education, and application but also through a broad range of work experiences in a variety of contexts, is a necessity for engaging in entrepreneurship.

### *Limitations and Future Studies*

Inevitably, our research has some limitations. First, while most earlier studies investigated entrepreneurial attitudes as factors giving rise to EI, we understood creativity, as a subjective and intrinsic demand of knowledge workers to express themselves creatively and pursue self-realization, as a reason for their EIs. Although our study addressed an important and overlooked aspect of knowledge workers' EIs, that is, creativity, and thereby enriches our understanding on EI, our results are not directly comparable with the earlier studies focusing on entrepreneurial attitudes, due to the use of different concepts. However, in addressing an important intrinsic demand and subjective driver of EI, and thus broadening the view on knowledge workers' EIs, the contributions of our study align with the research by Elfing et al. (2009), who questioned the dominating EI models. Therefore, future studies and research models should consider not only entrepreneurial attitudes but also subject-related contextual needs and aspects.

Second, our study is limited in that we focused on EI related to a traditional type of entrepreneurship—starting and running a firm of one's own—and ignored other forms of entrepreneurship in contemporary economies, such as freelancing, independent contracting, and self-employed professionals, which have been recognized as “neglected by researchers as a form of small business activity” (Kitching & Smallbone, 2012, p. 74). Besides the more visible business ventures, becoming individual professionals (“IPros”) is a conscious career choice for an increasing number of professionals, who tend to be high earners and actively take responsibility for the development of their working lives (McKeown, 2015). As a recent study by McKeown and Pichault (2020) has shown, these contemporary forms of entrepreneurship are increasingly used; therefore, future studies on EI should consider not only the traditional manifestation of entrepreneurship as a business venture but also the various other forms of entrepreneurship available for professionals.

Third, even though we had a rather well-represented sample of highly educated individuals in the field of engineering (individual members of a trade union), we only examined highly educated Finnish individuals, which might have affected the results, especially as cultural differences in EI are likely (Liñán & Chen, 2009). It is important to note that entrepreneurship among the members of the trade union in our sample was rather low (approximately 6%), because highly educated engineers and architects in Finland have traditionally been employed by companies and organizations; hence, self-employment has not been a typical career choice for them. Its popularity is increasing, however, as highly educated professionals increasingly value autonomy, self-actualization, and opportunities to use their creative potential and capacities in a variety of

work environments. Moreover, Finland has a relatively stable market economy, with strong social support systems, and there is relatively little risk in becoming an entrepreneur, although the small internal market could limit the expected returns and growth compared to other areas. Combined with entrepreneurs' diminished access to social security in Finland, the organizational career path might be preferable in terms of stability and low risk. Sometimes, the nonmonetary drivers of EI outweigh the monetary drivers (increases in income), as studies have shown (Hamilton, 2000; Kautonen et al., 2017), which could be especially true for more creative, highly educated engineers who feel a greater need for self-realization than for securing a high income. Consequently, future studies should address personal (nonmonetary) factors in parallel with monetary ones.

Fourth, a limitation is also that we used satisfaction as a control variable. It might have been potential and interesting independent variable, as our findings (negative impact on EI) and earlier studies from other than EI research contexts showed. Specifically, the evidence showed that low satisfaction (Griffeth et al., 2000; Nauta et al., 2009; Hatak et al., 2015) and imbalance between personal and work environment factors (Lee et al., 2011) are likely to lead to EI and career shifts. While the role of satisfaction is an interesting subject of research, we considered such a research model theory-wise as distinct from our current research model that focused on the role of creativity in knowledge workers' EIs. Consequently, future studies should involve such work environment-related factors also while investigating the factors affecting EI.

Finally, while our goal was to investigate the personal and nonmonetary aspects of EI among highly educated organizational employees, it could have been interesting also to involve some materialistic variables in perceived feasibility. While it is likely that EI is often driven by personal needs, such as self-realization (Carsud & Brännback, 2011; Elfving, 2008), and work-life balance (Hatak et al., 2015; Lee et al., 2011), future studies could investigate a broader set of factors in tandem with subjective non-monetary reasons for EI among a variety of respondents; for example, respondents from different professional fields and industries may have different subjective demands in terms of EI.

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#### **APPENDIX A: measurement items, CR and AVE**

<i>Concept</i>	<i>Item</i>	<i>Factor loading</i>	<i>Chronbach's Alpha</i>	<i>CR</i>	<i>AVE</i>
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Creativity	<i>Please indicate to what extent the following statements characterize you. (1 = never, 4 = sometimes, 7 = always)</i>		.896	.922	.665
	I take risks in terms of producing new ideas in doing my job	0.749***			
	I solve problems that had caused others difficulty	0.748***			
	I try out new ideas and approaches to problems	0.826***			
	I identify opportunities for new products/processes	0.802***			
	I generate novel and operable ideas	0.995***			
	I generate ideas revolutionary to my field	0.745***			
	<i>How well do the following statements describe you? (1 = the statement does not describe you at all, 7 = describes you very well)</i>		.892	.914	.606
General self-efficacy (GSE)	I will be able to achieve most of the goals that I have set for myself.	0.650***			
	When facing difficult tasks, I am certain that I will accomplish them.	0.782***			
	In general, I think that I can achieve outcomes that are important to me.	0.750***			
	I believe I can succeed in almost any endeavor to which I set my mind.	0.780***			
	I will be able to successfully overcome many challenges.	0.824***			
	I am confident that I can perform effectively in many different tasks.	0.798***			
	Even when things are tough, I can perform quite well.	0.847***			
EI	<i>To what extent you agree with the following statements regarding entrepreneurship? (1=completely disagree; 7= completely agree)</i>		.921	.961	.926
	I will make every effort to start and run my own firm. (1 = completely disagree, 7 = completely agree)	0.963***			
	I have got a firm intention to start a firm someday. (1 = completely disagree, 7 = completely agree)	0.962***			

\*\*\* p < 0.001

EI = Entrepreneurial intention

CR = Construct reliability

AVE = Average Variance Extracted

#### APPENDIX B: Collinearity VIFs

<b>Entrepreneurial intention</b>	<b>Creativity</b>	<b>General self-efficacy</b>	<b>Satisfaction</b>
1.000	1.274	1.274	-
1.093	-	1.137	1.093
1.136	1.130	-	1.030
-	1.274	1.332	1.056