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Creativity, innovation and employment growth in sub-Saharan Africa

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Abstract

Purpose – Although employees' creativity is vital for firm innovation and overall performance, little is done to examine the potential association between creativity and employment. This paper investigates the contribution of employees' creativity, process and product innovations to firm-level employment growth.
Design/methodology/approach – The authors use data from World Bank Enterprise Survey and Innovation Follow-up Survey on 9503 firms covering the period 2012–2015 in 11 countries from sub-Saharan Africa and Heckman's two-stage estimation model.
Findings – This study's results indicate a positive role of creativity on firm-level employment growth. In addition, the authors find evidence for a complementary effect arising from the combination of creativity with managerial experience, staff level of education and their associated skills, in contrast, combining creativity with internal or external R&D results in a substitution effect. Interestingly, these synergy effects are pronounced for SMEs but absent for large firms.
Practical implications – Policy makers in developing economies of sub-Saharan Africa should stimulate company management to use free time offered to employees to be creative in the workplace as one of their key strategies to stimulate employment growth. This strategy is expected to be particularly fruitful among SMEs having some managerial experience and skilled stuff.
Originality/value – In contribution to innovative work practices and workforce creativity, the authors demonstrate that providing employees with free time could be an alternative way to enhance the focal firms' performance.

Keywords Firm size, Free time, Open innovation, R&D, Synergy effect
Paper type Research paper

1. Introduction

Innovation relies on many factors, including the state of knowledge, *individual creativity*, public policy, economic institutions, and social norms (Sohn and Jung, 2010; von Graevenitz *et al.*, 2016). Previous studies indicate that creative employees can generate new knowledge that ultimately fosters economic growth (Romer, 1990; Teodoridis *et al.*, 2019). Drucker (1993) argues that innovations built on brilliant ideas possibly surpass other innovations. The author also points out that "*bright ideas are the riskiest and least successful sources of*

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innovative opportunities." Creativity and innovation are essential for a firm's success (Sohn and Jung, 2010; Anderson *et al.*, 2014). This study examines the contribution of employees' creativity and process and product innovations to firm-level employment. A handful of studies affirm the relevance of creativity to organizational success (Dubina, 2005; Sohn and Jung, 2010; Anderson *et al.*, 2014; Navaresse *et al.*, 2014; Hua *et al.*, 2015; Groza *et al.*, 2016; Castillo-Vergara *et al.*, 2018; Cheng and Yang, 2019) and innovation performance (Gupta and Singhal, 1993; Abimiku, 2016), but its measurement remains problematic theoretically and empirically. In addition, previous studies do not consider whether creativity can boost firm-level employment growth.

Creativity is essential in organizational research (Sohn and Jung, 2010; Aschauer *et al.*, 2021) and complements firm-level resources to enhance performance (Castillo-Vergara *et al.*, 2018). While employee creativity plays a vital role, allotting free time can stimulate knowledge growth within firms. We suggest that providing employees *free time* for creative thinking could contribute to firms' internal knowledge development and lead to higher performance returns. Moreover, it can provide room for knowledge accumulation, recombination, and future exploitation (Dosi and Nelson, 2010; Savin, 2021).

While generating new ideas in the workplace rests exceptionally on the quality of human capital, complementing these ideas with other firm resources has been demonstrated to enhance firm performance. Moreover, empirical literature shows the complementarity of knowledge inputs (Bianchini *et al.*, 2018; Wang *et al.*, 2021). Stressing the relevance of employee creativity to firm performance, this study uses *free time* offered to employees in the workplace as a proxy for creativity and measures its impact on firm-level employment growth. Free time has been empirically investigated to stimulate innovation-based performance (see van Uden *et al.*, 2017; Medase, 2019), but no study has analyzed its role in employment growth.

There is a notion that sub-Saharan Africa has the youngest working age but a relatively high unemployment level (Fox and Thomas, 2016; Sparreboom, 2017). Therefore, the public and private sectors must implement efforts to combat regional unemployment and poverty. In addition, since R&D spending and on-the-job training are very costly, stimulating creativity could be one way to foster firms' innovative performance at a relatively low cost. Thus, while employment growth indicates more opportunities for young workers, management can use their talent by giving them free time. Thus, we presume that the free time strategy can be valuable for exploring new market needs and growing firms' revenue streams.

Our study contributes to the literature in three ways: First, it establishes the link between *free time,* a proxy for creativity, and employment growth. Thus, we demonstrate that offering *free time* to employees supports idea generation, with a consequential effect on firm growth. Second, the study demonstrates that providing employees free time could be an alternative way to develop internal knowledge via skilled and educated staff in expanding focal firms. Third, offering employees the time to be creative in the workplace supports managerial experience in influencing employment growth. The synergistic effect arising from managerial experience and creativity further reinforces the view in management studies on the importance of managers to organizational performance.

The remainder of this paper is organized as follows. Section 2 provides a literature review. Section 3 describes the data and empirical strategy, and Section 4 presents our results. Finally, Section 5 presents the policy implications and concludes the paper.

2. Literature overview and hypotheses

While the literature has noted the presence of *free time* in the workplace, assessment of how it enhances employees' creativity is limited. *Free time* allows employees to relate positively to new ideas, enhancing their creativity and innovation output (Burkus and Oster, 2012; van

Uden *et al.*, 2017; Medase, 2019). However, creativity can only enhance performance once a firm nurtures it, inspires employees to pursue new ideas and provides employees with the necessary resources (Levitt, 2002; Muñoz-Doyague *et al.*, 2008). While nurturing personal development might become essential for employees' knowledge growth, measuring this empirically is vital to this study. While this section documents reviews linking creativity to different knowledge-related variables, it also sparsely reviews the empirical accounts of the nexus between innovation and employment growth.

Although recent firm-level studies have focused on the relationship between creativity and innovation (Ek Styvén *et al.*, 2022; Collin *et al.*, 2020), less is known about how creativity fosters growth. In the framework of human resource development, scholars have found that the survival of firms is increasingly reliant on the creativity and skills of employees (Jimenez-Jimenez and Sanz-Valle, 2012), capability and workplace learning (El-Kassar *et al.*, 2022; Poell and van der Krogt, 2017). The channel through which creativity contributes to employment can be multifaceted. However, there is no theoretical concept or empirical research linking creativity to employment growth at the firm level. We believe that the skills of employees, and time offered to employees within the workplace to generate innovative ideas, can help foster inclusive organizational performance, especially in employment growth. While employment growth remains a fundamental measure of organizational performance, such performance cannot be attained without the competence and ingenuity of employees. Competence building revolves around organizational activities that foster creativity in employees (Bharadwaj and Menon, 2000; Cropley *et al.*, 2011; Ek Styvén *et al.*, 2022), which we believe include specialized, generalized training and providing slack time for creative thinking. Creativity generates new valuable products, services, processes and ideas in an appropriate context, which can indirectly impact the growth of firms.

Consequently, talented employees can be attracted to high-growth firms (Savin and Novitskaya, 2023). This indicates that firms need creativity to adapt to the dynamic business environment (Nanda and Singh, 2009), which is essential to foster growth. Hence, the development of new products, due to the ingenuity of the organizational workforce, can impact employment growth. The subsequent subsections clarify the channels through which we believe creativity contributes to employment growth.

2.1 Creativity, innovation and employment

Entrepreneurship and innovation are widely considered the most effective tools for stimulating an economy. In particular, the effect of innovation on employment has been the subject of much debate (Baumol, 2004; Soete and Stephan, 2004). On the contrary, employment is an important macroeconomic variable. Regarding innovation and employment growth, there are many studies on developed economies (Hall and Hefferman, 1985; Tether, 2000; Diaz and Tomas, 2002; Evangelista and Savona, 2003; Bogliacino and Pianta, 2010; Gunday *et al.*, 2011; Lachenmaier and Rottmann, 2011; Bogliacino *et al.*, 2013; Harrison *et al.*, 2014; Dachs and Peters, 2014; Cirera and Sabetti, 2019; Horbach and Janser, 2016). However, empirical evidence regarding the effect of innovation on employment is mixed. While it points to product innovation as having a positive effect on employment (see, e.g. Chennells and Van Reenen, 2002; Hall *et al.*, 2008; Smolny, 1998, 2002; Van Reenen, 1997; Calvino and Virgillito, 2016), process innovation sometimes has a job displacement effect (Vivarelli, 2015; Piva and Vivarelli, 2018).

Lack of consensus on the role of innovation for employment is particularly evident for developing countries due to fewer studies available. To the best of our knowledge, only the studies by Cirera and Sabetti (2019), Avenyo *et al.* (2019), Okumu *et al.* (2019), and Medase and Wyrwich (2021) document evidence regarding the effects of innovations on employment growth in sub-Saharan African (SSA) countries. This lack of research in developing countries

is surprising for several reasons. First, innovative activity can enhance firms' absorptive capacity (Cohen and Levinthal, 1989; Egbetokun and Savin, 2014), positively impacting the innovative potential of regions in which these firms are active (Maskell and Malmberg, 1999). Thus, innovation processes and firms could be the basis for catching up and learning the evolution of knowledge-based growth in emerging economies (Medase and Wyrwich, 2021). Moreover, successful innovative firms may grow into "anchor firms" to develop regional innovation systems (e.g. Feldman and Desrocher, 2003).

Creativity refers to thinking about new things, while innovation denotes doing new things (Levitt, 2002). As much as organizational culture shapes human creativity, its social importance is essential for organizational exploration and usage (Weiner, 2000; Levitt, 2002; Navaresse *et al.*, 2014). A major challenge is the measurement of creativity. In an insightful study, Mitchell *et al.* (2003) stress that creativity develops via education and opportunity. Dubina (2005), reviewing facts and figures from *General Electric's* two-year creativity course for its employees, finds that investment increases *by 60% in a patentable idea* for the company. Similarly, Dubina further demonstrated that in *Pittsburg Plate Glass* creativity training, workers who participated in the training exercise *showed a 300% increase* in valuable ideas compared to those who did not participate.

Openness to novel ideas and solutions is vital for innovation projects, especially at the incipient stage (Fagerberg *et al.*, 2005). If creativity can be taught and measured, its optimization should stimulate organizational performance at all levels. We conjecture that the positive impact of creativity on organizational performance could also be contingent on the *free time* available for employees to learn and generate knowledge. However, firms' competitiveness and success rely on a compelling blend of performance strategies (Groza *et al.*, 2016; Cheng and Yang, 2019). These firms' strategies define their uniqueness and distinguish them from others. For example, Nelson (1991, p. 72) argues that differences in organizational performance can be attributed to the ability to generate ideas and innovate *"rather than differences in command over particular technologies that are the source of durable, not easily imitable, differences among firms"*. We contend that such dynamic capabilities could stem from offering *free time* to employees for knowledge development activities. On the other hand, Teece *et al.* (1997) argue that dynamic capabilities rest on firms' capacity to incorporate, develop, and reconfigure internal and external capabilities to address environmental dynamics.

Furthermore, Lazonick (2005) argues that contemporary innovation theory is contingent on "*the resource-based theory of a firm*". This finding suggests that firms' physical and intangible assets underpin their capabilities. Dynamism in knowledge bases reflects the overarching importance of capabilities in innovative learning (Lazonick, 2005). Smith (2005) argued that free time to generate informative knowledge for performance is essential in this dynamism. This is merely because talent and creativity have attracted much debate among economists, economic geographers, and other scholars (Mellander and Florida, 2007). The ability to generate new ideas and innovate (Simon, 2009) are specific resources that are rare, inimitable, non-substitutable, and characterized by value creation. Roy (2018) argues that firms must continuously develop and upgrade their employees' skills and knowledge bases to integrate, build, and reconfigure internal and external competencies that address rapidly changing environments.

Many scholars have argued that *creativity* and innovation are well-connected entities (Govindarajan, 2010; Burus, 2013). Kim and Pierce (2013) identified two forms of creativity: adaptive and innovative. The former relates cognitive thinking to prevailing results and methods, whereas the latter concerns creative thinking that brings about new solutions. Best (1990) termed this a *new competition* because it transforms the era of product and service creation into quality products and services. The interplay between firms' knowledge and creativity could be contingent on the complementarity of employees and firms' goal adaptability (Muñoz-Doyague *et al.*, 2008; Simon, 2009). When a company finds creative employees, it finds an adequate match between employees' long-term career objectives and

overall future goals (Gupta and Singhal, 1993; Navaresse *et al.*, 2014). Our question is how firms can foster creativity in their employees to impact the employment generation. Can management create slack time for idea generation in an organization to stimulate employees' creativity? We presume that maximizing innovation and creativity could rest solely on the quality of human capital (Harrison, 2009) and managerial skills (Egbetokun *et al.*, 2016; Hatzikian, 2015), which are embodiments of knowledge that could drive performance.

Generating ideas or creative thinking is linked to greater innovation (Huselid, 1995; Lane and Lubatkin, 1998; Anderson *et al.*, 2014). Thus, employers tend to instill workers to increase their innovative efforts (Roy *et al.*, 2020). Holmström (1989) argued that only some activities a worker can perform in jobs could produce novel ideas applied to products and processes. Simon (2009) also reiterates that firms should strive to mobilize their employees' creativity as much as possible. Following Holmström and Simon's views, we conjecture that time allotment for creative thinking and effort across competing activities could be vital for overall employee performance. Considering that absorptive capacity is necessary for firms to capitalize on and internalize the complementarity of knowledge (Egbetokun and Savin, 2014), creating an enabling environment and availing workers' time and space for creative thinking could be essential instruments for firms' performance. Moreover, it stresses the importance of another aspect of organizational performance. Lam (2005) documented that this aspect relates to organizational cognition and learning theories, focusing on how organizations develop new ideas to solve innovative and organization-related problems.

Therefore, we formulate the following hypothesis:

H1. Firms that offer free time to employees to generate new innovative ideas experience higher employment growth than firms that do not offer this time.

2.2 Creativity and human capital

Idea generation at the firm level can begin with the workforce and be developed and enriched within organizational processes (Navaresse *et al.*, 2014; Teodoridis *et al.*, 2019). Thus, it is beneficial if the workplace fosters effective interaction and capabilities. On the other hand, creative ideas can be effortlessly repressed by fear of failure, inflexible organizational norms, routines, processes, and methods. Thus, organizational culture and management techniques are crucial to redefine organizational goals to accommodate the distinct forms of employees' ideation.

For instance, Florida *et al.* (2008) linked creativity to economic development using different measures of human capital: university degrees, talent, and technology. Empirically, the link between innovation and human capital is well documented, particularly when compared to innovation and creativity. Leiponen (2005) stressed the importance of human capital in boosting innovation outcomes. Several studies use a wide range of variables to measure employee creativity in workplace performance. Some essential variables for innovation outcomes include managerial experience, education, and training (Roy *et al.*, 2020; Barasa *et al.*, 2017; Danquah and Amankwah-Amoah, 2017; Medase, 2019). However, the lack of creativity in most firms is partly due to enterprises not giving credence to their employees' ideas (Simon, 2009).

We contend that firm growth could be contingent on the idea management system. A firm with a good and functional management system of ideas can reflect a measure of human capital quality. As a conveyor belt for firms' growth, creativity could remain unrealized without the quality of human capital. For instance, Lund Vinding (2006) shows that applying human resource management practices within a firm and developing a close relationship with vertically related actors and knowledge institutions stimulates innovation.

Similarly, Cabello-Medina *et al.* (2011) showed that the uniqueness of human capital positively affects innovation outcomes. However, this performance is contingent on human

resource management practices (Delaney and Huselid, 1996) and social capital. More prominently, the roles of employee empowerment and selection based on learning potential and interpersonal abilities, are crucial (Delaney and Huselid, 1996). Simon (2009) suggests that organizational performance rests mainly on employee performance, while managers only lead. In addition, Mazzucato (2015) emphasizes an increase in private-public sector investments in human capital formation as essential for creating innovation with an indirect effect on other organizational performance outcomes, such as employment growth. This stems from the notion that a combination of trained workers and time offered to generate new ideas could exhibit a positive synergistic effect on organizational performance. Therefore, we propose our second hypothesis:

H2. Staff level of education and on-the-job training combined with creativity result in a positive complementary effect on employment growth at the focal company.

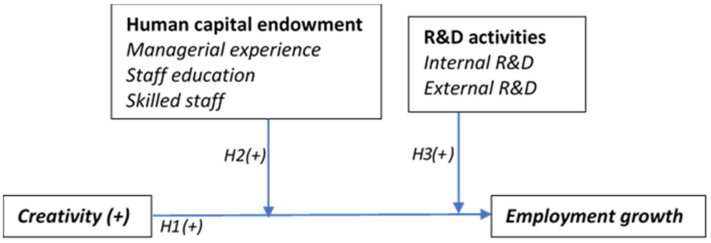
2.3 Creativity and R&D

Creativity is an essential element in the R&D process and is of significant interest to management (Teodoridis *et al.*, 2019). Krzeminska and Eckert (2016) found empirically significant complementarity between internal and external R&D on firm performance. Further, R&D cooperation offers firms an opportunity to internalize knowledge spillovers (d'Aspremont and Jacquemin, 1988; Kaiser, 2002; Savin and Egbetokun, 2016; Savin, 2021). However, investments in human resources stimulate employee and organizational competencies and, consequently, derive more benefits from collaborative agreements (Roy, 2018).

Similarly, scholars argue that useful managerial competencies and individual incentives are essential to firms' R&D efforts, further enhancing their degree of cooperation (Mowery *et al.*, 1996; Boschma, 2005). Although cooperation may be crucial to boosting firms' innovation outcomes, scholars reiterate that what is most important is the development of sufficient expertise within the firm to utilize the outcomes of external cooperation (Mowery and Rosenberg, 1989). Therefore, we conjecture that innovative firms must emphasize the crucial role of internal capabilities (Teece *et al.*, 1997; Ketata *et al.*, 2015) and competencies contingent on a favorable environment for ideas to breed. Furthermore, creative thinking, an extension to strengthening internal capabilities, and R&D investment are complementary to achieving innovative and organizational outcomes (Spithoven and Teirlinck, 2015). We hypothesize the following:

H3. Firms that combine R&D with creativity experience a positive complementary effect on employment growth.

Figure 1 summarizes the three hypotheses we test.



Source(s): Created by authors

Figure 1.
Summary of research hypotheses

3. Data and empirical strategy

3.1 Data

The analysis relies on the World Bank Enterprise Survey (WBES, www.enterprisesurvey.org) and Innovation Follow-up Survey (IFS) to test our hypotheses. Because both datasets consist of the same firms, we merge them using specific identifiers. The two datasets are firm-level and cover 2012–2015 for DR Congo, Ghana, Kenya, Malawi, Namibia, Nigeria, South Sudan, Sudan, Tanzania, Uganda, and Zambia. The firm-level WBES is a representative sample of firms in the formal nonagricultural sector. It is stratified based on activity sector, firm size, and geographical location. Business owners and top-echelon managers were respondents in the WBES and IFS (World Bank, 2017). We show the number of firms in each country, including manufacturing, retail, and services (Table 1). Below, we describe the variables used in the analysis.

Employment growth. Measuring our dependent variable, which is full-time permanent employees' growth for firms as contained in WBES, we take the difference between the current and past employees of the firms and express it as a proportion of past employment, that is, $[(Emp_{2015} \boxminus Emp_{2012})/Emp_{2012}]$. The employment growth rate takes a firm's size into account; a large firm employing ten new employees is different from a small firm doubling its staff with those ten employees. Our sample's average employment growth rate is 4.8%, but the overall distribution is skewed, with few firms growing very fast (above 10% per year) and many firms having a growth rate below the average (Figure A1 in the Appendix).

Product and process innovations. The survey asks top managers of participating firms if they have introduced new or significantly improved goods and services for product innovation in the last three years. In addition, the survey asks the same respondents if firms introduce innovative methods of manufacturing products or offering services, which represents process innovation. We measured the two innovation types as dummy variables.

Creativity. This variable forms the core of this study. The WBES respondents are asked whether firms give employees free time to develop new ideas during the last three years. Van Uden *et al.* (2017) refer to this as employees' slack time, while Burkus and Oster (2012) refer to this as non-commissioned time. Unfortunately, the survey does not reveal how much time is given or whether all employees of the firms have time for creative thinking. Therefore, it is a dummy variable with "1" if employees received time to develop new ideas and "0" otherwise.

Table 1.
l Distribution of firms across countries and sectors

Country	Manufacturing	Retail	Services	Total
DR Congo	243	136	150	529
Ghana	377	115	228	720
Kenya	414	166	201	781
Malawi	176	144	203	523
Namibia	170	188	222	580
Nigeria	1,147	549	979	2675
South Sudan	90	390	258	738
Sudan	103	139	420	662
Tanzania	441	121	251	813
Uganda	382	165	215	762
Zambia	368	123	229	720
Total	3,911	2,236	3,356	9,503

Source(s): Created by authors

Internal R&D. R&D efforts of firms are essential for innovation outcomes (Gomez *et al.*, 2016). R&D activities also positively impact firm growth (Hall, 1987). Bogliacino *et al.* (2012) find a positive and significant association between R&D expenditure and employment (larger firms spend on R&D with a close to 100% probability). This is evident in services and high-tech manufacturing, but with a higher magnitude in services. As reported in IFS, top managers are asked if firms conducted internal R&D, which is coded as a binary variable.

External R&D. Gomez *et al.* (2016) stress that external sources of information are vital for achieving innovation success. Fındık and Beyhan (2015) find that external R&D contributes to product and process innovation. On the other hand, Veugelers (1998) highlights numerous advantages that firms can gain from cooperation, including skill acquisition, economies of scale, and exploitation of complementarity. In the innovation follow-up survey (IFS), the respondents are asked if firms conducted external R&D, which is coded as a binary variable.

Firm size. We use firm sales as a control variable. We use firms' sales three years ago to measure a firm size and then express it as a natural logarithm. Earlier studies have employed this approach to measure firm size (e.g. Shehata, 1991; Becker-Blease *et al.*, 2010; Dang *et al.*, 2018; Aduralere, 2019; Abeyrathna and Priyadarshana, 2019).

Skilled staff. Training courses are structured to help individuals develop skills that may be useful in their jobs (Blundell *et al.*, 1999). Leiponen (2005) empirically studied the complementarity between employees' skills and firms' innovative activities. The results reveal that employees with high technical skills effectively blend with R&D collaboration in product or process innovation. This variable is unique to the economics of knowledge and interacts with creativity. The WBE Survey asks respondents about the number of full-time employees who are skilled production workers. We include the logarithm of the number of skilled workers as knowledge input contributing to R&D measurement. Skilled staff and *creativity* are firms' distinct knowledge-based entities.

Education. Aghion and Akcigit (2015) suggest that a leapfrogging economy that wants to catch up with a technologically advanced economy requires a high level of education. Therefore, the respondents in WBES report the percentage of full-time workers who have completed high school.

Managerial experience. Custódio *et al.* (2019) stress the importance of managerial skills over lifetime work experience. McGee and Dowling (1994) showed that new ventures with management teams with more experience could successfully engage in R&D cooperative activities. The WBE survey asks respondents about top managers' years of work experience.

Firm age. Several studies have argued that age plays a role in a firm (Huergo and Jaumandreu, 2004; Huynh and Petrunia, 2010; Yildiz *et al.*, 2013) by contributing to innovation output (Anderson and Eshima, 2013) and employment generation. However, empirical evidence on the contribution of a firm's age to innovation performance is mixed. The WBES experts ask respondents about the year the firms began operations. We measure firm age as the difference between the year firms started operations and the last survey year. We further express the outcome using the natural logarithm:

Location. Agglomeration is one of the arguments put forward by scholars as contributing to firm growth and employment concentration (Beule and Van Beveren, 2012). Empirical evidence shows the importance of agglomeration in innovation performance. However, this may be true and conditioned by inherent firm characteristics. In SSA countries, this could play a role, considering that agglomerated areas are likely to be more developed and infrastructure concentrated compared with less agglomerated regions. Thus, we measure location as a dummy variable based on WBES, which has a value of "1" if a firm situates in regions with over one million inhabitants and "0" otherwise.

External funding. WBES provides three categories of working capital: working capital owned by firms, working capital borrowed from banks, and working capital borrowed from non-bank institutions. The distinct categories of funding are expressed as percentages. The IFS experts ask firms' top managers to provide estimates of the proportion of working capital used to finance their innovation activities. Mazzucato (2015) stresses the strong link between financial resources and the success of innovative firms of various sizes. In addition, Lee *et al.* (2001) find that financial resources are necessary for firm performance. Therefore, we use the percentage of working capital financed from external sources, specifically banks. An external source of financing is important because it complements firm-level resources for innovation activities.

Industry, country, and year fixed effects. Knowing how essential industry-specific characteristics could impact firm-level employment generation and diversity in firms' innovativeness across industries (Leiponen and Helfat, 2010), we included a set of industry dummies based on the two-digit level NACE2 industry code [1]. For example, 16 belong to the manufacturing sector, and seven belong to the retail and services sectors. We also generated dummies for the 11 countries covered. We assume that time plays a prominent role in a firm's performance as it accounts for any microeconomic effects and external shocks. Therefore, we measured the two-year effect based on the start and end of the survey.

Descriptive statistics of the variables used and their covariance matrix are reported in Tables A1 and A2 in the Appendix. The free time offered to employees to be creative in the workplace, a measure of creativity, has an average of 40% of the firms represented in our sample. Furthermore, 13% of the managers had managerial experience; on average, 53% completed high school, and 79% were considered skilled production staff. The shares of product and process innovations were 53 and 47%, respectively. In our sample, 11% of firms conducted internal R&D. In comparison, only 4% conducted external R&D. Drawing on the importance of location to businesses in developing countries, especially in SSA, we observe that 52% of firms are in cities with a population of over one million. On average, 41% of firms belong to the manufacturing sector, 24% to retail, and 35% to services. We also observe that 7.2% of the firms have a percentage of their working capital sourced from banks. Bivariate correlations between the explanatory variables are low. To further test the risk of multicollinearity affecting our results, we estimated the variance inflation factor (VIF). In all estimations, we observe an average value of 2.51, and the highest VIF is 5.10, which is below the benchmark of 10 (Hsieh *et al.*, 2003), dispelling the likelihood of multicollinearity.

3.2 Econometric approach

Apart from analyzing the direct linear effect on employment growth, we are interested in identifying possible synergy effects by combining creativity with other knowledge inputs. Milgrom and Roberts (1990, 1995) documented studies on the combination of inputs using the theory of supermodularity. Thus, when firms combine two inputs, the combined effect exhibits a significantly higher performance outcome than when using the inputs in isolation (Cassiman and Veugelers, 2006; Schmiedeberg, 2008; Wang *et al.*, 2021; van den Bergh *et al.*, 2021). Unlike other studies that test for complementarity, mainly focusing on internal and external R&D, we employ free time as a term that interacts with other knowledge sources to explain firm employment growth.

We investigate how creativity enhances firm-level employment growth and how different R&D input variables complement or substitute each other at the firm level. We use the Huber–White Sandwich Estimator (HWSE) and Heckman two-stage approach. The HWSE is better than the standard OLS because it helps to obtain robust standard errors without imposing any assumptions on the structure of heteroskedasticity (White, 1980). To address the potential endogeneity problem (in particular, non-random sample selection), we employ

Heckman's two-stage approach (Heckman, 1979) that assumes that firms with positive employment growth are not an arbitrary subgroup of all firms but have specific characteristics allowing them to grow. This problem is also known as "incidental truncation", and the solution is commonly known as a Heckman correction.

In practical terms, if we estimate equation (1) by regressing employment growth directly, a simple estimator (such as HWSE) can be biased, as we do not know if firms captured by our dataset are representative and firms with zero or negative employment growth (our selection variable) provide free time for creativity as often as their counterparts or not. It is also possible that firms with superior growth with significant size advantages have the potential to offer employees time to generate creative ideas. If such self-selection exists, it could bias our findings, as estimated with Eq. (1).

$$EmpGrowth_i = \beta_0 + \beta_1 AC_i + \beta_2 C_i + \beta_3 Inno_i + \beta_4 A_i + \varepsilon_{i,} \tag{1}$$

where AC_i is a set of absorptive capacity indicators (e.g. skilled staff, education, etc.), C_i represents free time for creativity, $Inno_i$ captures process and product innovations, and A_i - other firm-level attributes, Therefore, Equation (1) can be rewritten in the two-stage Heckman approach to show that it is jointly determined by two latent models.

The Heckman two-stage estimator for sample selection is a solution in this case. This method begins with a Probit estimation of the growth drivers, where the explanatory variable is a dummy *EmpGrowthDummy*, indicating whether a firm grows in terms of employment or not. Then, equation (1) is re-estimated in the second stage. This can be expressed as follows:

$$EmpGrowth_i^* = X\beta' + \lambda EmpGrowthDummy_i + \nu_{i,} \tag{2}$$

$$EmpGrowthDummy_i^* = Z\gamma' + u_{i,},$$

$$EmpGrowthDummy_i = \begin{cases} 1, if\ EmpGrowthDummy_i^* > 0 \\ 0, if\ EmpGrowthDummy_i^* \leq 0 \end{cases} \tag{3}$$

The solution here is, therefore, to predict the likelihood that a firm has positive employment growth at the first stage using a probit model (*EmpGrowthDummy*), calculate the predicted inverse Mills ratio (λ) for each observation, and in the second stage, estimate the role of creativity on employment growth using *mpGrowthDummy* as a predictor in the model (Wooldridge, 2009). If the coefficient of λ is statistically equal to zero, there is no evidence of sample selection (endogeneity), and HWSE results are consistent and can be presented. On the other hand, if the coefficient of λ is statistically significantly different from zero, one has to focus on the results of the Heckman corrected model.

To test for potential synergy effects, we also include in equations (1) and (2) the interaction effects of creativity with other relevant variables. Note that in line with Wang *et al.* (2021) and Marson and Savin (2022), we look at the sign and significance of the coefficient of the interaction effect (e.g. between creativity and skilled staff). If this is significant, that means that firms providing free time for creativity and having more skilled staff exhibit a positive synergy effect next to the unconditional effect of the two variables.

4. Results

Table 2 reports the estimated findings of the effect of creativity proxied by free time on firm-level employment growth. Models 1 and 3 report results without interaction effects of creativity with factors like R&D, education and experience, while models 2 and 4 report results with those interaction effects. The results show that firm age, size, skilled staff,

	Model 1	Model 2	Model 3	Model 4
	HWSE		Heckman	
Creativity	0.835***	0.545	5.984***	−4.753**
Product Innovation	1.050***	1.059***	3.955***	3.891***
Process Innovation	−0.060	−0.057	−0.443	−0.264
Firm Size	0.057***	0.057***	0.169**	0.158**
Firm Age	0.008	0.0101	2.452***	2.086***
Managerial Experience	0.051***	0.056***	0.057***	0.026
Education	0.016***	0.013***	0.0198	−0.003
Skilled Staff	1.171***	1.172***	1.263***	1.261***
Internal R&D	0.488*	0.477	2.207	3.050
External R&D	0.268	0.917	9.468***	11.320***
External funding	0.002	0.001	0.058**	0.060**
Managerial Experience*Creativity		−0.013		0.474***
Education*Creativity		0.008*		0.074***
Skilled Staff*Creativity		0.717*		7.380***
Internal R&D*Creativity		−0.216		−5.343
External R&D*Creativity		−1.382		−4.966
Constant	3.417***	3.512***	6.551***	9.505***
Net effect of creativity	0.835	3.626	5.984	11.274
λ			−1.558**	5.191**
Sigma			41.865	41.799
HWSE Model/Wald χ^2	2076.22***	1880.57***	5646.25***	5818.57***
Pseudo R2	0.926	0.927		
rho			−0.114	0.224
Observations	9304	9305	9306	9306

Table 2.
Regression results explaining employment growth on the full data sample

Note(s): All estimations include country, industry, location, and year dummies. The selection equation from the Heckman two-stage model is not reported; only the outcome equation is reported in Models 3 and 4. Asterisks ***, **, and * denote 1%, 5%, and 10% significance, respectively

Source(s): Created by authors

managerial experience, external R&D, and external funding contribute to firm employment growth. Furthermore, creativity positively influences employment growth supporting Hypothesis 1. To estimate the overall effect of creativity on employment growth, in line with Brambor *et al.* (2006), we also estimate the net effects of this free time allocation (Tchamyou and Asongu, 2017; Tchamyou, 2019; Asongu *et al.*, 2017; Tchamyou *et al.*, 2019). In particular, the net effect of creativity for the HWSE estimation is either 0.835 (the unconditional effect of creativity in the absence of interaction terms) or 3.62= ([53.08*0.08] + [0.79*0.72]), where 53.08 and 0.79 are the mean value of education and skilled staff (see Table A1). At the same time, 0.008 and 0.72 are the conditional effects of the interaction between these variables and creativity. Similarly, for the Heckman two-stage estimation, the net effect of creativity is 11.274 = ([13.22*0.474] + [53.08*0.074] + [0.79*7.38] + [−4.75]). These consistently positive values of the net effect of creativity further support our Hypothesis 1. Also, firms that conduct external R&D and produce product innovations are more likely to grow. Model 4 in Table 2 reports the interaction effects between creativity and other explanatory variables. The results show that managerial experience, staff level of education, skilled staff and external R&D are complementary inputs for firms that provide free time for creativity in supporting their employment growth. These results support Hypothesis 2. However, since no significant results are found for interaction terms of creativity with internal and external R&D, we find no evidence supporting Hypothesis 3. Further, we find product innovation, firm age, size, external funding, and external R&D to retain their sign and significance.

In the following, we estimate our regression models separately for small and medium-sized (SMEs) [2] and large firms and test whether the observed effects are equally present for larger and smaller companies (Table 3). The results for SMEs and large firms diverge significantly from each other. While we find that creativity is associated with employment growth for firms of all sizes, the interaction terms do not reflect similar results. SMEs tend to benefit more from a combination of innovative inputs than large firms do. However, this result is somewhat surprising. Creativity, staff education, skilled staff, and managerial experience reinforce each other to predict a positive and significant return on employment growth for SMEs (Model 4 in Table 3). The same does not hold for large firms (see Model 8 in Table 3). The findings show that Hypotheses 1 and 2 support SMEs, whereas none of the three hypotheses is supported for large firms. Estimating the net effects of creativity, we find that for SMEs in model 2, it equals 0.837 = ([52.6*0.008] + [0.66*0.63]), while for the Heckman two-stage estimation in model 4, it equals 5.185 = ([13.2*0.118] + [52.6*0.019] + [0.66*3.979]). When interaction effects are not included (models 1 and 3), the net effect of creativity is also significant. For large firms, in contrast, we can only estimate the net effect in the absence of interaction terms, where it is highly positive and significant. However, in the presence of interaction terms, all the relevant coefficients turn insignificant. To sum up, the role of creativity is clearer for employment growth in SMEs than in large companies. Also note that creativity often loses significance when interaction effects of creativity with experience, education and R&D are included. This indicates that creativity fosters employment growth not alone but in combination with these factors.

5. Discussion and conclusion

This study examines the effects of employees' creativity on firm-level employment. It offers insights into the influence of creativity, proxied by free time offered to employees to generate creative ideas in the workplace, and its paired effect with managerial experience, staff level of education, skilled staff, and internal and external R&D. This study distinguishes between SMEs and large firms.

Our results demonstrate the overarching importance of knowledge in the growth trajectory of innovative firms. Such a knowledge quest impacts innovation potential within and across firms (Maskell and Malmberg, 1999; Bathelt *et al.*, 2004). This is vital for firms operating in countries facing a shortage of skilled workers, such as SSA countries (Tybout, 2000; Lall *et al.*, 2016). Furthermore, firms that engage in innovation could be a nub for catching up and mastering the transition toward knowledge-based development in developing countries such as Africa.

We demonstrate that employees' creativity and knowledge mix could allow firms to efficiently adopt and manage diverse knowledge sources to enhance performance. Few studies using different approaches have attempted to better understand the sources of creativity and innovation in individuals. While these efforts have significantly widened our insight into the issue, a divergence between theories and various propositions remains to be entirely confirmed. However, the challenge lies partly in the complexity and uncertainty surrounding innovation and the definition of creativity itself. Creativity can assume various modes and be discovered in various situations. Moreover, an individual exemplifies this with a wide gamut of personal attributes, experiences, and competencies. Hence, the ability to enhance employees' creativity via free time offered in the workplace is relevant when assessing the different internal competencies of firms.

Our analysis revealed a strong and positive effect of creativity on firm-level employment. After controlling for traditional knowledge-related inputs and firm-specific characteristics, *free time* offered to employees to be creative in the workplace considerably impacted employment growth. Our results further show that enhancing firm performance

Table 3.
Regression results explaining employment growth for firms of different sizes

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	HWSE		Heckman		HWSE		Heckman	
	SMEs				Large firms			
Constant	4.011***	4.033***	7.286***	8.171***	57.287***	54.954***	78.228***	78.388***
Product Innovation	0.982***	1.003***	1.992***	1.970***	10.804*	10.951*	13.535	14.029
Process Innovation	−0.028	−0.034	0.096	0.129	−13.723**	−13.942**	−9.808	−11.480
Creativity	0.648***	0.544	1.690***	−1.279	10.072*	14.306	22.495**	27.517
Firm Age	0.054	0.061	0.867***	0.788***	1.485	1.523	2.668	2.211
Firm Size	0.053***	0.053***	0.083***	0.080***	0.450	0.464	0.671	0.646
Education	0.013***	0.010***	0.006	−0.000	0.233***	0.276**	0.251	0.143
Skilled Staff	1.111***	1.112***	1.146***	1.143***	0.953***	0.950***	0.849***	0.852***
Managerial Experience	0.045***	0.054***	0.015*	0.009	0.952***	0.888***	1.167***	1.595**
Internal R&D	0.308	0.542	−0.075	−0.154	−4.572	−6.009	−0.218	0.493
External R&D	0.418	1.049	2.809**	2.472	17.642	37.657**	19.449	48.148
Managerial Experience*Creativity		−0.025		0.118***		0.077		−0.717
Education*Creativity		0.008**		0.019*		−0.064		0.174
Skilled Staff*Creativity		0.631*		3.979***		3.724		3.673
Internal R&D*Creativity		−0.673		−1.652		−0.166		−4.522
External R&D*Creativity		−1.251		−0.369		−31.650		−42.964
External funding	0.003	0.003	0.013	0.013	0.085	0.094	0.143	0.154
Net effect of creativity	0.648	0.837	1.690	5.148	10.072	na	22.495	na
λ			−0.876**	0.699**			131.713***	134.587***
Sigma			17.699	17.662			131.713	134.586
HWSE Model/Wald χ^2	414.9***	380.89***	4015.87***	4063.16***	14.13***	12.93***	209.67***	204.36***
Observations	8,269	8,269	8,270	8,270	853	852	854	854
R-squared	0.742	0.742			0.489	0.486		
rho			−0.1	0.31836			1	1

Note(s): All estimations include country, industry, location, and year dummies. The selection equation from the Heckman two-stage model is not reported; only the outcome equation is reported in Models 3–4 and 7–8. Asterisks ***, **, and * denote 1%, 5%, and 10% significance, respectively
Source(s): Created by authors

and blending free time with other variables could be a good managerial strategy. As management tends to employ different strategies in their managerial process, our study unveils *free time* as an essential candidate firms can combine with other inputs to optimize performance. While conglomerate corporations may not find it daunting to allot *free time* to employees for idea generation, the effect of this free time on firm performance has proven useful. Therefore, we believe that policy makers in developing economies of sub-Saharan Africa should stimulate company management to use free time offered to employees to be creative in the workplace as one of their key strategies to stimulate employment growth. This strategy is expected to be particularly fruitful among SMEs having some managerial experience and skilled stuff.

To stress the importance of creative thinking, Zimmerer *et al.* (2008) put this in a proper context: entrepreneurs attain greater success when they think and do new or old things in new ways. They further asserted that having new ideas does not suffice but converting them into tangible items or business ventures is vital. Creativity might be inadequate for fostering sustained growth and innovation intensity if creative individuals and ideas are not well managed. Therefore, the strategy to manage creative people and ideas in the workplace is shown to matter in our study if knowledge is efficiently utilized.

Our results support the argument that employees' creativity is necessary for performance. It may become difficult for firms to acquire external knowledge without employees' creativity. Moreover, it means that a firm's ability to integrate creativity into its internal knowledge generation could complement its effort to import and use external know-how, which has been evinced to impact performance positively.

5.1 Limitations and future research

Our study has some limitations that can be addressed using extended data. Due to the lack of previous empirical studies on this topic, we could not compare our results with those of other studies. However, our hypotheses can be tested in different countries and regional contexts and on larger panel datasets. It is also essential to point out that our study examines only a subset of firms in selected countries in SSA. Hence, our results should be generalized to other firms with caution. Moreover, our study did not address how ideation differs between service and manufacturing companies. This could be an extension of our analysis.

Notes

1. The 23 sectors included are food, tobacco, textiles, garments, leather, wood, paper, refined petroleum products, chemicals, nonmetallic mineral products, basic metal, fabricated metal products, machinery and equipment, electronics, transport machines, furniture, recycling, retail, information technology, hotel and restaurants, services of motor vehicles, construction and transport.
2. We measure SMEs by combining employees of small and medium-sized firms, respectively. Small firms have employees ≥ 5 and ≤ 19, medium-sized firms ≥ 20 and ≤ 99, and large firms >99.

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Appendix

	Mean	S.D.	Min	Max	Units of measurement
Employment growth	4.78	2.43	0	18.09	Percent
Creativity	0.40	0.49	0	1	Dummy
Product Innovation	0.54	0.50	0	1	Dummy
Process Innovation	0.47	0.50	0	1	Dummy
Firm Size (sales)	9.29	8.49	0	30.03	Log of sales
Firm Age	2.56	1.43	0	7.61	Log of age
Manager experience	13.22	22.92	0	57	Years
Education	53.08	38.35	0	100	Percent
Skilled Staff	0.79	1.29	0	8.29	Log of skilled workers
Internal R&D	0.11	0.31	0	1	Dummy
External R&D	0.04	0.20	0	1	Dummy
External funding	7.20	19.42	0	100	Percent
Location	0.52	0.50	0	1	Dummy
SMEs	0.88	0.32	0	1	Dummy
Large firm	0.18	0.39	0	1	Dummy
Manufacturing	0.41	0.49	0	1	Dummy
Retail	0.24	0.42	0	1	Dummy
Services	0.35	0.48	0	1	Dummy
Year Dummy	0.35	0.48	0	1	Dummy

Source(s): Created by authors

Table A1. Descriptive statistics of variables

Table A2.
Bivariate correlation matrix

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Employment Growth	1																		
Creativity	0.19*	1																	
Product Innovation	0.17*	0.35*	1																
Process Innovation	0.16*	0.41*	0.55*	1															
Firm Size (sales)	0.27*	0.11*	0.1*	0.11*	1														
Firm Age	0.13*	0.02*	0	0.03*	0.03*	1													
Manager Experience	0.11*	0.03	0.02	0.02	0.06*	0.06*	1												
Education	0.21*	0.05*	0.08*	0.05*	0.15*	−0.02	0.03*	1											
Skilled Staff	0.46*	0.13*	0.1*	0.14*	0.19*	0.08*	0.06*	0.07*	1										
Internal R&D	0.08*	0.12*	0.1*	0.12*	0.06*	0	0.02	0.04*	0.07*	1									
External R&D	0.06*	0.08*	0.07*	0.07*	0.02	−0.01	0.01	0.02	0.03*	0.41*	1								
External funding	0.15*	0.13*	0.11*	0.11*	0.14*	0.04*	0.03	0.06*	0.15*	0.04*	0.02	1							
Location	0.09*	0.07*	0.04*	0.11*	0.1*	0.07*	0.01	0.05*	0.11*	0.05*	0	−0.03*	1						
SMEs	−0.43*	−0.09*	−0.07*	−0.06*	−0.07*	−0.11*	−0.04*	−0.05*	−0.27*	−0.07*	−0.05*	−0.08*	−0.07*	1					
Large firms	0.14*	0.09*	0.06*	0.07*	0.02	0.08*	0	0.03*	0.03*	0.07*	0.05*	0.03*	0	−0.15*	1				
Manufacturing	0.16*	0.08*	0.04*	0.12*	0.12*	0.09*	0.05*	−0.05*	0.7*	0.05*	0.02	0.03*	0.1*	−0.11*	0	1			
Retail	−0.17*	−0.08*	−0.03*	−0.09*	−0.05*	−0.08*	−0.05*	0.01	−0.33*	−0.02	−0.01	−0.01	−0.05*	0.07*	0.02	−0.46*	1		
Services	−0.01	−0.01	−0.01	−0.04*	−0.08*	−0.02	−0.01*	0.04*	−0.43*	−0.03*	−0.01	−0.02	−0.06*	0.04*	−0.02	−0.62*	−0.41*	1	
Year Dummy	0.05*	0.05*	0.05*	0.09*	0.18*	0.05*	0.03*	0.07*	0.13*	0.11*	0.04*	0.06*	0.17*	−0.01	−0.09*	0.15*	−0.06*	−0.1*	1

Source(s): Created by authors

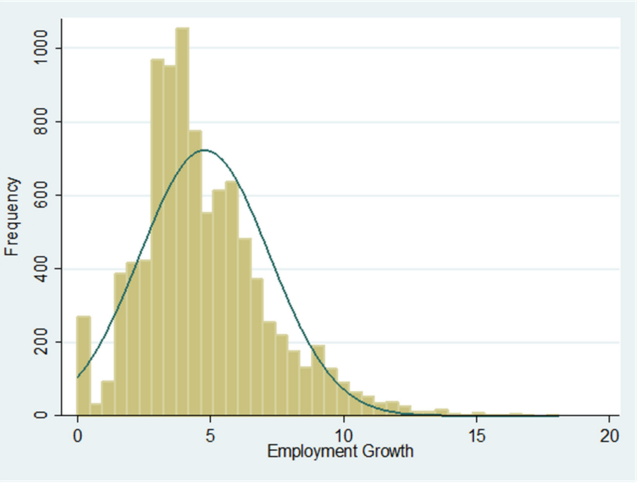

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Figure A1.
The employment growth distribution in our data sample and a fitted normal density plot

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