A G D I Working Paper

WP/22/099

The relationship between firms that start operating as unregistered and firms' innovation: the moderating effect of access to finance

Sam Njinyah
Lecturer in Enterprise, Manchester Metropolitan University.
E-mail: S.Njinyah@mmu.ac.uk.

Simplice A. Asongu
African Governance and Development Institute,
P.O Box 8413, Yaoundé, Cameroon.
E-mails: asongusimplice@yahoo.com, asongus@afridev.org

2022 African Governance and Development Institute WP/22/099

Research Department

The relationship between firms that start operating as unregistered and firms' innovation: the moderating effect of access to finance

Sam Njinyah & Simplice A. Asongu

Abstract

The purpose of this paper is to examine the relationship between a firm starting operation informally and its future innovation and whether this relation is moderated by institutional support (having access to finance from financial institutions to run their business). Data from the World Bank Enterprise Survey on 30 Eastern European and South-East Asian countries were analysed using probit regression analysis. The findings show that there is a positive significant relationship between firms that start operations informally and the firms' innovation and that such effect persists over time. We found that this relationship is stronger if the firms can gain access to finance to expand their business activities. Finally, our result shows that such a relationship is based on the type of innovation being pursued by the firm. By examining the moderation effect of access to finance on starting a business informally, we provide an alternative explanation to policymakers on how to deal with informal firms to benefit from their contribution to growth.

Keywords: Informality/unregistered firms, Innovation, Institutions, and Eastern European and South East Asia

Introduction

There is a limited but growing evidence on firms informality within the entrepreneurship literature (Williams et al., 2017; Dua and Cuervo-Cazurra, 2014; Damente et al., 2015; Porta and Shleifer, 2014; Thai and Turkina, 2014; William and Martinez, 2013). Firms informality has applied in this research based on the World Bank Enterprise Survey which captures whether the firm started operation as an unregistered business and such categorisation has been applied in existing studies such as Mccann and Bahl, 2017; Siqueira et al., 2016; Siqueira and Bruton, 2010; Heredia Péreza et al., 2018; Williams et al., 2017; Williams, 2007). Researching firms informality is important because it informs discussions on agency in or through entrepreneurship where too often, entrepreneurs operating within the legal framework are perceived as those contributing to economic growth (Walter et al., 2015; Williams, 2007). However, the fact that entrepreneurs operate wholly or partially in the informal sector, entrepreneurs operating informally are changed agents (Ribeiro-Soriano and Galindo-Martín 2012; Williams et al., 2017). Moreover, because the context in entrepreneurship matters, researching firms informality provides policymakers with knowledge about the current nature of their business environment and therefore develop better policies for growth (Thai and Turkina, 2014; Ribeiro-Soriano and Galindo-Martín 2012; Sun et al., 2020). With many businesses starting as unregistered in developing economies, not studying informal entrepreneurship limits our understanding of the entrepreneurial process (Williams et al., 2017).

Research linking informal entrepreneurship and firm innovation largely has been based on how competition from the informal sector affects the innovation of formal firms (firms that started operation as registered firms). For example, Mendi and Costamagna (2017) show how formal firms innovation decreases due to competitive pressure from unregistered firms. However, McCann and Bahl, (2017) show how competition from informal firms

makes formal firms to be more innovative due to the need to fight for market share. Perez et al., (2018) showed how competition from the informal sector would affect formal firms innovation based on the sector in which the firm operates with negative effects on suppliers dominated industries and no change on science-oriented firms. While these studies suggest how innovative informal firms could be, limited studies have examined the direct relationship between starting a business unregistered and firm innovation. This includes Mendi and Mudida (2018) who found a negative relationship between starting a business unregistered and the firm's innovation and that such a relationship lasts over time. However, Williams et al., (2017) show how firms that start as unregistered and operated longer as unregistered firms had significantly higher annual sales and productivity than firms starting operation as registered. The above represents a gap in the literature due to the contradictory effect of starting a business unregistered on firm's outcome and such a direct relationship could be influenced by potential moderators.

We examine the above gap by arguing for a positive relationship between starting a business unregistered and the firm's innovation and that this positive relationship will be stronger if the firm benefits from institutional support (access to finance). This positive relationship is because researchers have suggested weak and inefficient institutions to be a major motive for firms informality (Williams and Nadin, 2012; William and Shahid, 2016). Firms operating unregistered therefore can evade taxes and ongoing regulatory compliance, which allows them to increase their earnings as a result and have more resources to pursue innovation (Walter et al., 2015; Autio and Fu, 2014; Benjamin and Mbaye, 2012; Heredia Péreza et al., 2018). Firm's informality may be transient towards a market-based system when institutional quality improves and therefore explains why firms may start unregistered and later formalise their operations (Walter et al., 2015). However, it is not clear whether the effect of starting unregistered persist over time. Besides, examining how access to finance

could moderate the effect of starting a business unregistered and the firm's innovation is based on the institutional theory, which has dominated studies on firms informality. For example, William and Shahid (2016) show how the lower level of formalisation was associated with higher levels of institutional asymmetry. William and Nadin (2012) Ribeiro-Soriano and Galindo-Martín 2012 shows how government policies can be used to support informal entrepreneurs to formalise their activities. Dua and Cuervo-Cazurra (2014) discuss how institutional control reduces informal entrepreneurship more than they do increase formal entrepreneurship and therefore resulting in a net reduction in entrepreneurial activities. Therefore, if firms that start unregistered benefit from institutional support (access to finance), they could innovate more.

To analyse our hypotheses, we used data from the World Bank Enterprise Survey (WBES) on 30 Central and Eastern European countries and analyse them using a probit model. The WBES ask firms whether they started operation as a registered or unregistered business and for firms that started unregistered, they were asked the years in which they became formal by registering their business. Endogeneity was not an issue as firms informality is being determined or measured in the past (Mendi and Mudida, 2018; Williams et al., 2017). To examine whether the relationship between starting a business unregistered and firm innovation last over time, we divided our sample firms into subsample based on the number of years that the firms have been operation (greater than 5, 10, 15 and 20 years) – This was for firms that indicated they started as unregistered before formalising their operations. Our results show a positive relationship between starting a business unregistered and the firm's innovation, which was significant, based on the type of innovation being considered and that this relationship persists over time and is positively moderated by the firms having access to finance.

Based on our findings, we contribute to entrepreneurship literature in many ways. First, unlike studies that have examined the direct effect of starting a business unregistered and firms outcomes (e.g., Mendi and Mudida, 2018; Williams et al., 2017), we have used institutional theory to argue that firms starting operations unregistered may be more innovative by using their scarce resources to overcome their limitations and be innovative because market imperfection may not bring considerable benefits for registered firms. Second, we show that inclusive growth (supporting businesses in the informal sector) is necessary for development through innovation. We show in our moderation analysis that institutional support through providing access to finance will help firms that start unregistered to be more innovative and therefore support the role of institutional support for firms operating within the informal sector (Dua and Cuervo-Cazurra, 2014; Williams and Nadin, 2012; Walter et al., 2015). Finally, by examining data from 30 Eastern European and Central Asian countries across different industries, we have demonstrated that our contribution can be applied to other developing economies (Heredia Péreza et al., 2018).

The rest of the paper is structured as follows: Section 2 discusses the review of relevant literature to develop hypotheses on the interaction effect of 'access to loans from financial institutions and starting a business unregistered' on firm future innovation. Section 3 presents the data and how variables have been measured. Section 4 covers the analytical framework and results from the data analysis. Section 5 concludes with the contribution of the study, limitations and directions for future research.

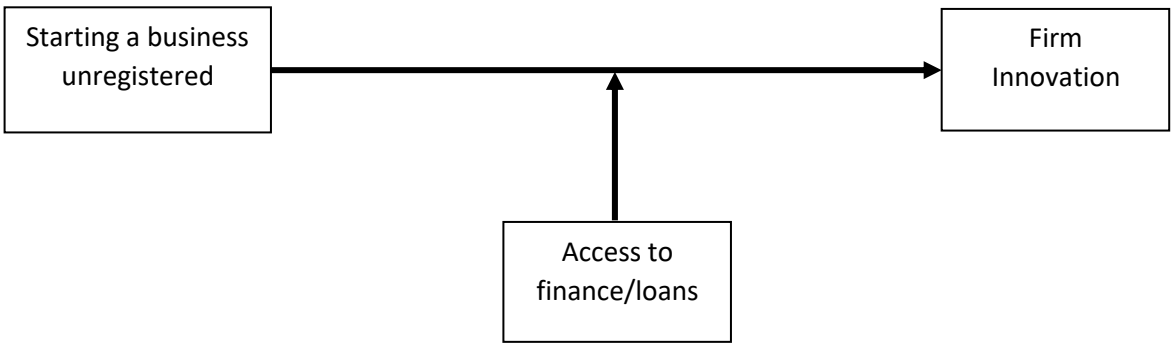
Literature review and hypotheses development.

Institutional theory

Informality is institutionalised in the sense that the decision to operate in the formal or informal sector is influenced by the institutional context in which the firm operates (Autio

and Fu, 2014; William and Shahid, 2016; Sun et al. 2020; Williams et al., 2017). The effectiveness of institutions will promote the rule of law, access to finance, fairer tax system, increase the ease of doing business, which may encourage firms to take risks and pursue innovative activities (Thai and Turkina, 2014; Peng et al., 2008; Mendi and Costamagna, 2017; Heredia Péreza et al., 2018). This makes sense to use institutional variables (financial loan) to examine its interaction effect with firms starting operations unregister on their future innovation. Our focus on access to finance is based on the fact that one of the biggest obstacles facing small and medium-sized enterprises in accessing finance for their growth (Tchamyou and Asongu, 2017; Tchamyou, 2019). North (1990) defines institutions as formal and informal human devised constraints that influence human interaction. When formal institutions become ineffective and inefficient, it creates a void filled by economic activities that are not aligned with regulations but are considered acceptable in the confinement of informal institutions (William and Shahid, 2016; William and Martinez, 2013). Formal institutions have different dimensions namely economic, financial, political, and socio-cultural (Zoogah et al., 2015; Zoogah, 2018). We examine the financial dimension of institutions because they provide incentives such as loans to help firms facilitate their transactions and improve their performance (Peng et al., 2008). For innovative firms, access to loans may enable them to obtain more valuable resources, invest in research and development (R&D), and improve their innovation. The cost-effectiveness of starting a business unregistered enables the firms to use such benefits to overcome their liabilities and drive innovation. By benefiting from institutional support, firms that start unregistered may become more innovation as shown below.

Figure 1: Conceptual framework



Firms' informality has been broadly defined based on the size of the business; registration with the government; maintenance of honest and complete accounts (Benjamin and Mbaye, 2012; Benjamin and Mbaye, 2014). Autio and Fu (2014) define informal firms as those selling products and services but have not yet applied for business registration or filed any incorporation documents with government authorities. This definition which is the one adopted in this research is one of the most easily utilised definition (see Mccann and Bahl, 2017; Siqueira et al., 2016; Siqueira and Bruton, 2010; Heredia Péreza et al., 2018) as have been used by the World Bank Enterprise Survey (WBES) to define informality based on whether the firm stated operations as registered or unregistered.

Existing literature has suggested contradictory evidence as to the factors influencing firms' informality. According to the extant studies (e.g., Autio and Fu, 2014; Benjamin and Mbaye, 2012; Heredia Péreza et al., 2018; Thai and Turkina, 2014; Porta and Shleifer, 2014), inefficient formal institutions or poor institutional quality may make formality undesirable for firms. However, William et al. (2016) demonstrated that it is the characteristics of the entrepreneur and the enterprise that influence informality and not the institutions as the role of gender on firms informality is discussed by ; William and Martinez (2013). This supports the contribution of Siqueira et al. (2016) who argued that industry conditions and the need to exploit a business proposition might influence informality and therefore contribute to the institutional theory by examining how factors outside formal institutions could influence

informality. Nevertheless, we cannot ignore the effect of institutions on firm formality when we consider the contribution of Dua and Cuervo-Cazurra (2014) where institutional control reduces informality, as it does to increase formality. Poor institutional quality may hinder firms from achieving the expected benefit to formalising (Autio and Fu, 2014; Benjamin and Mbaye, 2012). Also, Thai and Turkina (2014) contributed to the existing literature on formality by developing a framework showing how governance quality (ease of doing business), resource abilities, economic opportunities, performance, and social culture (collectivism and human orientation) influence formal and informal entrepreneurship differently. When such benefits are unclear, the associated cost of formality is high, and poor institutions restrict the availability of information required to formalise business operations, and hence, many firms may decide to start business unregistered (Demenet et al., 2015).

The Oslo Manual (OECD, 2005) has defined innovation based on the introduction of new or improved goods and services or processes, which could be either radical or incremental. Many studies in business management and entrepreneurship literature have used this definition to measure innovation (e.g., Mendi and Costamagna, 2017; Mccann and Bahl, 2017). However, existing studies have expanded this categorisation to include organisational and marketing innovation. Research on firm innovation is well established in existing literature with different conceptualisations. For example, Ramadani et al. (2019) have developed and tested hypotheses examining the positive effect of different determinants of innovation on product innovation and that product innovation positively influence firm performance. The innovation determinants examined range from skilled workers, use of technology, and networking, patent and marketing innovation and suggest these factors enable firms to gain a competitive advantage to innovate (Ramadani et al., 2019). Our focus is, however, on a specific type of determinant (starting a business unregistered) which is a

typical characteristic of developing economies (Benjamin and Mbaye, 2012; Mendi and Mudida, 2018; McCulloch et al., 2010).

Formal firms that started operation as unregistered businesses are found to perform less than those starting operations as registered firms (Mendi and Mudida, 2018). The negative effect of starting a business unregistered on the firm's outcome is based on the low start-up capital and productivity that characterises the informal sector (Porta and Sheifer, 2014). Mendi and Mudida (2018) argued that the negative relationship was because starting a business unregistered and the firm's innovation was based on the fact that such firms are not aware of distribution channels different from those they currently use, unregistered firms have inefficient organisational forms not suitable for innovation and the location of unregistered firms does not provide access to formal costumers. The small sample size, one country and one sector analysis used in Mendi and Mudida (2018) makes the sample unrepresentative and the results could have significant differences with much larger samples and multiple country analysis, which is what we have achieved in this research.

However, with many entrepreneurs starting a business within the informal sector (Williams and Nadin, 2012), operating unregistered may be out of choice and may subsequently outperform firms that started operation as registered (Williams et al., 2017). The positive effect of starting a business unregistered on the firm's innovation may be explained by some factors. The first is the competition between formal and informal firms for market share (Distinguin et al., 2016; Mendi and Costamagna, 2017; Heredia Péreza et al., 2018). The fight for market share reflects the romantic view of Porta and Sheifer (2014) which considers both formal and informal firms to be similar in the ability to be innovative and their innovation contributes to economic development (ILO, 2011; Benjamin and Mbaye, 2014; Fu et al., 2018; Mendi and Costamagna, 2017). Through competition for market shares, these firms become more innovative (Mccann and Bahl, 2017; Heredia Péreza et al. 2018).

The second factor for the positive effect of starting a business unregistered on the firm's innovation may be linked to the cost savings associated with evading government regulations such as tax and regulatory compliance (Williams et al., 2017; Benjamin and Mbaye, 2012). Institutional compliance may present a constrain to firms innovation as formal firms will suffer from cost disadvantage compared to registered firms (Porta and Sheifer, 2014). Informality is a general characteristic of developing economies (McCulloch et al., 2010) and for such firms, reputation matters less and through corruption, unregistered firms can gain unfair advantages to resources to make them more innovative (Lavallée and Roubaud, 2019). Finally, the constrain gazelle phenomenon (Grimm, Knorringa, and Lay, 2012) could influence the positive effect of starting a business unregistered and the firm's innovation. Unlike formal entrepreneurs who contribute to economic growth, informal entrepreneurs also contribute to growing their innovation (Ribeiro-Soriano and Galindo-Martín 2012). Their abilities to innovate suggest they have the skills and knowledge to be successful just as registered firms. Informality is transient (Walter et al., 2015). However, it is not certain as to whether registering a business will eliminate the effect of the firms status on its outcome compared to when it was operating unregistered (Porta and Sheifer, 2014). We expect therefore that this positive effect of formal firms that start as unregistered businesses will persist over time. We hypothesised thus;

H1: There is a positive relationship between formal firms that starting as unregistered businesses and the firm's innovation and that this relationship persists over time.

Moderation effect of access to finance

Week institutions have been suggested to be a major factor for why firms operating within the informal sector will perform less than formal firms (William and Shehid, 2016). The role of the financial institutions in firm formality is pivotal to their innovation and performance

(Heredia Péreza et al., 2018; Mccann and Bahl, 2017). A key constraint facing firms that start operations unregistered is access to finance (Distinguin et al., 2016). Lack of access to finance hinders the firm's ability to function efficiently especially for small businesses (Njinyah, 2018; Bottazzi et al. 2014). Access to finance is used here to mean loans from financial institutions. There is overwhelming support in the existing literature about the significance of access to finance as a positive determinant of firm innovation and performance (OECD, 2006). Gaining access to finance will enable firms to introduce innovations such as new products and processes and the development of different sales channels. It enables the firms to invest and attract the brightest talents and train existing staff, which helps, drive innovation within the firm. Access to finance also enable firms to purchase raw materials and equipment, integration of business activities, and developing a structure that improves their performance. Empirical evidence on the positive effect of access to finance on firm innovation can be found in Ayyagari et al. (2011), Fowowe (2017) and Bottazzi (2014).

One of the motives for starting unregistered is that it is cost-effectiveness (Autio and Fu, 2014). This suggests unregistered firms can use these extra savings from evading regulatory compliance to improve their innovation by allocating resources efficiently to overcome their liabilities (Williams et al., 2017). However, with more access to finance, the benefit of starting a business unregistered on innovation will be stronger than when access to finance is less because the firms will be able to invest in its operations. Entrepreneurship contributes to economic growth and the contribution of informal entrepreneurship cannot be ignored (Walter et al., 2015). George et al (2012) call for policy intervention for inclusive innovation (supporting entrepreneurs excluded from development mainstreams). Through policy support, the benefit of informal entrepreneurship to economic development through innovation can be stimulated (Ribeiro-Soriano and Galindo-Martín 2012; William and Nadin,

2012). The innovative ability of unregistered firms is based on the fact that owners or managers of these firms can be categorised under constrain gazelle which means they have the attributes of top performers but may be limited due to some constraints (Grimm, Knorringa, and Lay, 2012). With more finance, these firms can improve their internal capabilities, reduce inefficiencies to exploit missed opportunities and strengthen their supply chain (Williams et al., 2017). The above suggests that with more financial assistance, firms starting unregistered will be able to overcome their internal and external liabilities and will be more innovative. We, therefore, state the corresponding hypothesis thus;

H2: The positive relationship between formal firms that started operations as unregistered businesses and the firm's innovation will be stronger for firms with access to finance and that this relationship persists over time.

Research Method

Data and Sample

The data for this research is obtained from the World Bank Enterprise Survey (WBES) of 30 countries from Eastern Europe and Central Asian countries (https://www.enterprisesurveys.org) collected over a period from 2008 – 2013. Table 1 below presents the list of countries and the total number of firms involved in the survey. However, because our focus is on firms which did answer "Yes" to starting their business unregistered, our final sample is lower than the 27,551 shown in Table 2. Moreover, firms were asked in what year did the establishment began operations. The difference between the year the firm started operations and when it formally registered represents the length of time taken to move from informality to formality. However, we are unable to present this information for all firms due to our large sample size. But to summarise the statistics, 1.91% of the firms in our sample registered their firms for at least one year before starting operations, 93.06% starting

operations and registered at the same time, 2.76% started operation and formalised within 10 years, 0.63% started operations and formalised within 10 -20 years and 1.65% started operation and formalised after 20 years.

Our final sample for each model can be seen from the number of observations in each regression. With the difficulties involved in collecting quantitative data of a valuable size to produce reliable results, the WBES which is now a reference point for many quantitative studies has bridged that huddle. The WBES is used to collect data from the micro, small, medium, and large firms from different sectors of the economy. Because such data is used to gauge the economic health of every economy, it has helped to provide data for variables ranging from institutions, firms formality, firms innovation, firm characteristics, firm performance, and crimes among others, and therefore provide reliable data to examine our argument. Data from the WBES is now increasingly being used in research on institutions, innovation, and firm performance (e.g., Ramadani et al., 2019; Mendi and Costamagna, 2017; Mccann and Bahl, 2017; Heredia Péreza et al., 2018; Williams et al., 2017).

"Insert Table 1 Here"

Measurement of Variables

Dependent variables

We have measure innovation using the four main categories namely product, process, organisation and market innovations to capture every aspect of a firm's innovation (Ramadani et al., 2019; Mendi and Mudida, 2018). For all four measures of innovation, firms had to respond to questions such as whether they have introduced new products, new processes, new supply methods, and new marketing methods over the last three years with "1" = Yes and "0" = No. Marketing innovation may be related to changes in the packaging of goods and

changes in sales methods such as internet sales and organisational innovation may include changes in the firm's structure and business activities (Mendi and Mudida, 2018).

Independent and moderating variables

Our main independent variable is informality which was a dummy variable on whether the firm began operations unregistered with "1" = Yes and "0" No. For the moderating variable, we have used access to finance from financial institutions. Managers had to answer whether they have received a loan from a financial institution with "1" = Yes and "0" = No.

Control variables

To consider alternative explanations of our research, we have taken on board other variables that could influence firm innovation and therefore added them as control variables in our analysis. We have controlled for firm size and manager's level of education (Siqueira and Bruton, 2010; Williams et al., 2017) as large firms may have more resources to introduce innovation than small firms. Managers with a high level of education have the cognitive ability to scan the environment for opportunities, analyse complex information, and develop strategies to capitalise on such opportunities to drive innovation. We control for managers' experience (Mccann and Bahl, 2017; Williams et al., 2017) as firms can gain from transferable skills. Managers with experience within the industry can also leverage their network to build capabilities and success strategies from their previous employer could be implemented in their current jobs to drive innovation. We control for whether the firm is part of a large firm (Mendi and Costamagna, 2017). Large firms have more human capital than small firms, they can borrow more easily and they have a well-established network that they can often leverage from and benefit from better decision making process than small firms which makes them more innovative. We also control for the gender of the manager, the legal status of the firm, power outages, and the use of email to communicate with customers, the

firm paying for security, purchase of fixed assets (Mccann and Bahl, 2017), and having a savings account. Table 2 below provides a complete description of all variables and their measurements.

"Insert Table 2 Here"

Analysis and results

Due to the binary nature of our dependent variables, we have use probit model to examine the following; 1) the effect of starting an unregistered business on the firm's future innovation and 2) whether such a relationship could be moderated (strengthened) if the firm has received support from the government. The analysis involved a series of hierarchical regressions to show the contributions of additional variables to the model (William and Shahid, 2016) and therefore help provide for alternative explanations. The first stage was to run the control variables against our dependent variables as shown in Tables 4 and 5 Models 1 and 5. The second stage was to add our moderating variable to the control variables to examine their direct effect on firm innovation. The third stage involved adding our independent variable (starting unregistered) to the controls and in the last stage, we combine our independent variables, moderating variables, and the interaction effects with the control to capture the significance of the moderating variables strengthening the effect of unregistered on firm innovation.

We have shown how the common method bias (CMB) is not an issue of concern in our model. We have computed the variance inflation test (VIF) to examine whether our model is stable. The mean value of VIF for each model as shown in Tables 4, 5, and 6 and 7 are less than 5 and within the acceptable cut off of 5 and 10 (Kutner et al., 2004). This means our model is stable and our independent variables are not strongly correlated. To further examine this, we compute the correlation statistics as shown in Table 3 and there was no

correlation greater than 5 (Tabachnick and Fidell, 2001). As adopted by Mccann and Bahl (2017), our model involves a moderating variable and respondents cannot reconceptualise their responses based on our model.

Also, the variables used in our model are not based on perceptual cognition, but the action taken by the firms (e.g., whether they have introduced innovation or not), and this minimizes CMB (Mccann and Bahl, 2017). Moreover, in responding to Richardson et al. (2009) who argue that because no amount of ex-post analysis can compensate for poor design, the focus should be on developing a research design that can produce reliable results, we now present how the WBES data collection can minimise CMB. The WBES guarantees participants confidentiality and anonymity and therefore suggest respondents may be inclined to give their honest responses and this minimises CMB issues. Moreover, with more than 50 questions to answer with different scales, respondents cannot recall previous responses, and their cognitive ability to establish relationships between responses is greatly reduced (Baker et al., 2016; Podsakoff et al., 2003). On the above bases, we suggest that CMB was not a threat to our model. Moreover, potential endogeneity has been reduced and is not a concern because our variable of informality was measured or determined at a specific point in the past and the inclusion of other control variables in our model helps resolve alternative effects (Mendi and Mudida, 2018; Williams et al., 2017).

"Insert Table 3 Here"

Table 4, Model 1 shows the significant effect of our control variables on firm innovation. we found that firms with managers having a doctorate degree ($\beta = 0.455$, $SE = 0.145$, $P = 0.002$), firms with a website ($\beta = 0.434$, $SE = 0.146$, $P = 0.003$), purchase of fixed assets ($\beta = 0.525$, $SE = 0.101$, $P = 0.000$) and paying for security ($\beta = 0.548$, $SE = 0.120$, $P = 0.000$) all had a significant positive effect on product and process innovation (see Models 1

and 5 of Table 4). This means that a firm's product and process innovation increase as the manager's level of education increases, and for a unit increase in doctorate, product innovation increases by 45% while process innovation increases by 51%. Also, a unit increase in the purchase of fixed assets increases product innovation by 52% and process innovation by 45%. Moreover, a unit increase in the payment for security increases product innovation by 55% and process innovation by 45%.

"Insert Table 4 and 5 Here"

The second stage of the analysis was the addition of our moderating variable to the controls. Models 2 and 6 of Table 4 shows that having a loan from a financial institutions has a significant effect on a firms product ($\beta = 0.340, SE = 0.106, P = 0.001$) and process innovation ($\beta = 0.403, SE = 0.112, P = 0.000$). Therefore, a unit increase in financial loan to a firm will increase product innovation by 34% and process innovation by 40%. In the next stage of the analysis we added our main independent variable to the controls and Table 4 suggests that the effect of starting an unregistered business is positive and significant for the firms future process ($\beta = 0.403, SE = 0.239, P = 0.092$) and product innovation ($\beta = 0.503, SE = 0.239, P = 0.036$) as shown in Model 3 and 7. Consequently, a unit increase in starting unregistered increases future process innovation by 40% and product innovation by 50%. However, the interaction effect of financial loan and starting unregistered on product ($\beta = 0.367, SE = 0.482, P = 0.447$) and process innovation ($\beta = 0.321, SE = 0.491, P = 0.513$) though positive was not significant as shown in Model 4 and 8 in Table 4.

Table 5 presents the results on the effect of starting unregistered on the firms' future organisation and marketing innovation. Model 1 shows the significant effect of our control variables on the firm organisation and marketing innovation. We found a significant positive effect for large firms, managers with a doctorate, firms with websites, an establishment that is

part of a large firm, firms that pay for security and purchase fixed assets on the firm's future organisation and marketing innovation but negative for savings accounts. The second stage of the analysis was the addition of our moderating variable to the controls. Models 2 and 6 in Table 5 show that a loan from a financial institutions has a significant effect on a firm's organisation (*β = 0.410, SE = 0.102, P = 0.000*) and market innovation (*β = 0.287, SE = 0.099, P = 0.004*). A unit increase in financial loan to a firm will increase organisational innovation by 41% and process market innovation by 29%. In the next stage of the analysis, we added our main independent variable to the controls and Table 5 suggests that the effect of starting an unregistered business is positive but not significant for the firms organisation (*β = 0.387, SE = 0.246, P = 0.117*) and market innovation (*β = 0.372, SE = 0.231, P = 0.109*) as apparent in Table 5, Models 3 and 7. However, the interaction effect of financial loan and starting unregistered on organisation (*β = 1.417, SE = 0.589, P = 0.016*) and market innovation (*β = 1.056, SE = 0.502, P = 0.036*) was positive and significant as shown in Models 4 and 8 in Table 5. Therefore, a unit increase in our interaction term will increase future organisational innovation by 141% and marketing innovation by 105%.

The above results show that there is a positive relationship between starting an unregistered business and the firm's current innovation. We draw from Mendi and Midida (2018) to understand whether these differences persist over time by analysing the same model but excluding firms based on their age. We computed the firm's age by taking the difference between the years in which the survey was administered from the year the firm started operation. On like Mendi and Midida (2018) who excluded firms from less than 5 and 10 years of age, our data provides us with the opportunity to increase this to firms less than 15 and 20 years of age. The motive of this is that we expect the effect of starting an unregistered business on the firm's innovation to decrease as we leave out younger firms and examine the

results of firms that have been in existence much longer to understand whether this positive relationship persists over time.

"Insert Table 6 and 7 Here"

Table 6 presents the results of the direct relationship between starting an unregistered business and the firm's innovation-based while excluding younger firms up to 20 years of age. Models 1 and 2 in Table 6 show results for firms that are less than 5 and 10 years with positive but insignificant results. However, it is apparent from Models 3 and 4 that the effect of starting unregistered on product innovation is stronger for older firms (firms within 15 and 20 years old) compared to results in Model 3 of Table 4. Models 5, 6, 7, and 8 of Table 6 reveal that this positive relationship is stronger and persists over time as compared to the results of Model 7 in Table 4. Nevertheless, results of Model 9 – 16 in Table 6 reveal that the effect of starting unregistered is not significant for organisational and market innovation over time when compared to results in Table 5 of Models 3 and 7.

Finally, when we consider the moderation effect using the exclusion criteria as shown in Models 1 – 4 of Table 7, the moderation effect on product innovation was not stronger compared to Model 4 in Table 4 and was not significant. Though the moderation effect was positive and stronger for process innovation over time (Table 7, Models 5 – 8) compared to Model 8 of Table 4, it was however not significant. Nevertheless, we observe in Models 9 and 10 of Table 7 that moderation was significant and stronger for organisation innovation with younger firms than for older firms and suggest this effect does not persist over time. This was also true for marketing innovation as shown in Table 7, Model 13. We, therefore, conclude that the persistence of the direct positive relationship highlighted in Tables 4 and 5 overtime is stronger for product and process innovation than for organisational and market innovation. This persistent effect may be because unregistered firms are more likely to

engage in product and process innovation than engage in organisational and market innovation. This is because new products and processes could just be an imitation from another firm's product that is already in the market but new to the firm, unlike organisational and market innovation that may require plenty of resources.

Discussion and conclusion

While researchers have examined how competition between formal and informal firms affects the innovation of formal firms, limited empirical evidence exists as to the relationship between firms that started operations as unregistered businesses and the firm's innovation. The aim of this research is therefore to examine this relationship and to determine whether the effect of starting operations as unregistered business may persist over time. To improve the contribution of our research we examine how the provision of institutional support (access to finance) could positively moderate this relationship. Using WBES data from 30 Eastern Europe and Central Asian countries (see Table 1), our analysis supports our hypothesised relationship for a positive relationship between starting a business as unregistered and the firm innovation and that such relationship persists over time. Moreover, we show that by benefiting from access to finance, unregistered firms could become more innovative. These significant results, therefore, contributes to our understanding of informal entrepreneurship and the role of institutions in several ways.

Theoretical contributions

First, we contribute to the institutional theory by uncovering how formal firms that started operations, as an unregistered business due to poor institutional quality can be move innovative. We show that the cost-effectiveness of informality due to tax avoidance and the cost of regulatory compliance could firms overcome their limitations and allocate resources more efficiently to pursue innovation. We argued that unlike formal businesses, informal

businesses do make a similar contribution to economic growth and with more institutional support, they could become more innovative. We demonstrate this by showing the positive interaction effect between accesses to finance (institutional support) and starting a business unregistered on firm's innovation. Moreover, we show that the benefits of starting a business unregistered persist over time even when the firms have formalised their operations by registering their business.

Apart from cost-effectiveness that influences innovation of informal businesses, in developing economies, starting a business unregistered does not prevent the firm from being socially acceptable and the need to satisfy its customers will make them more innovative. Unethical practices and reputations matter less for these firms (Thai and Turkina, 2014; McCulloch et al., 2010) and the greasing of the wheel of corruption may make them more innovative (Lavallée and Roubaud, 2019). Moreover, the literature suggests that competition from the informal sector affects the innovation of formal firms. This competition arises based on the need to gain market share. Unlike formal firms, informal businesses involved in this competition are developing new ways of reaching their customers and making sure, they can meet the demands of their customers through innovation.

Second, we contribute to a limited but growing number of literature on firm's informality. As already discussed, existing research has focused more on how competition from unregistered firms affects the innovation capability of formal firms. Such competition decreases formal firms innovation as the practices of informal firms discourages investment and therefore reduces innovation (Mendi and Costamagna 2017). However, McCann and Bahl, (2017) showed that such competition increases formal firms innovation because they will want to fight for a bigger market share and therefore will innovate more. Nevertheless, Perez et al., (2018) show that the effect of such competition will depend on the sector in which the firm operates. We contradict the negative relationship between starting a business

unregistered and firm innovation by Mendi and Mudida (2018). We argued following Williams et al., (2017) who shows that the gains from starting unregistered outweigh the benefit from registering the business before starting operations. While Mendi and Mudida, (2018) examined a direct relationship between starting a business unregistered and firm innovation, we complement this direct relationship by explaining the mechanism (interaction effect of access to finance) through which unregistered firms can become more innovative. Access to finance is a major obstacle to firms operations in Africa and may suggest the negative results in Mendi and Mudida (2018). We, therefore, show that institutional support could be a mechanism through which unregistered firms could more innovative. This, therefore, support Williams and Nadin (2012); Walter et al., (2015), Ribeiro-Soriano and Galindo-Martín (2012) and William and Shahid (2016); Dua and Cuervo-Cazurra (2014) on the need of institutional support to tackle hidden entrepreneurial culture to improve growth through innovation.

Policy and managerial implications

The contribution of our research presents important policy and managerial implications. For policymakers, our findings provide them with an understanding of the contribution of informal businesses to economic growth through innovation. This is particularly relevant when we consider the contribution of George et al., (2012) in which they showed that inclusiveness is necessary for the development and the government should support businesses operating within the informal sector. Policy interventions to support informal businesses are therefore needed. Thai and Turkina (2014) suggested promoting networking to encourage social capital for informal entrepreneurs to improve their innovation and performance while developing appropriate reforms to enable them transit to formality. While the immediate benefit of formality does not outweigh the cost of formality, the long-run effect of formalisation could improve efficiency as the firm may be able to network with

different stakeholders and obtain investment for innovation. Therefore, the benefit of formalisation should be considerable (Williams et al., 2017). Institutional quality should improve with the reduction in cost and procedures of registration (Williams and Nadin, 2012; Williams and Shahid, 2016). These findings support the views of George et al. (2012) on inclusive innovation whereby the government needs to support firms that are often excluded from mainstream economic investment. Thai and Turkina (2014) suggested that to increase entrepreneurship, policymakers may promote networking to encourage social capital for informal entrepreneurs to improve their performance while developing appropriate reforms to enable them transit to formality.

From a managerial perspective, our contribution creates a better understanding of informality and the choice of whether to stay informed or to transit to formality (Thai and Turkina, 2014). This is important especially from the fact that inefficient institutions make the transition to formality undesirable (Autio and Fu, 2014; Benjamin and Mbaye, 2012; Heredia Péreza et al., 2018). This undesirability corroborates with the positive effect of formal firms on innovation due to the competitive strategies of innovating to overcome the threat of informal firms (Péreza et al., 2018; Mccann and Bahl, 2017) which is, however, relevant for large but not for small firms because the cost of formalisation is not proportionate to the benefit they will derive (McCulloch et al., 2010; McKenzie and Sakho, 2010). Moreover, the positive relationships oppose the view of Mendi and Midida (2018) that informality constrains the innovative behaviour of the firm. Therefore, with a better strategy, informal firms may leverage their advantages to be more innovative.

Conclusion

The contribution derived from our analysis however provides avenues for future research. First, while focusing on firm-level data enables us to analyse individual-level data to inform

decision making at the firms level, future research can focus on country-level data especially when we consider the argument of whether informality increases or decreases entrepreneurship through its influence on firm innovation. Second, though our 30 countries from Eastern Europe and Southeast Asia provide a reasonable sample, studies about informality and innovation using data from developed economies where informality is low may help provide different perspectives to our understanding about this relationship. Finally, research exploring the relationship between starting an unregistered business and the firm's innovation is still limited and sparse and therefore our research can serve as a reference point for more exciting studies that incorporate different mediators and moderators.

Declaration of conflicting interests: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding: The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

Autio E, and Fu K. (2015). "Economic and Political Institutions and Entry into Formal and Informal entrepreneurship", *Asia Pacific Journal of Management,* Vol. 32, No. 1, pp. 67–94.

Ayyagari, M., Demirgüç-Kunt, A. and Maksimovic, V. (2011), "Firm Innovation in Emerging Markets: The Role of Finance, Governance, and Competition", *The Journal of Financial and Quantitative Analysis,* Vol. 46, No. 6, pp. 1545-1580.

Baker W, Grinstein A, and Harmancioglu N. (2016), "Whose Innovation Performance Benefits more from External Networks: Entrepreneurial or Conservative Firms", *Journal of Product Innovation Management,* Vol. 33, No. 1, pp. 104-120.

Benjamin NC, and Mbaye A. (2012), "The Informal Sector, Productivity, and Enforcement in West Africa: A firm-level Analysis", *Review of Development Economics,* Vol. 16, No. 4, pp. 472–492.

Benjamin NC, and Mbaye AA. 2014. Informality, Growth, and Development in Africa. In: UNU-WIDER Working Paper 2014–52. UNU-WIDER, Helsinki (Finland).

Bottazzi G, Secchi A, and Tamagni F. (2014), "Financial Constraints and Firm Dynamics", *Small Business Economics,* Vol. 42, No. 1, pp. 99-116.

Dau LA, and Cuervo-Cazurra A. (2014), "To Formalize or not to Formalize: Entrepreneurship and Premarket Institutions", *Journal of Business Venturing,* Vol. 29, 668–686.

Demenet A, Razafindrakoto M, and Roubaud F. (2015), "Do Informal Businesses Gain from Registration and How? Panel Data Evidence from Vietnam", *World Development, Vol* 84, 326-341.

Distinguin I, Rugemintwari C, and Tacneng R. (2016), "Can Informal Firms Hurt Registered SMEs' Access to Credit", *World Development,* Vol. 84: 18-40.

Fowowe, B. (2017), "Access to Finance and Firm Performance: Evidence from African Countries", *Review of Development Finance,* Vol. 7, No. 1, pp. 6-17.

Fu X, Mohnen P, and Zanello G. (2018), "Innovation and Productivity in Formal and Informal Firms in Ghana", *Technological Forecasting & Social Change*, Vol. 131, 315-325.

George G, McGahan AM, and Prabhu J. (2012), "Innovation for Inclusive Growth: Towards a Theoretical Framework and a Research Agenda", *Journal of Management Studies*, Vol. 49, No. 4, pp. 661–683.

Grimm M, Knorringa P, and Lay J. (2012), "Constrained Gazelles: High potentials in West Africa's informal economy", *World Development,* Vol. 40: 1352–1368.

Heredia Pérez J.A, Kunc M.H, Durst S, Flores A, and Geldes C. (2018), "Impact of Competition from Unregistered Firms on R&D Investment by Industrial Sectors in Emerging Economies", *Technological Forecasting & Social Change*, Vol. 133, pp. 179-189.

ILO. 2011. Statistical Updates on Employment in the Informal Economy. Geneva: ILO.

Kutner MH, Nachtsheim CJ, Neter J, and Li W. (2004), Applied Linear Regression Models, 5th edition. McGraw-Hill/Irwin, New York.

Lavallée E, and Roubaud F. (2019), "Corruption in the Informal Sector: Evidence from West Africa", *The Journal of Development Studies*, Vol. 55, No. 6, pp. 1067-1080.

McCann BT, and Bahl M. (2017), "The Influence of Competition from Informal Firms on New Product Development", *Strategic Management Journal*, Vol. 38, No. 7, pp. 1518-1535.

McCulloch N, Schulze G, and Voss J. (2010), What Determines Firms' Decisions to Formalize? Discussion Paper Series, No. 13. Frieburg: University of Frieburg Department of International Economic Policy.

McKenzie D, and Sakho YS. (2010), "Does it Pay Firms to Register for Taxes? The Impact of Formality on Firm Profitability", *Journal of Development Economics,* Vol. 91, No. 1, pp. 15–24.

Mendi P, and Costamagna R. (2017). "Managing Innovation Under Competitive Pressure from Informal Producers", *Technological Forecasting & Social Change,* Vol. 114, pp. 192-202.

Mendi P, and Mudida R. (2018), "The Effect on Innovation of Beginning Informal: Empirical Evidence from Kenya", *Technological Forecasting & Social Change,* Vol. 131, pp. 326-335.

Njinyah SZ. (2018), "The Effectiveness of Government Policies for Export Promotion on the Export Performance of SME Cocoa Exporters in Cameroon", *International Marketing Review,* Vol. 35, No.1, pp. 164-185.

North DC. (1990). Institutions, Institutional Change and Economic Performance. Cambridge: Cambridge University Press.

Sun, S. L., Shi, W., Ahlstrom, D., and Tian, L. (2020). "Understanding institutions and entrepreneurship: The micro foundations lens and emerging economies", *Asia Pacific Journal of Management*, Vol. 37, No. 4, pp. 957-979.

OECD 2005. Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data. OECD Publishing, Paris.

OECD 2006. Financing SMEs and Entrepreneurs, OECD Policy Brief. Organisation for Economic Co-operation and Development, Paris (November).

Peng MW, Wang D Y, and Jiang Y. (2008), "An Institution-based View of international Business Strategy: A focus on Emerging Economies", *Journal of International Business Studies*, Vol. 39, No. 5, pp. 920-936.

Podsakoff PM, MacKenzie SB, Lee J, and Podsakoff NP. (2003). “Common Method Biases in Behavioral Research: A critical review of the literature and recommended remedies”, *Journal of Applied Psychology,* Vol. 88, No. 5, pp. 879-903.

Porta RL, and Shleifer A. (2014), “Informality and Development”, *The Journal of Economic Perspectives,* Vol. 28, No. 3, pp. 109-126.

Ramadani V, Hisrich RD, Abazi-Alili H, Dana L, Panthi L, and Abazi-Bexheti L. (2019), “Product Innovation and Firm Performance in Transition Economies: A Multi-stage estimation Approach”, *Technological Forecasting & Social Change*, Vol. 140, pp 271-280.

Ribeiro-Soriano, D. and Galindo-Martín, M. (2012), "Government Policies to Support Entrepreneurship", *Entrepreneurship and regional development,* Vol. 24, No. 9-10, pp. 861-864.

Richardson H, Simmering M, and Sturman M. (2009), “A Tale of three Perspectives: Examining Post hoc Statistical Techniques for Detection and Correction of Common Method Variance”, *Organizational Research Methods,* Vol. 12, pp. 762–800.

Siqueira A, and Bruton GD, (2010), “High-technology Entrepreneurship in Emerging Economies: Firm Informality and Contextualization of Resource-Based Theory*”*, *IEEE Transactions on Engineering Management,* Vol. 57, No. 1, pp. 39-50.

Siqueira A, Webb JW, and Bruton GD. (2016), “Informal Entrepreneurship and Industry Conditions”, *Entrepreneurship Theory and Practice,* Vol. 40, No. 1, pp. 177-200.

Tabachnick, B.G. and Fidell, L.S. 2001. Using Multivariate Statistics. 4th Edition, Allyn and Bacon, Boston.

Tchamyou, V. S. (2019), “The Role of Information Sharing in Modulating the Effect of Financial Access on Inequality”, *Journal of African Business,* Vol. 20, No. 3, pp. 317-338.

Tchamyou, V. S., and Asongu, S. A., (2017), « Information Sharing and Financial Sector Development in Africa", *Journal of African Business,* Vol. 18, No. 7, pp. 24-49.

Thai MTT, and Turkina E. (2014), "Macro-level Determinants of Formal Entrepreneurship Versus Informal Entrepreneurship", *Journal of Business Venturing*, Vol. 29, No. 4, pp. 490–510.

Welter, F., Smallbone, D. and Pobol, A. (2015), "Entrepreneurial Activity in the Informal Economy: A Missing Piece of the Entrepreneurship Jigsaw Puzzle", *Entrepreneurship and regional development,* Vol. 27, No. 5-6, pp. 292-306.

Williams CC. and Shahid M. (2016), "Informal Entrepreneurship and Institutional Theory: Explaining the Varying Degrees of (In)formalisation of Entrepreneurs in Pakistan", *Entrepreneurship and Regional Development,* Vol. 28, No. 1–2, pp. 1–25.

Williams, C.C. and Nadin, S. (2012), "Tackling the Hidden Enterprise Culture: Government Policies to Support the Formalization of Informal Entrepreneurship", *Entrepreneurship and regional development*, Vol. 24, No. 9-10, pp. 895-915.

Williams, C., and Martinez, A. (2014), "Is the informal economy an incubator for new enterprise creation? a gender perspective", *International Journal of Entrepreneurial Behaviour and Research,* Vol. 20, No. 1, pp. 4–19.

Williams, C. C. (2007), "Small business and the informal economy: evidence from the UK", *International Journal of Entrepreneurial Behaviour & Research*, Vol. 13, No. 6, pp. 349–366.

Zoogah D B, Peng MW, and Woldu H. (2015), "Institutions, resources, and organizational effectiveness in Africa", *Academy of Management Perspectives,* Vol. 29, No. 1, pp. 7-31.

Zoogah D B. (2018), "Institutional Risk and Firm Performance in Africa: The Moderating Role of Corruption Control", *Africa Journal of Management,* Vol. 4, No. 4, pp. 401-425.

Table 1. List of countries

Countries	**Number of Firms**	**Countries**	**Number of firms**
Albania	535	Kyrgyz Republic	505
Belarus	633	Mongolia	722
Georgia	733	Estonia	546
Tajikistan	719	Kosovo	472
Turkey	2,496	Czech Republic	504
Ukraine	1,853	Hungary	601
Uzbekistan	756	Latvia	607
Russia	5,224	Lithuania	546
Poland	997	Slovak Republic	543
Romania	1,081	Slovenia	546
Serbia	748	Bulgaria	581
Kazakhstan	1,144	Croatia	519
Moldova	723	Montenegro	266
Bosnia	721	Fyr Macedonia	726
Azerbaijan	770	Armenia	734
Total 27,551			

Table 2. Variable Description

Informality		
Unregistered firms	The establishment started business operations unregistered with “1” = Yes and “0” = No, it did not.	WBES
Firm innovation		
Product innovation	New products/services introduced with “1” = Yes and “0” = No, it did not.	WBES
Process innovation	New production/supply methods introduced with “1” = Yes and “0” = No, it did not.	WBES
Organisational innovation	New organisational/management practices or structures with “1” = Yes and “0” = No, it did not.	WBES
Marketing innovation	New marketing methods introduced with “1” = Yes and “0” = No, it did not.	WBES
Institutional support		
Access to finance	Line of credit or a loan from a financial institution with “1” = Yes and “0” = No, it did not.	WBES
Control variables		
Size of the firm	A categorical variable with “1” = small, “2” = medium and “3” = large.	WBES
Managers level of education	What is the highest level of formal education the top manager has complete with “1” = degree, “2” = masters and “3” = doctorate	WBES
Website	Does the firms have a website with “1” = Yes and “0” = No, it did not.	WBES
Gender of manager	Whether the top manager is a female with “1” = Yes and “0” = No, it is not.	WBES
Part of an establishment	Whether the firm is part of a larger firm with “1” = Yes and “0” = No, it is not.	WBES
Legal status	Whether the firm is a sole proprietor with “1” = Yes and “0” = No, it is not.	WBES
Years of managerial experience	A continuous variable on the number of years of experience the manager has in the sector (Log)	WBES
Power Outages	Whether the firm has experienced power outages over last fiscal year with “1” = Yes and “0” = No, it did not.	WBES
E-mail	Whether the firm use e-mail to communicate with clients or suppliers with “1” = Yes and “0” = No, it did not.	WBES
Pay for security	Whether the firm pays for security in last fiscal year with “1” = Yes and “0” = No, it did not.	WBES
Purchased of fixed assets	Whether a firm purchase of fixed assets in last fiscal year with “1” = Yes and “0” = No, it did not.	WBES
Savings account	Whether the firm have a checking or savings account with “1” = Yes and “0” = No, it did not.	WBES

Table 3. Descriptive and correlation statistics

	1	2	3	4	5	6	7	8	9	10
Unregistered (1)	1									
Product Innovation (2)	0.035	1								
Process Innovation (3)	0.048*	0.481***	1							
Organisational Innovation (4)	0.027	0.364***	0.5153	1						
Marketing Innovation (5)	0.032	0.377***	0.471***	0.547***	1					
Access to finance (6)	-0.039	0.152***	0.160***	0.180***	0.155***	1				
Firm size (7)	-0.062**	0.104***	0.073**	0.146***	0.145***	0.134***	1			
Managers education (8)	-0.055*	0.155***	0.135***	0.215***	0.149***	0.077**	0.260***	1		
firm has website (9)	-0.004	0.144***	0.121***	0.153***	0.138***	0.156***	0.303***	0.270***	1	
Managers gender (10)	0.048	0.036	-0.042	0.004	0.038	-0.012	-0.064**	0.013	-0.027	1
Firm is part of a large firm (11)	-0.024	0.070**	0.065**	0.162***	0.160***	0.074**	0.209***	0.132***	0.118***	-0.008
Legal status of the firm (12)	0.068**	-0.050*	-0.022	-0.057**	-0.056*	-0.081***	-0.346***	-0.203***	-0.327***	0.096***
Managerial experience (13)	0.018	0.043	-0.026	0.028	-0.001	-0.009	0.111***	-0.019	0.060**	-0.105***
Power outages (14)	-0.03	0.057**	0.055*	0.099***	0.097***	0.096***	0.069**	0.078***	0.028	0.072**
Firm uses email (15)	0.002	0.064**	0.022	0.056**	0.049	0.065**	0.169***	0.155***	0.303***	0.02
Pays for security (16)	-0.068**	0.185***	0.145***	0.147***	0.134***	0.160***	0.229***	0.142***	0.161***	-0.019
Purchased fixed assets (17)	0.008	0.203***	0.164***	0.188***	0.202***	0.244***	0.095***	0.075**	0.141***	-0.02
Has savings account (18)	-0.027	0.03	-0.03	0.021	0.037	0.169***	0.198***	0.127***	0.184***	-0.039
N	27232	15797	15796	15795	15778	27158	27551	1299	27428	27430
Mean	0.031213	0.241881	0.197455	0.212409	0.230511	0.405553	1.669703	2.588915	0.582835	0.192636
SD	0.173897	0.428236	0.398091	0.409026	0.421173	0.491008	0.795594	0.699152	0.4931	0.394377
Min	0	0	0	0	0	0	0	2	0	0
Max	1	1	1	1	1	1	3	4	1	1

…….. table 3 continues

	11	12	13	14	15	16	17	18
Firm is part of a large firm (11)	1							
Legal status of the firm (12)	-0.105***	1						
Managerial experience (13)	0.02	-0.046	1					
Power outages (14)	0.145***	0.008	0	1				
Firm uses email (15)	0.053**	-0.196***	0.023	0.101***	1			
Pays for security (16)	0.176***	-0.191***	0.001	0.168***	0.139***	1		
Purchased fixed assets (17)	0.097***	0.012	0.026	0.101***	0.073**	0.158***	1	
Has savings account (18)	0.065**	-0.195***	0.079***	0.081***	0.275***	0.233***	0.064**	1
N	27551	27551	26740	27231	27478	27390	27300	27321
Mean	0.096512	0.111466	2.581876	0.393963	0.820984	0.620153	0.479707	0.905494
SD	0.295297	0.314714	0.749612	0.488636	0.383373	0.485357	0.499597	0.292537
Min	0	0	0	0	0	0	0	0
Max	1	1	3.912023	1	1	1	1	1

Table 4. Regression result on unregistered firms on firm product and process innovation (full sample)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Prod. Ino	Prod. Ino	Prod. Ino	Prod. Ino	Proc. Ino	Proc. Ino	Proc. Ino	Proc. Ino
Starting unregistered (A)			0.403*	0.247			0.503**	0.384
			(0.092)	(0.429)			(0.036)	(0.235)
Access to finance (B)		0.340***		0.336***		0.403***		0.394***
		(0.001)		(0.002)		(0.000)		(0.001)
A × B				0.367				0.321
				(0.447)				(0.513)
Medium firms	-0.135	-0.153	-0.139	-0.169	-0.101	-0.105	-0.080	-0.096
	(0.288)	(0.231)	(0.280)	(0.193)	(0.430)	(0.423)	(0.534)	(0.469)
Large firms	0.064	0.023	0.083	0.044	0.043	0.003	0.063	0.026
	(0.640)	(0.871)	(0.549)	(0.754)	(0.769)	(0.986)	(0.666)	(0.862)
Managers with Masters	0.053	0.070	0.057	0.073	0.112	0.130	0.131	0.149
	(0.642)	(0.543)	(0.621)	(0.530)	(0.343)	(0.286)	(0.269)	(0.221)
Managers with Doctorate	0.455***	0.491***	0.475***	0.519***	0.507***	0.537***	0.530***	0.570***
	(0.002)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Firm has a Website	0.434***	0.394***	0.432***	0.381**	0.443***	0.398***	0.438***	0.385**
	(0.003)	(0.007)	(0.004)	(0.010)	(0.003)	(0.008)	(0.004)	(0.011)
Gender of manager	0.308	0.319*	0.292	0.309	-0.349	-0.359	-0.379	-0.393
	(0.105)	(0.095)	(0.125)	(0.110)	(0.144)	(0.134)	(0.116)	(0.108)
Firm is part of large firm	0.009	-0.023	-0.001	-0.033	0.097	0.082	0.087	0.073
	(0.939)	(0.858)	(0.995)	(0.800)	(0.450)	(0.539)	(0.503)	(0.586)
Sole Proprietorship	-0.008	-0.021	-0.039	-0.056	0.092	0.085	0.056	0.046
	(0.965)	(0.903)	(0.822)	(0.753)	(0.560)	(0.595)	(0.728)	(0.774)
Years of managerial experiences	0.047	0.082	0.044	0.083	-0.157**	-0.129*	-0.155**	-0.125
	(0.544)	(0.304)	(0.561)	(0.293)	(0.031)	(0.099)	(0.035)	(0.115)
Power outages	0.042	0.014	0.054	0.033	0.077	0.048	0.079	0.056
	(0.684)	(0.892)	(0.604)	(0.753)	(0.472)	(0.657)	(0.461)	(0.606)
Firm uses email	0.180	0.199	0.124	0.149	-0.056	-0.029	-0.082	-0.042
	(0.397)	(0.356)	(0.567)	(0.499)	(0.773)	(0.881)	(0.678)	(0.829)
Firm pays for security	0.548***	0.530***	0.544***	0.529***	0.455***	0.420***	0.468***	0.436***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
Firm purchase fixed assets	0.525***	0.469***	0.525***	0.463***	0.447***	0.385***	0.433***	0.363***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Firm has saving account	-0.166	-0.223	-0.149	-0.205	-0.338**	-0.417***	-0.361***	-0.445***
Industry, year and country effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-2.386***	-2.548***	-2.353***	-2.526***	-1.460***	-1.619***	-1.444***	-1.611***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	1,157	1,142	1,130	1,118	1,158	1,143	1,132	1,120
Wald chi2(14)	96.75	112.54	95.47	110.92	83.55	95.07	84.03	960.5
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mean VIF	3.39	3.32	3.25	3.15	3.37	3.3	3.32	3.13
Robust P values in parentheses; *** p<0.01, ** p<0.05, * p<0.1; Prod. Ino. = Product Innovation; Proc. Ino. = Process Innovation.								

Table 5. Regression result on unregistered firms on firm organisation and marketing innovation (full sample)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Org. Ino.	Org. Ino.	Org. Ino.	Org. Ino.	Mkt. Ino.	Mkt. Ino.	Mkt. Ino.	Mkt. Ino.
Starting unregistered (A)			0.387	-0.428			0.372	-0.186
			(0.117)	(0.353)			(0.109)	(0.596)
Access to finance (B)		0.410***		0.356***		0.287***		0.234**
		(0.000)		(0.001)		(0.004)		(0.023)
A × B				1.417**				1.056**
				(0.016)				(0.036)
Medium firms	-0.034	-0.047	-0.019	-0.054	-0.030	-0.037	-0.004	-0.026
	(0.781)	(0.707)	(0.877)	(0.665)	(0.802)	(0.759)	(0.972)	(0.833)
Large firms	0.259*	0.201	0.263*	0.212	0.255**	0.219*	0.272**	0.242*
	(0.052)	(0.138)	(0.050)	(0.123)	(0.048)	(0.096)	(0.036)	(0.069)
Managers with Masters	0.190*	0.229**	0.203*	0.243**	0.176	0.196*	0.176	0.198*
	(0.088)	(0.045)	(0.069)	(0.035)	(0.108)	(0.078)	(0.111)	(0.079)
Managers with Doctorate	0.654***	0.693***	0.676***	0.733***	0.356**	0.352**	0.371**	0.383***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.014)	(0.016)	(0.011)	(0.009)
Firm has a Website	0.435***	0.378***	0.421***	0.349**	0.360**	0.333**	0.345**	0.302**
	(0.002)	(0.009)	(0.003)	(0.017)	(0.010)	(0.018)	(0.014)	(0.033)
Gender of manager	0.182	0.175	0.150	0.144	0.293	0.282	0.266	0.265
	(0.348)	(0.361)	(0.438)	(0.455)	(0.127)	(0.140)	(0.163)	(0.164)
Firm is part of large firm	0.288**	0.304**	0.280**	0.306**	0.331***	0.345***	0.331***	0.350***
	(0.014)	(0.011)	(0.017)	(0.011)	(0.004)	(0.003)	(0.004)	(0.003)
Sole Proprietorship	0.050	0.051	0.026	0.029	0.001	0.003	-0.019	-0.019
	(0.761)	(0.759)	(0.878)	(0.869)	(0.996)	(0.987)	(0.907)	(0.908)
Years of managerial experiences	-0.012	0.016	-0.004	0.031	-0.054	-0.047	-0.057	-0.046
	(0.876)	(0.848)	(0.961)	(0.705)	(0.460)	(0.531)	(0.434)	(0.544)
Power outages	0.124	0.123	0.135	0.147	0.175*	0.164	0.175*	0.173*
	(0.211)	(0.227)	(0.175)	(0.152)	(0.076)	(0.101)	(0.078)	(0.085)
Firm uses email	-0.005	0.009	0.028	0.069	-0.104	-0.085	-0.086	-0.050
	(0.978)	(0.961)	(0.889)	(0.730)	(0.576)	(0.648)	(0.655)	(0.798)
Firm pays for security	0.336***	0.271**	0.346***	0.290**	0.195*	0.166	0.194*	0.172
	(0.002)	(0.016)	(0.002)	(0.011)	(0.065)	(0.120)	(0.070)	(0.111)
Firm purchase fixed assets	0.459***	0.373***	0.441***	0.341***	0.533***	0.486***	0.511***	0.457***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Firm has saving account	-0.265**	-0.313**	-0.298**	-0.349**	-0.026	-0.091	-0.048	-0.113
	(0.043)	(0.022)	(0.025)	(0.011)	(0.848)	(0.506)	(0.722)	(0.412)
Industry, year and country effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-1.969***	-2.140***	-2.006***	-2.189***	-1.762***	-1.829***	-1.747***	-1.814***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	1,156	1,141	1,131	1,119	1,158	1,143	1,132	1,120
Wald chi2	120.99	125.52	121.94	113.38	99.61	105.03	97.56	107.96
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mean VIF	3.38	3.31	3.24	3.31	3.38	3.31	3.24	3.13

Robust P values in parentheses; *** p<0.01, ** p<0.05, * p<0.1; Org. Ino. = Organisational Innovation; Mtk. Ino. = Marketing Innovation.

Table 6. Robustness regression result on unregistered firms on firm product and process innovation

	Age > 5	**Age > 10**	**Age > 15**	**Age > 20**	**Age > 5**	**Age > 10**	**Age > 15**	**Age > 20**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Prod. Ino.	Prod. Ino.	Prod. Ino	Prod. Ino.	Pro. Ino.	Proc. Ino	Proc. Ino.	Proc. Ino
Starting unregistered	0.393	0.453	0.770***	0.785**	0.497**	0.754***	1.093***	1.451***
	(0.104)	(0.102)	(0.008)	(0.014)	(0.039)	(0.005)	(0.000)	(0.000)
Medium firms	-0.187	-0.234	-0.226	-0.079	-0.133	-0.092	-0.231	-0.098
	(0.176)	(0.133)	(0.221)	(0.738)	(0.333)	(0.547)	(0.214)	(0.686)
Large firms	0.096	-0.011	0.116	0.215	0.075	-0.031	0.012	-0.007
	(0.502)	(0.943)	(0.538)	(0.375)	(0.625)	(0.858)	(0.954)	(0.980)
Managers with Masters	-0.013	0.006	0.084	0.182	0.152	0.116	0.233	0.083
	(0.919)	(0.966)	(0.607)	(0.396)	(0.228)	(0.412)	(0.162)	(0.722)
Managers with Doctorate	0.461***	0.486***	0.597***	0.512**	0.518***	0.547***	0.731***	0.679**
	(0.003)	(0.005)	(0.003)	(0.047)	(0.001)	(0.002)	(0.000)	(0.012)
Firm has a website	0.412**	0.398**	0.433*	0.899***	0.473***	0.507***	0.511**	1.137***
	(0.012)	(0.033)	(0.065)	(0.001)	(0.004)	(0.006)	(0.042)	(0.000)
Gender of manager	0.371*	0.320	0.351	0.211	-0.472	-0.788	-0.689	-0.608
	(0.082)	(0.239)	(0.244)	(0.561)	(0.114)	(0.111)	(0.216)	(0.316)
Subsidiary firm	-0.106	-0.092	-0.031	-0.091	-0.068	-0.061	-0.169	-0.191
	(0.435)	(0.533)	(0.862)	(0.673)	(0.636)	(0.698)	(0.371)	(0.420)
Legal status	-0.047	0.135	0.310	0.759**	0.082	0.317	0.353	0.510*
	(0.809)	(0.533)	(0.219)	(0.017)	(0.647)	(0.116)	(0.156)	(0.095)
Managerial experience	0.022	0.078	0.202	0.054	-0.148*	-0.156	-0.083	-0.164
	(0.798)	(0.449)	(0.106)	(0.749)	(0.082)	(0.116)	(0.456)	(0.335)
Power outages	0.032	0.021	-0.142	-0.102	0.073	-0.069	-0.165	-0.205
	(0.778)	(0.865)	(0.322)	(0.578)	(0.529)	(0.592)	(0.278)	(0.302)
Firm pays for security	0.188	0.219	0.236	0.220	-0.078	-0.137	0.192	-0.386
	(0.425)	(0.397)	(0.461)	(0.572)	(0.719)	(0.564)	(0.543)	(0.327)
Firm purchased fixed assets	0.612***	0.602***	0.655***	0.631***	0.456***	0.564***	0.704***	0.868***
	(0.000)	(0.000)	(0.000)	(0.006)	(0.001)	(0.000)	(0.000)	(0.001)
Firm has savings account	0.508***	0.540***	0.453***	0.342*	0.445***	0.451***	0.400***	0.350*
	(0.000)	(0.000)	(0.001)	(0.053)	(0.000)	(0.000)	(0.006)	(0.065)
industry, year and country effects								
	-	-	-	-	-	-	-	-
Constant	2.281***	2.545***	3.018***	3.194***	1.531***	1.629***	2.360***	2.642***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	999	800	586	353	1,001	802	587	356
Wald chi2	86.31	74.62	59.03	46.42	71.64	71.67	62.76	53.69
Prob > chi2	0	0	0	0	0	0	0	0
Mean VIF	3.39	3.57	3.93	4.4	3.35	3.54	3.91	4.38

Robust P values in parentheses; *** p<0.01, ** p<0.05, * p<0.1; Prod. Ino. = Product Innovation; Proc. Ino. = Process Innovation.

…. Table 6 continue

	Age > 5	**Age > 10**	**Age > 15**	**Age > 20**	**Age > 5**	**Age > 10**	**Age > 15**	**Age > 20**
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	Org. Ino.	Org. Ino.	Org. Ino.	Org. Ino.	Mak. Ino	Mak. Ino	Mak. Ino	Mak. Ino
Starting unregistered	0.377	0.294	0.438	0.365	0.373	0.173	0.371	0.246
	(0.130)	(0.319)	(0.162)	(0.301)	(0.109)	(0.544)	(0.219)	(0.471)
Medium firms	-0.023	-0.045	-0.026	-0.031	0.052	0.036	0.062	0.290
	(0.858)	(0.757)	(0.875)	(0.888)	(0.688)	(0.799)	(0.715)	(0.198)
Large firms	0.285**	0.243	0.260	0.186	0.334**	0.291*	0.368**	0.454*
	(0.045)	(0.118)	(0.141)	(0.415)	(0.016)	(0.056)	(0.039)	(0.055)
Managers with Masters	0.232*	0.151	0.197	0.203	0.177	0.083	0.117	0.207
	(0.053)	(0.246)	(0.190)	(0.318)	(0.137)	(0.532)	(0.461)	(0.328)
Managers with Doctorate	0.674***	0.595***	0.582***	0.653***	0.391**	0.311*	0.373*	0.427*
	(0.000)	(0.000)	(0.002)	(0.006)	(0.011)	(0.063)	(0.053)	(0.080)
Firm has a website	0.558***	0.389**	0.446**	0.668**	0.343**	0.353**	0.178	0.432
	(0.001)	(0.023)	(0.032)	(0.012)	(0.028)	(0.040)	(0.393)	(0.133)
Gender of manager	0.238	0.200	0.183	0.134	0.297	-0.059	0.149	0.151
	(0.281)	(0.487)	(0.568)	(0.719)	(0.152)	(0.839)	(0.634)	(0.688)
Subsidiary firm	0.178	0.197	0.170	0.163	0.296**	0.294**	0.238	0.122
	(0.164)	(0.155)	(0.285)	(0.401)	(0.017)	(0.029)	(0.136)	(0.543)
Legal status	0.036	0.083	0.262	0.561*	0.093	0.278	0.295	0.744**
	(0.853)	(0.696)	(0.294)	(0.083)	(0.596)	(0.164)	(0.216)	(0.017)
Managerial experience	0.007	0.018	0.112	0.062	-0.070	-0.072	0.068	0.103
	(0.934)	(0.858)	(0.321)	(0.691)	(0.406)	(0.448)	(0.532)	(0.475)
Power outages	0.134	0.187	0.053	0.070	0.177*	0.226*	0.154	0.250
	(0.208)	(0.113)	(0.693)	(0.688)	(0.097)	(0.057)	(0.262)	(0.169)
Firm pays for security	0.059	0.147	0.129	-0.218	-0.182	-0.171	-0.263	-0.751**
	(0.792)	(0.551)	(0.659)	(0.514)	(0.360)	(0.438)	(0.310)	(0.016)
Firm purchased fixed assets	0.267**	0.174	0.254*	0.340*	0.229**	0.143	0.249	0.176
	(0.024)	(0.177)	(0.099)	(0.086)	(0.049)	(0.259)	(0.111)	(0.379)
Firm has savings account	0.501***	0.487***	0.572***	0.445***	0.493***	0.472***	0.514***	0.444***
	(0.000)	(0.000)	(0.000)	(0.009)	(0.000)	(0.000)	(0.000)	(0.006)
industry, year and country effects								
	-	-	-	-	-	-	-	-
Constant	2.201***	2.216***	2.515***	2.258***	1.689***	1.765***	2.070***	2.212***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	1,000	800	586	355	1,002	801	586	356
Wald chi2	107.77	76.93	63.95	45.51	87.48	65.03	49.26	35.74
Prob > chi2	0	0	0	0	0	0	0	0
Mean VIF	3.37	3.56	3.92	4.38	3.36	3.56	3.92	4.38

Robust P values in parentheses; *** p<0.01, ** p<0.05, * p<0.1; Org. Ino. = Organisational Innovation; Mtk. Ino. = Marketing Innovation.

Table 7. Robustness regression result on unregistered firms on firm organisational and marketing innovation

	Age > 5	**Age > 10**	**Age > 15**	**Age > 20**	**Age > 5**	**Age > 10**	**Age > 15**	**Age > 20**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Prod. Ino	Prod. Ino	Prod. Ino	Prod. Ino	Proc. Ino	Proc. Ino	Proc. Ino	Proc. Ino
Starting unregistered (A)	0.232	0.351	0.684**	1.107***	0.406	0.646*	0.862**	1.085**
	(0.460)	(0.274)	(0.048)	(0.007)	(0.211)	(0.051)	(0.036)	(0.021)
Access to finance (B)	0.343***	0.261**	0.266*	0.240	0.435***	0.361***	0.527***	0.232
	(0.004)	(0.043)	(0.081)	(0.204)	(0.000)	(0.008)	(0.002)	(0.255)
A × B	0.379	0.276	0.239	-0.525	0.273	0.333	0.618	0.773
	(0.436)	(0.621)	(0.667)	(0.397)	(0.580)	(0.543)	(0.290)	(0.239)
Medium firms	-0.223	-0.266*	-0.256	-0.052	-0.164	-0.122	-0.294	-0.141
	(0.109)	(0.091)	(0.176)	(0.835)	(0.243)	(0.442)	(0.146)	(0.586)
Large firms	0.055	-0.061	0.072	0.261	0.028	-0.094	-0.082	-0.059
	(0.706)	(0.710)	(0.710)	(0.308)	(0.859)	(0.596)	(0.704)	(0.832)
Managers with Masters	0.000	0.020	0.105	0.189	0.169	0.136	0.259	0.132
	(1.000)	(0.888)	(0.529)	(0.391)	(0.192)	(0.347)	(0.140)	(0.587)
Managers with Doctorate	0.512***	0.538***	0.670***	0.558**	0.569***	0.605***	0.820***	0.779***
	(0.001)	(0.002)	(0.001)	(0.032)	(0.000)	(0.001)	(0.000)	(0.004)
Firm has a website	0.359**	0.359*	0.386	0.874***	0.422**	0.463**	0.477*	1.109***
	(0.029)	(0.056)	(0.107)	(0.003)	(0.011)	(0.011)	(0.065)	(0.001)
Gender of manager	0.400*	0.385	0.444	0.300	-0.499*	-0.748	-0.609	-0.508
	(0.062)	(0.156)	(0.145)	(0.406)	(0.097)	(0.130)	(0.288)	(0.403)
Subsidiary firm	-0.146	-0.139	-0.097	-0.209	-0.097	-0.095	-0.241	-0.314
	(0.300)	(0.361)	(0.606)	(0.345)	(0.515)	(0.563)	(0.222)	(0.202)
Legal status	-0.071	0.117	0.304	0.743**	0.069	0.294	0.337	0.496
	(0.720)	(0.596)	(0.238)	(0.023)	(0.708)	(0.155)	(0.197)	(0.123)
Managerial experience	0.064	0.133	0.322***	0.224	-0.110	-0.102	0.033	-0.008
	(0.486)	(0.223)	(0.009)	(0.200)	(0.238)	(0.344)	(0.781)	(0.962)
Power outages	0.010	0.002	-0.163	-0.116	0.053	-0.088	-0.189	-0.205
	(0.931)	(0.987)	(0.258)	(0.527)	(0.654)	(0.496)	(0.230)	(0.306)
Firm pays for security	0.219	0.243	0.253	0.168	-0.036	-0.115	0.240	-0.355
	(0.361)	(0.350)	(0.438)	(0.669)	(0.867)	(0.624)	(0.457)	(0.396)
Firm purchased fixed assets	0.589***	0.593***	0.651***	0.625***	0.403***	0.526***	0.701***	0.872***
	(0.000)	(0.000)	(0.000)	(0.008)	(0.002)	(0.001)	(0.001)	(0.002)
Firm has savings account	0.450***	0.498***	0.389***	0.293	0.376***	0.394***	0.296*	0.304
	(0.000)	(0.000)	(0.009)	(0.105)	(0.001)	(0.003)	(0.053)	(0.116)
industry, year and country effects								
	-	-	-	-	-	-	-	-
Constant	2.469***	2.777***	3.472***	3.832***	1.739***	1.863***	2.930***	3.486***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	989	790	578	348	991	792	579	351
Wald chi2	86.31	74.62	59.03	46.42	71.64	71.67	62.76	53.69
Prob > chi2	0	0	0	0	0	0	0	0
Mean VIF	3.26	3.42	3.76	4.29	3.23	3.39	3.75	4.26

Robust P values in parentheses; *** p<0.01, ** p<0.05, * p<0.1; ; Prod. Ino. = Product Innovation; Proc. Ino. = Process Innovation

… table 7 continue

	Age > 5	**Age > 10**	**Age > 15**	**Age > 20**	**Age > 5**	**Age > 10**	**Age > 15**	**Age > 20**
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	Org. Ino.	Org. Ino.	Org. Ino.	Org. Ino.	Mak. Ino	Mak. Ino	Mak. Ino	Mak. Ino
Starting unregistered (A)	-0.404	-0.292	-0.147	-0.140	-0.206	-0.069	0.108	0.284
	(0.380)	(0.523)	(0.760)	(0.793)	(0.553)	(0.844)	(0.774)	(0.508)
Access to finance (B)	0.365***	0.317***	0.407***	0.179	0.206*	0.132	0.167	-0.027
	(0.001)	(0.009)	(0.004)	(0.312)	(0.061)	(0.268)	(0.236)	(0.880)
A × B	1.352**	1.097*	1.026	0.846	1.086**	0.510	0.510	-0.080
	(0.022)	(0.083)	(0.115)	(0.226)	(0.030)	(0.378)	(0.381)	(0.901)
Medium firms	-0.065	-0.085	-0.042	-0.054	0.032	0.028	0.062	0.277
	(0.631)	(0.567)	(0.808)	(0.813)	(0.806)	(0.847)	(0.717)	(0.225)
Large firms	0.233	0.174	0.179	0.119	0.304**	0.254	0.332*	0.413*
	(0.110)	(0.274)	(0.329)	(0.608)	(0.032)	(0.103)	(0.070)	(0.087)
Managers with Masters	0.272**	0.191	0.222	0.260	0.197	0.094	0.131	0.239
	(0.028)	(0.153)	(0.156)	(0.215)	(0.105)	(0.485)	(0.420)	(0.265)
Managers with Doctorate	0.735***	0.649***	0.619***	0.741***	0.406***	0.310*	0.369*	0.468*
	(0.000)	(0.000)	(0.001)	(0.002)	(0.009)	(0.067)	(0.058)	(0.057)
Firm has a website	0.490***	0.324*	0.375*	0.600**	0.296*	0.326*	0.138	0.428
	(0.004)	(0.068)	(0.083)	(0.031)	(0.060)	(0.060)	(0.515)	(0.142)
Gender of manager	0.241	0.253	0.264	0.182	0.310	-0.021	0.207	0.153
	(0.274)	(0.378)	(0.422)	(0.633)	(0.138)	(0.942)	(0.512)	(0.687)
Subsidiary firm	0.197	0.223	0.182	0.123	0.319**	0.314**	0.266	0.090
	(0.134)	(0.118)	(0.268)	(0.535)	(0.011)	(0.022)	(0.101)	(0.659)
Legal status	0.040	0.089	0.278	0.576*	0.092	0.274	0.309	0.737**
	(0.845)	(0.684)	(0.280)	(0.084)	(0.608)	(0.174)	(0.200)	(0.017)
Managerial experience	0.048	0.082	0.232**	0.147	-0.059	-0.062	0.113	0.082
	(0.620)	(0.468)	(0.049)	(0.352)	(0.495)	(0.534)	(0.324)	(0.590)
Power outages	0.151	0.213*	0.105	0.099	0.179*	0.229*	0.168	0.225
	(0.169)	(0.077)	(0.452)	(0.576)	(0.097)	(0.057)	(0.233)	(0.220)
Firm pays for security	0.093	0.158	0.145	-0.224	-0.145	-0.146	-0.250	-0.734**
	(0.678)	(0.528)	(0.638)	(0.507)	(0.470)	(0.510)	(0.345)	(0.020)
Firm purchased fixed assets	0.188	0.098	0.186	0.289	0.203*	0.126	0.233	0.184
	(0.117)	(0.453)	(0.241)	(0.142)	(0.084)	(0.326)	(0.143)	(0.364)
Firm has savings account	0.405***	0.408***	0.486***	0.417**	0.444***	0.453***	0.485***	0.487***
	(0.000)	(0.001)	(0.000)	(0.016)	(0.000)	(0.000)	(0.000)	(0.004)
industry, year and country effects								
	-	-	-	-	-	-	-	-
Constant	2.413***	2.512***	3.058***	2.692***	1.745***	1.807***	2.225***	2.110***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Observations	990	790	578	350	992	791	578	351
Wald chi2	107.77	76.93	63.95	45.51	87.48	65.03	49.26	35.74
Prob > chi2	0	0	0	0	0	0	0	0.002
Mean VIF	3.24	3.41	3.76	4.26	3.24	3.41	3.73	4.26

Robust P values in parentheses; *** p<0.01, ** p<0.05, * p<0.1; Org. Ino. = Organisational Innovation; Mtk. Ino. = Marketing Innovation.