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Training, Human Capital, and Gender Gaps in Entrepreneurial Performance

IZA Discussion Papers, No. 12777

Provided in Cooperation with:
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Suggested Citation: Brixiova, Zuzana; Kangoye, Thierry; Said, Mona (2019) : Training, Human Capital, and Gender Gaps in Entrepreneurial Performance, IZA Discussion Papers, No. 12777, Institute of Labor Economics (IZA), Bonn

This Version is available at:
https://hdl.handle.net/10419/215173

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Training, Human Capital, and Gender Gaps in Entrepreneurial Performance

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ISSN: 2365-9793

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ABSTRACT

Training, Human Capital, and Gender Gaps in Entrepreneurial Performance[1]

In the aftermath of the global financial crisis, policymakers have been increasingly striving to support female entrepreneurship as a possible growth driver. This paper contributes to reconciling mixed findings in the literature on the effectiveness of entrepreneurial training with an analysis that links training and human capital, including tertiary education and non-cognitive skills, with gender gaps in entrepreneurial performance in Africa. We have found that while financial literacy training directly benefits men, it does not raise the sales level of women entrepreneurs. Instead, tertiary education has a direct positive link with the performance of women. Consistent with our theoretical model where different skills are complements, tertiary education can act as a channel that makes training effective. Regarding non-cognitive skills, evidence shows that women entrepreneurs who are tenacious achieve stronger sales performance. Our results underscore the importance of incorporating tertiary education and entrepreneurial training programs focused on a balanced set of skills, including non-cognitive skills, among policies for women entrepreneurs.

JEL Classification: L53, O12, J4

Keywords: female entrepreneurship, training, non-cognitive skills, tertiary education

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[1] We are very grateful to Susumu Imai, Sushanta Mallick, Sadia Priyanka, and two anonymous referees for comments and discussions that improved the paper. Earlier versions were presented at the CSAE 2019 conference on Economic Development in Africa (March 2019, Oxford) and at the Workshop on Gender and Family in the Labor Market (Prague, May 2019). The views expressed are those of the authors and do not necessarily reflect those of their respective institutions. Zuzana Brixiová acknowledges funding from the Czech Science Foundation under Grant No. GA19 – 25280S.

1. Introduction

Given the uncertain global environment, policymakers in developing countries have been increasingly turning to inclusive entrepreneurship to stimulate growth with job creation (OECD, 2017a; World Bank, 2012; Global Entrepreneurship Monitor (GEM), 2017).[2] This renewed interest in entrepreneurship generated a rise in studies on female business owners as a source of women economic empowerment in developing countries (Hallward-Driemeier, 2013; De Vita et al., 2014; Dutta and Mallick, 2018). A key driver of this surge is the idea that entrepreneuership in developing countries is an essential component of structural transformation and sustained growth (Gries and Naudé, 2010; Brixiová et al, 2015). Against this background, recent governmental policies focus on supporting entrepreneurship, particularly among women and youth.

Research on entrepreneurship typically centers around one or more of the three broad factors: (i) the institutional environment, (ii) sociological factors, and (iii) entrepreneurs‘ characteristics (Djankov et al., 2005). Personal characteristics of entrepreneurs, on which our paper focuses, include skills, demographic factors, and entrepreneurs‘ sociological background, among others. While the literature on human capital and entrepreneurship is substantial, evidence on the effectiveness of human capital interventions for entrepreneurial performance remains mixed (Hogendoorn et al., 2019 and Cho and Honorati, 2014). Almost no research has been conducted with respect to whether and which non-cognitive skills make training programs more effective in terms of entrepreneurial perfromance. An exception for advanced economies is the research done by Fairlie and Holleran (2012). However, the topic has so far been understudied for entrepreneurs in developing countries. As Lundberg (2018) underscores, the case for including non-cognitive skills in human capital is that many such skills, while relatively stable, are augmentable traits that enhance cognitive performance and economic outcomes.

Evidence also remains mixed on the role of gender in entrepreneurial performance in both developed and developing countries (Fairlie and Robb, 2009; GEM, 2017). In Sub-Saharan Africa, the bulk of the empirical literature points to a persistent unadjusted gender gap in entrepreneurial performance, with female entrepreneurs being more concentrated in the low-productivity activities in the informal sector and less in higher productivity and value-adding activities such as manufacturing (Hallward-Driemier, 2013; Campos et al., 2014). Examining Latin America, Sub-Saharan Africa, and Eastern Europe and Asia, Sabarwal and Terrell (2009) found that female entrepreneurs held smaller scales of operation, while gender performance gaps diminished when individual and environmental characteristics were taken into account.

This paper aims to close the gap in the literature on entrepreneurial training, human capital, including non-cognitive skills, and gender gaps in firm performance in developing countries. We first develop a theoretical framework that reflects the stylized facts that women in developing countries often start their businesses with less education, less relevant work experience, and lower participation in professional networks than their men counterparts (Hallward-Driemier, 2013). Because of their lower educational attainment and their limited specialization in technical fields, women entrepreneurs also tend to possess fewer technical skills than men, which hampers their entry into higher value-added sectors or their raising productivity in existing firms. Women are

[2] The role of productive entrepreneurship in development was already underscored in Baumol (1990). Global Entrepreneurship Report (GEM) 2017 focused on women’s entrepreneurship.

also often less confident about their entrepreneurial skills than men, which can exacerbate the impact of existing skill shortages. The model shows that the government has a potential role to play in addressing sub-optimal levels of entrepreneurial search into high productive activities overall and especially among women, by supporting entrepreneurial training.

We test the model on a unique survey of urban entrepreneurs in Eswatini, a small middle-income country in Africa with one of the highest female unemployment rates globally.[3] Our baseline empirical results show that business training (in financial literacy) has a positive and statistically significant association with sales of men, while tertiary education has a positive and significant link with sales of women. Financial literacy is linked with stronger sales performance only among women with tertiary education, pointing to human capital complementarity. Among non-cognitive skills, tenacity seems to boost the performance of both male and female-run firms, while motivation by the need for autonomy is associated with higher sales levels only among male entrepreneurs. Tenacity is also linked with a higher predictive probability that both male and female entrepreneurs will run firms with stable or growing rather than declining sales. Financial literacy training is associated with a higher probability of stable or rising sales, while a perceived lack of skills has a negative impact on the sales dynamics of women entrepreneurs.

Our findings provide a possible explanation of why narrow business training programs have a limit success in closing gender gaps in entrepreneurial skills and performance. The limited effectiveness of training for women entrepreneurs in Eswatini contrasts with evidence from other African countries, where broader training programs that included life-skills boosted women's earning potential (Bandiera et al., 2017). The key message from our results is that since for entrepreneurship, the complementarity of skills (including cognitive and non-cognitive) is essential, training programs need to be carefully designed and well-targeted to take into account the skill spectrum. These findings are consistent with Fairlie and Holleran (2012), who found that individuals with specific personality traits seem to benefit more from entrepreneurial training programs than people without such characteristics. Our results are also linked with research on the productive potential of soft skills and with the recommendations for balanced development of hard and soft skills (Ruback, 2015; Balcar, 2016).

The paper is organized as follows: after this introduction, section 2 reviews the literature, while section 3 highlights several stylized facts on human capital, skills and entrepreneurship as well as gender gaps in entrepreneurial outcomes in emerging markets and developing countries. Section 4 presents a model that links entrepreneurship to skills and training. Section 5 discusses empirical results from a survey of entrepreneurs in Eswatini. Section 6 concludes.

2. The literature review

The empirical literature on entrepreneurship has provided ample evidence about the existence of a significant, robust, and causal relationship between entrepreneurial skills and business performance. The theoretical reasoning underpinning this finding is that the more skilled and experienced are the entrepreneurs, the more successful they are in identifying and seizing business opportunities as well as in running successful and sustainable firms (Bates, 1990; Honig, 1998;

[3] In April 2018, Swaziland changed its name to Eswatini. While in most places the paper reflects this change, several documents and reports issued prior to this change still make reference to 'Swaziland'.

Ucbasaran et al., 2008). In contrast, the empirical literature on the impact of entrepreneurial training on firm performance is inconclusive, as elaborated in Hogendoorn et al. (2019) for advanced economies, and Cho and Honorati (2014) for developing countries.

Studies at the intersection of human capital, gender, and entrepreneurship are relatively scarce but growing.[4] The majority highlights the lower human capital among women entrepreneurs relative to those of men as a factor behind gender differences in firm performance in advanced economies (Hisrich & Brush, 1984; Boden & Nucci, 2000). Welter and Smallbone (2003) posit that due to human capital gaps, women-owned micro and small enterprises in transition economies are more likely to underperform as compared with men-owned businesses. More recently, investigating the relationship between female entrepreneurship and fertility rates across both developing and developed countries, Dutta and Mallick (2018) show that higher levels of female tertiary enrollment mitigate the deterrent effect of fertility rate on female entrepreneurial rates.

Drivers of the gender gaps in entrepreneurial performance in developing countries remain relatively unexplored. When studied, the traditional topics (access to finance, property rights) prevail, leaving topics such as the role of training and skills, especially non-cognitive skills, unexplored. Attempts to address this gap include Cooray et al., (2014), who focus on the role of secondary education in South Asia's growth while Cooray et al., (2016) stress the need for female-specific human capital training beyond promoting literacy. Both papers provide the needed empirical evidence. However, as Yadav and Unni (2016) point out, the field of gender and entrepreneurship is still missing a strong theoretical foundation.

Research on gender, skills, and entrepreneurship in sub-Saharan Africa has been limited relative to other developing regions. Contributions in this area include Kithae et al (2012), who show that managerial experience correlates with the performance of women-owned firms in Kenya alongside access to sound infrastructure, business information, and financial services. Chinomona and Maziriri (2015) show similar findings, basing their study on a sample of small businesses in the urban areas in South Africa. Regarding the role of training, Drine and Grach (2010) analyze a survey of 100 men and women entrepreneurs in Tunisia and find that the mainstream approaches of supporting women entrepreneurs (networking and peer-learning) were ineffective as they were not tailored to women's needs. Brixiová and Kangoye (2016), who examine urban entrepreneurs in Eswatini, illustrate that while business training has had a positive impact on the performance of men (in terms of sales), it has not been associated with higher sales among women entrepreneurs.

Starting with the seminal work of Knight (1921) on risk attitudes among entrepreneurs, the literature examining the relationship between personality traits and entrepreneurship has a long history and continues to expand. However, as pointed by Fairlie and Holleran (2012), almost no previous studies explore whether some personality traits (or non-cognitive skills) are linked with entrepreneurs' greater benefits from business training. A notable exception for developed countries is work by Fairlie and Holleran (2012), who, utilizing evidence from randomized control experiments in the United States, find evidence suggesting that more risk-tolerant individuals benefit more from entrepreneurship training than less risk-tolerant individuals. To best of our knowledge, no study has attempted to look at the role of non-cognitive skills in explaining

[4] International journals began to systematically cover female entrepreneurship only recently (De Vita et al., 2014).

performance gaps among male and female entrepreneurs and in explaining the effectiveness of training among these two groups.[5]

This paper contributes to closing the gap in the literature on the role of training, non-cognitive skills, and education in gender gaps in entrepreneurial performance by examining the differences in performance of men and women entrepreneurs in Africa. Specifically, it uses a unique and rich dataset from Eswatini, which, besides the more standard questions on the business environment, includes parts on the entrepreneurs' personal traits and social backgrounds. The paper derives testable hypotheses from a theoretical model of costly start-ups in an economy where women have lower relevant skills and higher opportunity costs of establishing a firm than their men counterparts. The findings help reconcile the varied effects of entrepreneurial training on gender gaps and entrepreneurial outcomes displayed in the literature. More broadly, our article also contributes to the literature emphasizing the need to account for heterogeneity in education and other personality characteristics in the design of policy interventions targeting entrepreneurship.

We find that while entrepreneurial training programs can directly raise sales of men entrepreneurs, they do not work for women. However, and similarly to Dutta and Mallick (2018), our results suggest that tertiary education has a positive impact on female entrepreneurial performance, especially among women who possess tertiary education. Our results thus indicate that while women benefit from general (tertiary) education, the specific content of business training alone is effective among men. Business training is also linked with better sales performance among men that exhibit specific non-cognitive skills such as tenacity. Other personality traits, such as the drive for autonomy, are directly linked with higher sales among both men and women entrepreneurs. Besides human capital and training, our results confirm that traditional factors such as the higher amount of start-up capital are associated with better sales performance for both genders.

When measuring performance by sales dynamics (i.e., sales being stable or growing), we find that women entrepreneurs who perceive their lack of skills to be an obstacle to better perfromance are indeed less likely to record stable or growing sales. Financial literacy training programs are associated with higher predictive probability of non-declining sales among women entrepreneurs. In contrast, we do not find a significant link between either skill perceptions or financial literacy training and performance of men. Our findings suggest that policymakers in developing countries may like to strengthen the designs and targets of training programs while also paying attention to gender differences in educational achievements and the non-cognitive skills of entrepreneurs.

3. Stylized facts

This section presents key stylized facts on human capital, non-cognitive skills, and entrepreneurial performance in emerging market and developing countries. Numerous factors impede female entrepreneurship in developing and emerging market countries. These include well-recognized

[5] Cognitive skills are usually understood as the ability to solve abstract problems, while non-cognitive skills are often identified with personality traits (Brunello and Schlotter, 2011). The concensus in this literature seems to be that these skills often correlate only weakly with IQ or school achievement, but are sometimes a stronger predictor of employment outcomes (Camfield, 2016). Heckman (2008) includes motivation, socio-emotional regulation, time preference, and the ability to work with others, among such skills. In contrast, Heckman (2006) emphasizes motivation, perseverance, and tenacity, which are also the focus of our study.

constraints within the business environment such as access to credit, the regulatory framework and property rights, as well as human capital constraints, societal attitudes towards entrepreneurship and the capacity of entrepreneurs to tap into networks (Ruback, 2015; Brush et al., 2017). We focus on the latter aspects, namely education and skills, and their links to entrepreneurship. For measuring skills, we draw on the Global Entrepreneurship Monitor (GEM) and, in particular, on the indicator specifying whether or not men and women of working age perceive that they have sufficient skills to be entrepreneurs. To measure education, we utilize the recent (October 2018) World Bank's human capital index (HCI), specifically the learning adjusted for years of schooling.[6] It is notable that among countries where the HCI was constructed by gender, most sub-Saharan African countries recorded lower HCI values for women than men.

Data in the OECD (2017a and 2017b) show that fewer women than men entrepreneurs have tertiary education or managerial experience globally. Given the distribution of university graduates by area of specialization, self-employed women are less likely to have technical skills (engineering, manufacturing, or construction). The skills shortages contribute to women's lower presence in technology-based manufacturing than in the services, especially retail. Recent studies also highlight that women may be lagging behind men in some aspects of soft skills such as self-starting behaviors, innovation, identifying and exploiting new opportunities, goal setting, planning, and overcoming obstacles (Siba 2019). The OECD evidence also points to different motives between men and women to enter entrepreneurship, with men putting a greater emphasis on the financial aspects while women more often than men want to pursue a hobby or an interest.

Fig 1. Total entrepreneurship rates and perceptions of own shortages of entrepreneurial skills among men and women (in % of working age population)

Fig 1a. Women

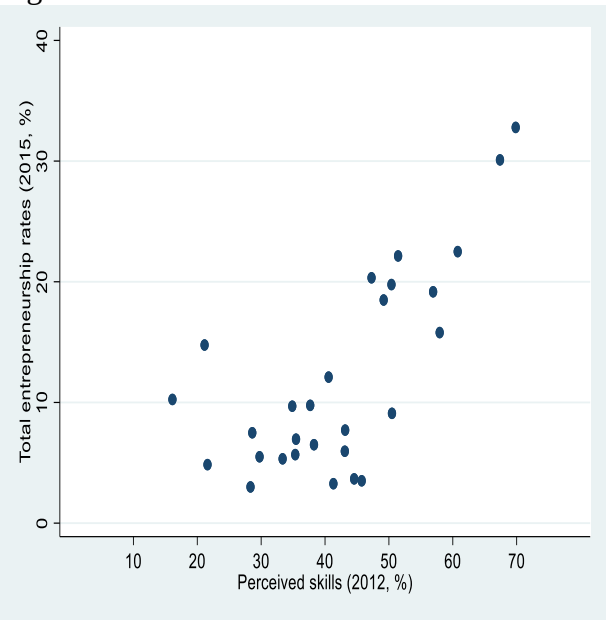
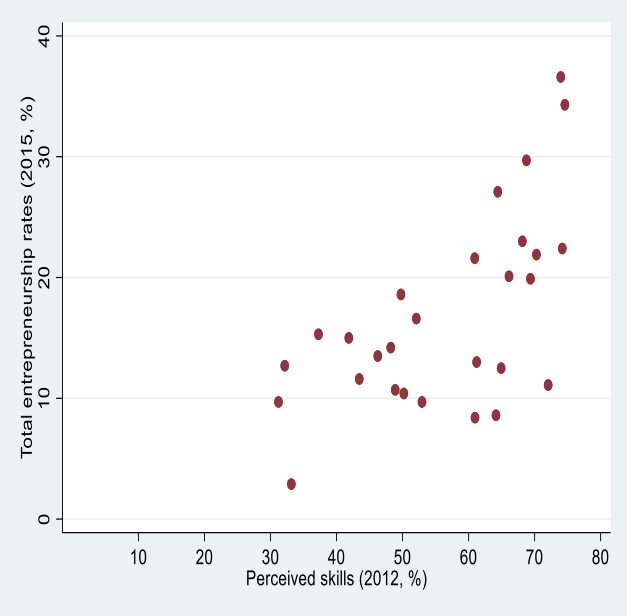


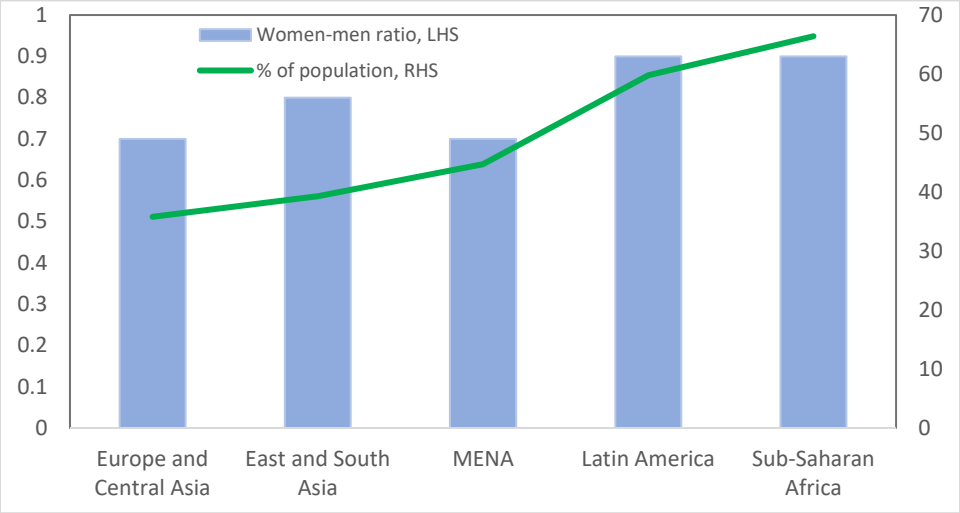
Fig 1b. Men



Source: Global Entrepreneurship Monitor, 2017. Note: Correlation coefficient for men is 0.63 and 0.72 for women.

[6] The World Bank index defines human capital as the sum of a population's health, skills, knowledge, experience and habits. It shows quantity and quality of education that a child born today is likely to achieve by the age of 18.

Fig 2. Women's perceptions of having capacity to be entrepreneurs, by region (in % of population, relative to men)

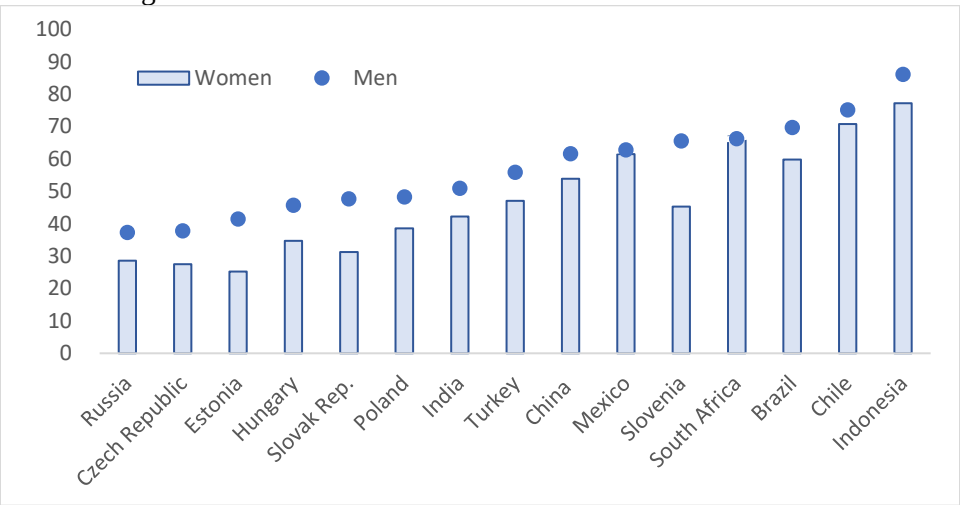


Source: Global Entrepreneurship Monitor, 2017.

Fig 3. Education and rates of necessity entrepreneurship

Source: World Bank and Global Entrepreneurship Monitor databases.
Note: While the learning-adjusted years of schooling are available only for 2018, the indicator is changing only gradually and can be assumed to approximate past several years.

Figure 4. Gender differences in personal traits: attitudes towards risks
% of men and women who would rather take a risk of being an entrepreneur than working for someone else



Source: OECD and Gallup.

In developing and emerging market countries, perceptions of entrepreneurial skills are positively related to entrepreneurial rates, and slightly more so for women than men entrepreneurs (Figure 1). Put differently, women entrepreneurs who view themselves as holding the necessary skills and knowlege to start a business are more likely to become entrepreneurs.[7] In most developing and emerging market countries, female entrepreneurs have lower education and less favorable perceptions of their abilities than men (Figure 2). In turn, lower education is associated with higher rates of necessity (survival) rather than opportunity entrepreneurship (Figure 3). Evidence also points to gender differences in personality traits such as willingeness to undertake risks (Figure 4).

Female entrepreneurs often have more limited access to entrepreneurial education and training than men. For example, the aa(2010) report on entrepreneurial training and education posits that, on average, less than half (44%) of individuals who received training in starting a business were women. Women's lower access to training amplifies challenges stemming from a limited access to start-up capital. Even when female entrepreneurs gain access to training, its effectiveness is often lowered by the focus on knowing how to write a business plan or a loan application, accounting, with training focused on communication, networking, and confidence building being more limited (Ruback, 2015). In recent years, examples of programs focused on soft skills and addressing social-cultural barriers to women's entrepreneurship have been emerging in countries ranging from Mexico to Zimbabwe. So far, however, these efforts have been sparse, carried out on small scale and not systematically (Onyas et al., 2018).

These findings lead to the following questions: to what extent does the lack of entrepreneurial skills constrain the start-up creation by women entrepreneurs in developing countries? How

[7] The literature on the motivational value of overconfidence posits that individuals with higher beliefs in their ability, even the overconfident ones, will put higher effort into activities where effort and ability are complements (Chen and Schildberg-Hörisch, 2018; Compte and Postlewaite, 2004; Barber and Odean, 2001). The role of non-cognitive skills in enterprise performance, such as motivation, was documented (Khalid and Sekiguchi, 2017; Rey-Marti et al., 2015).

effective are training programs in improving female entrepreneurial performance? The next sections provide a theoretical model that links the incentives for entrepreneurs to create new businesses and their skills, while puting a special emphasis on a skill gap between women and men entrepreneurs. The model is then tested on data from Eswatini, a country that continues to have high unemployment and exhibits persistent gender gaps in labor market outcomes.

4. The theoretical framework

This section presents a model with entrepreneurial search frictions and skill shortages, which reflects the key stylized facts. It is a model of structural transformation, with all entrepreneurs facing varying degrees of skill shortages while searching for more productive business opportunities. At the same time, the model is consistent with the observation that, relative to their men counterparts, women in developing countries, including in Africa, tend to start their businesses with a lower level of education, experience, and start-up capital as well as with less diverse networks. Reflecting on this fact in what follows, we assume that women are less efficient in their search for business opportunities, i.e., are low-skilled.[8]

The economy consists of individuals that live for one period and are endowed with one unit of time and b units of a single consumption good. The population size is normalized to one. All individuals have the same risk neutral preferences expressed as $U = c$, where c denotes consumption. They are either unemployed and earning income w in the informal subsistence sector and searching for a business opportunity with productivity z>w>0 or run a firm in the formal sector. Those individuals who do not find a business opportunity also work in the informal sector earning, w, but incur search costs. A portion p_h of individuals have high entrepreneurial skills (due to more relevant experience, higher education, stronger networks) and the remaining portion, p_l have low entrepreneurial skills, where $p_h + p_l = 1$.

New firms are created at a start-up cost to an individual i amounting to $d(x_i) = x_i^2/2\gamma_i$ units of consumption good, where x_i is the search effort by an individual of type i, $i = h, l$. The search effort levels x_i then determine the probability that an individual of type i finds a business opportunity. Similarly, $\gamma_i = min[L_{1i};\ L_{2i}] > 0$ denotes the efficiency of search by an individual of type i, $i = h, l$, where highly skilled individuals are more efficient $\gamma_h > \gamma_l > 0$ as $L_{jh} > L_{jl} > 0$ where $j \epsilon \{1,2\}$. The assumption about search effectiveness reflects the observation by Lazaer (2005) that individuals with more balanced skill sets are more likely to become entrepreneurs as opposed to specialists. We interpret L_{1i} as cognitive (technical, business) skills and L_{2i} as non-cognitive (tenacity, motivation, leadership, etc.) skills. Since the two types of skills act as complements, investing in only one type of skills will not raise search efficiency, unless the complementary skills are of a comparable level.

The optimization problem of an individual i , who chooses x_i so as to maximize his/her payoff, can be described as:

$$max[b + \left(-\frac{x_i^2}{\gamma_i} + x_i z + (1 - x_i)\, w\right)] \qquad (1)$$

[8] The model presented builds on Brixiová et al. (2015).

The return on search equals the initial endowment combined with the sales from the business net of cost of search (which can be interpreted as start-up cost). Equation (1) implies that the individual *i* searches for opportunities in the formal sector when the net payoff from search exceeds the income to be made in the informal sector. Each individual *i* when deciding whether to search for a business opportunity or to remain in the subsistence sector considers the return on their optimal search effort, x_i, with the marginal start-up cost of search equal to the marginal payoff, *z-w*:

$$x_i = \gamma_i(z - w) \qquad i = h, l; \tag{2}$$

In (2), *z* is the value (productivity) of a business opportunity. Denoting m_i to be the share of entrepreneurs with search efficiency *i*, their share become:

$$m_i = p_i x_i = p_i \gamma_i (z - w),\ i=h,\ l \tag{3}$$

Letting m_{ui} be the total share of entrepreneurs in the informal (subsistence) sector, the labor market clearing conditions for agents of type *i* (highly skilled and less skilled) become:

$$p_i = m_i + m_{ui}, \text{ where } i = h, l \quad \text{and} \quad p_h + p_l = 1 \tag{4}$$

The labor market clearing condition (4) states that the share of population with a skill level *i* comprises of entrepreneurs, m_i, running a firm in the formal sector and those who remain in the informal subsistence sector, m_{ui}. Referring to the terminology from the GEM reports, m_i represents the share of 'opportunity' entrepreneurs with skill level *i* and m_{ui} is the share of 'necessity' entrepreneurs with skill level *i*. Defining $m = m_h + m_l$ to be the total share of private firms in the formal sector and $m_u = m_{uh} + m_{ul}$ the total share of entrepreneurs in the subsistence economy, the aggregate entrepreneurial market clearing condition becomes:

$$1 = m + m_u \tag{5}$$

The equilibrium of this economy is the allocation of individuals into necessity and opportunity entrepreneurship such that: (i) each individual *i* chooses how much effort to put into search for business opportunities, x_i; and (ii) labor and product markets clear.

Equilibrium condition (3) shows that the share of opportunity entrepreneurs is larger with higher net productivity of the business and higher differential between payoffs in the formal and informal sectors. This is because when the value of a business opportunity is low, potential entrepreneurs will lower search intensity or may stop searching for business opportunities altogether. Moreover, due to their lower search efficiency, individuals with lower entrepreneurial skills will either opt out of searching for business opportunities or put less effort into their search than their more skilled counterparts. Subsequently, a smaller share of less skilled individuals become opportunity entrepreneurs in the formal sector than their more skilled counterparts:

$$m_h/p_h = \gamma_h(z - w) > \gamma_l(z - w) = m_l/p_l \tag{6}$$

Solving the social planner's problem (7), which maximizes output in the formal sector net of search costs, shows that without government's support in the search, the search effort exhorted by potential entrepreneurs and the share of firms created fall below the optimal levels:

$$Max\ (m_h z + m_l z - p_h\, x_h^2/2\gamma_h - p_l\, x_l^2/2\gamma_l)$$

$$s.t. \quad m_h \leq p_h x_h;\ m_l \leq p_l x_l;\ 0 < x_l, x_h < 1 \qquad (7)$$

Specifically, solving (7) yields that the socially optimal level of search, $\overleftarrow{x_i} = \gamma_i z$ exceeds the profit-maximizing levels of search $x_i = \gamma_i(z - w)$ derived in (3).

Our results have several policy implications. First, to raise the suboptimal search efforts exhorted by all entrepreneurs to their socially-optimal levels (derived in (7)), the government needs to offset disincentives in searching for business opportunities, which stem from a payoff to working in the informal sector. This can be done, for example, by subsidizing start-up activities or by bringing activities from the informal into the formal sector and regulating them. The government can subsidize start-up activities through, for example, training. However, if training is focused on one type of specific skills (hard or soft), it may not lead to improved search efficiency unless shortages of other skills are also addressed. In contrast, a balanced education is likely to develop both types of skills and serve as a more effective intervention. Beyond training, our results also indicate that individuals with higher initial endowment (start-up capital) could put higher effort into search and end-up more often to run highly productive firms than entrepreneurs with smaller initial resources.

While supporting search would raise rates of entrepreneurship among individuals of all skill levels, the sectoral and income inequalities between individuals with different skills would prevail. To address these disparities, the policies would need to aim at reducing skill gaps, by putting greater emphasis on less-skilled entrepreneurs. This would raise the ability of all, but especially less-skilled entrepreneurs, to run productive firms.

5. Empirical evidence from Eswatini

The sections below present empirical results on the constraints to women's entrepreneurship in the urban Eswatini. Eswatini is a small lower middle-income country in southern Africa. Its female unemployment rate of 24.4 percent in 2018 is one of the highest in Sub-Saharan Africa and globally. Unemployment is particularly high among women with less than tertiary education.

The empirical analysis focuses on the role of skills in explaining gender differences in entrepreneurial performance. The role of training is also investigated. More specifically, our empirical analysis takes into account differences in education, training, and non-cognitive skills such as tenacity as well as gaps in softs skills such as confidence (or perceptions of their capability). Based on the model, we expect individuals with a higher level of entrepreneurial skills due to education and/or experience to operate better performing firms (with higher sales) than their less-skilled counterparts. Tenacity, motivation and soft skills (e.g. self-confidence) on the part of the business owner/manager could also raise firm performance.

5.1. The data sources and descriptive statistics

This section employs a rich and unique UN survey of 640 small and medium-sized enterprises (SMEs) in urban Eswatini in the Hhoho and Manzini regions.[9] Our operational definition of entrepreneurs includes both business owners and managers. Among 640 firms surveyed, this definition encompasses 525 entrepreneurs of which 266 were men and 259 were women. The survey contains information that allows studying gaps between men and women entrepreneurs in terms of performance, skills, social networks, and values.

The Hhoho and Manzini regions were selected given their high concentration of entrepreneurial activities, especially around the Manzibi-Mbabane corridor. On average, the face-to-face interviews took 45 minutes and were conducted by twenty trained enumerators in major cities (Mbabane, Manzini, Ezulwini, Matsapha, Nhlangano, and Siteki) in the two aforementioned regions of Eswatini. The choice of cities was informed by the evidence from the 2007 and 2010 labor force surveys, which highlighted that unemployment was concentrated in urban areas.

The sampling frame for the survey contained SMEs listed in the directory of the SME Unit of the Ministry of Commerce, Industry and Trade. Using this framework, all firms listed in the major six cities that provided their full addresses were selected for interviews. This choice implied that new and small firms, as well as those that outgrew the 'SME status' or are not listed in the directory and operating more informally, may be systematically underrepresented. To partly correct for this bias, a large number of enterprises were interviewed relative to the population in the selected areas. As some SMEs listed in the directory went out of business or refused to participate in the survey, other (mostly new) companies, not listed in the directory but operated at the same location as the previous ones, were included and interviewed. The survey examined characteristics of the entrepreneurs and their backgrounds, the goals of their firms, and critical constraints. It also collected data on the main features of the enterprises (years of operations, sector, employment, and sales).

During collection, the survey information was supplemented by several focused group discussions (FGDs) with practicing female entrepreneurs. Since female entrepreneurship was one of the interests of the survey, male entrepreneurs (selected for one of the FGDs) served as a control group. The FGDs aimed to gain a deeper understanding of specific drivers of entrepreneurship, such as the value system, societal attitudes to female entrepreneurship, as well as general factors and institutions that motivate and support entrepreneurs in Eswatini.

Table 1 presents the key descriptive statistics from this survey. The details of these statistics are provided in Appendix 1. Table 1 reveals that only slightly more than one-third of female entrepreneurs have (at least some) tertiary education while almost half of the male entrepreneurs posses the same level of education. This indicator points to possible skill gaps among female entrepreneurs in terms of general skills that higher education typically provides. Furthermore, the analysis points to differences in sales and resources such as start-up capital and employment,

[9] During the development of the survey and the interpretation of the findings, the UN collaborated closely with the SME unit of the Ministry of Commerce, Industry and Trade, the relevant non-government organizations (NGOs) as well as with the financial sector institutions.

between male and female entrepreneurs. Specifically, firms run by male entrepreneurs tend to have higher sales, start-up capital, and employment than those run by female entrepreneurs, these differences being statistically significant. While more than one-third of female-run enterprises has no employees, less than one=quareter of male-managed firms are not employers. Hence men and women run firms that may require different managerial skills.

While more female than male entrepreneurs received basic business training, the difference is not statistically significant. Similar shares of men and women received training in financial literacy. Finally, no significant difference is found between men and women who perceived gender bias to be a major obstacle to entrepreneurship. Over half of men and women entrepreneurs viewed social and cultural attitudes towards entrepreneurship as an impediment, with a statistically significant difference between the two groups (Table 1).

Table 1: Differences between male and female entrepreneurs in Eswatini, all firms

(in % of all female or male entrepreneurs unless otherwise specified)

Variable	Men	Women	SE of difference	Stat. significance
Firm performance and funding				
Monthly sales (log, thousands E)	9.2	8.6	0.2	***
Sales are stable of growing	41.0	38.9	4.4	
Start-up capital (log, thousands E)	9.7	9.2	0.2	***
Had own source of initial capital	53.4	60.6	4.3	*
Entrepreneur's characteristis				
Has (at least some) tertiary education	47.4	36.3	4.3	***
Is motivated by autonomy	33.8	25.3	4.0	**
Has tenacity	68.8	66.8	4.1	
Received basic business training	46.9	53.5	4.4	
Received financial literacy training	28.2	26.3	3.9	
Has work experience	52.1	46.2	4.4	
Firm characteristics				
Size (number of employees)	2.5	1.6	0.4	**
Age of business (months)	71.3	65.1	6.9	
Has a valid license	72.2	77.6	3.8	
Perceived attitudes towards entrepreneurship				
Gender bias is an obstacle	18.0	17.8	3.4	
Social and cultural attitudes are an obstacle	57.5	50.2	4.3	*

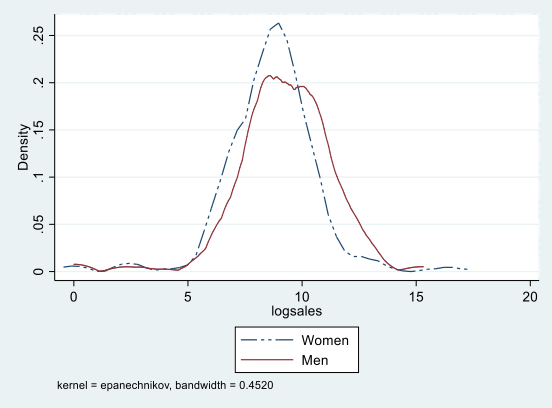
Source: Authors' calculations based on data from the UN 2013 survey.
Note: E stands for emalangeni; employment is in the number of workers. *, **, and *** denote 10%, 5% and 1% significance levels respectively.

5.2. Gender differences in entrepreneurial sales, training and skills

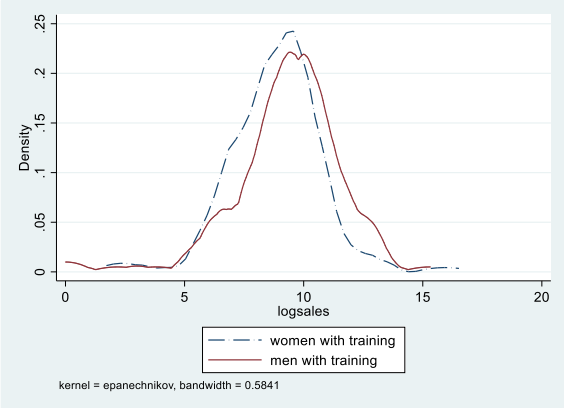
The figures below present the kernel density estimates of the probability function of (log of) monthly sales for male and female entrepreneurs. The analysis examines whether human capital interventions, such as training or higher education, combined with non-cognitive skills such as tenacity impact women's entrepreneurial performance as measured by monthly sales (Table 2).

Figure 5. Kernel density estimate (log of) sales for male and female entrepreneurs

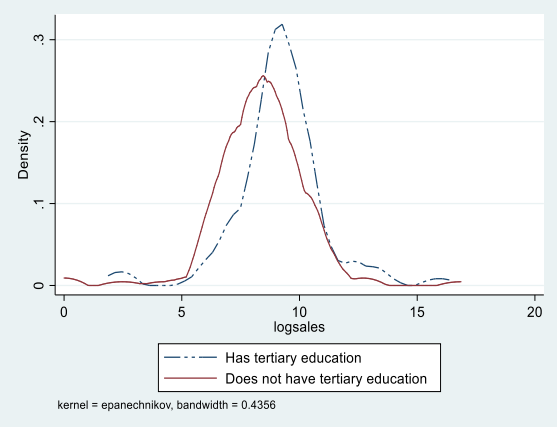
5a. Men and women



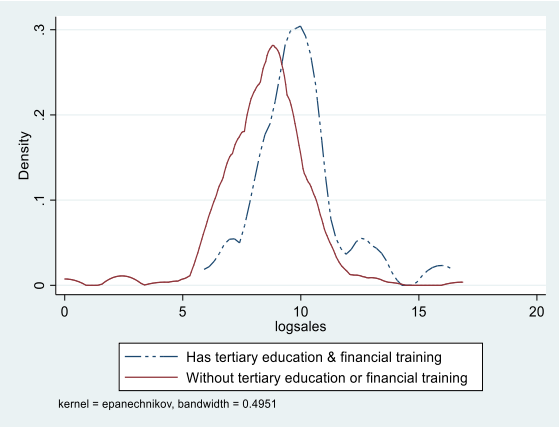
5b. Men and women with business training



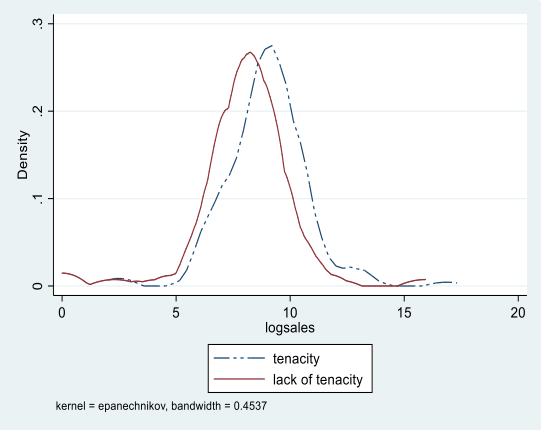
5c. Women, by tertiary education



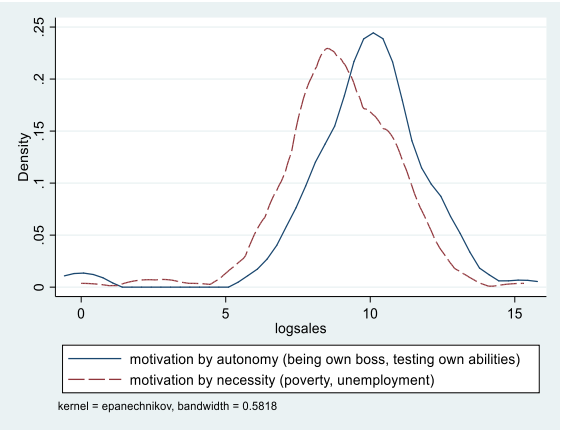
5d. Women, by fin. training and tertiary education



5e. Women, by tenacity



5f. Men, by autonomy motivation



Source: Authors' calculations.

Note: Sales are for a typical month.

Specifically, Figure 5a shows that both the sales distributions for male and female entrepreneurs have nearly uni-modal distributions, with men outperforming women, throughout the most of the range, except for the highest segment. The stronger performance of males relative to female entrepreneurs also prevails within the group that received business training for most of the sales range. However, trained women outperform trained men at the highest sales range, indicating that factors other than business training impact the strongest performers (Figure 5b). Moreover, among women entrepreneurs, those who have tertiary education record a stronger sales performance than women without such education (Figure 5c). The absence at low sales ranges is even more prevalent among women who combine tertiary education with training in financial literacy (Figure 5d). Women with tenacity and men motivated to enter entrepreneursip to gain autonomy prevail at highest sales ranges (Figure 5e and 5f).[10]

5.3. Entrepreneurs' skills, gender, and firm performance

The model in the previous section showed that individuals with higher entrepreneurial skills (general and specific) are more likely to operate productive firms than their less-skilled counterparts. This subsection empirically links firm performance with education level, training (general business or financial), non-cognitive skills (tenacity and motivation), and gender of entrepreneurs. Two estimation methods are applied: ordinary least square (OLS) regressions and probit regressions (PR). The OLS regressionsmeasure the effects of the explanatory variables education, non-cognitive skills) for the (average) sales, while the PR estimate the effect of the explanatory variables on the probability that firms are experiencing stable or growing sales relative to two years before the survey. We also employ quantile regression to identify if education, training, and non-cognitive skills have different effects on different ranges of the sales distribution.

We now present results from a multivariate OLS and probit regression analysis.[11] Specifically, we tests whether entrepreneurs' personal characteristics, especially those related to skills and training, are significant for firm performance (as proxied by the level of sales and whether the firms' sales are currently stable, growing or declining). Our identification strategy is specified in equations (1a) and (1b). We estimate the following equations separately for men and women:

$$log\ (sales_lev_i) = \gamma + \ \rho(training)_i + \theta(education)_i + \theta(non.cognitive\ skills)_i + \beta X_i + \epsilon_i \qquad (1a)$$

$$Pr(sales_dyn._i\ ) = \gamma + \ \rho(training)_i + \theta(education)_i + \theta(non.cognitive\ skills)_i + \beta X_i + \epsilon_i \qquad (1b)$$

where *i* stands for the individual entrepreneurs, and firm performance is represented either by a level of sales (*sales_lev*) or a dummy variable taking the value of '1' if the sales performance is stable or growing or 0 when it is declining (*sales_dyn*). *Training* is our first proxy of entrepreneurs' skills and is a dummy variable indicating whether they have received a business training (value of 1) or not (value of 0). Tertiary *education* is our second proxy of skills and it is a dummy variable

[10] Tenacity is a dummy variable that reflects whether entrepreneurs would prevail in entrepreneurship if their firm would go out of business, (taking value of 1), or if would seek regular employment (taking value of 0).

[11] Our sample consisted of all entrepreneurs, regardless of the age of their firms. For robustness, we have also examined firms older than 42 months (since survival is another measure of good performance) and obtained similar results.

indicating whether the entrepreneur has at least some college education (value of 1) or not (value of 0). *Non-cognitive skills* encompass tenacity (persistence in the face of obstacles) and motivation by a need for autonomy. Finally, X is a set of covariates including firm characteristics (the age of the business, the number of employees and a dummy variable taking the value of 1 of the entrepreneur has an up-to-date license) and access to finance-related variables including (i) the level of start-up capital, (ii) a dummy variable indicating whether or not the entrepreneur has contributed own sources to the start-up capital and (iii) a dummy variable indicating whether or not the entrepreneur has used an informal source of start-up capital (family, friends and social ntworks). γ is the intercept and ε the idiosyncratic error term.

Table 2 presents results of the OLS regressions. Consistent with the literature on human capital interventions (Hogendoon et al., 2019; Cho and Honorati, 2014), we find limited evidence about the impact of training on entrepreneurial performance. Our benchmark specifications (columns 1 and 4 without interactions) show that training in financial literacy is positively and significantly associated with sales level of male entrepreneurs but not female entrepreneurs. However, the positive association with sales of male entrepreneurs is no longer present when age of the firm and interaction of financial literacy with tertiary education are included in the regression (column 2).

When using a broader proxy of training (general business training), limited evidence is also found with respect to the impact on performance for both men and women, including for column 3 where the net marginal impact of the business training variable (taking into consideration the coefficient of the interactive variable between training and tenacity – 1.374) is close to 0 at the mean male sample value of the tenacity variable (0.69). These findings, are also consistent with work of El-Hamidi (2011) for Egypt and Mel, McKenzie and Woodruff (2012) for Sri Lanka, and suggest that business training programs in Eswatini are not well targeted to the entrepreneurs' needs.

In contrast, tertiary education is associated positively and significantly with sales performance of female entrepreneurs both in the benchark specification and in the ones containing interaction of tertiary education with financial literacy training (columns 5 and 6). Specifically, when interacted with financial literacy training, tertiary education seems to have a more significant impact on performance for female entrepreneurs, although with a slightly lower magnitude (considering a mean value of 0.26 of the financial literacy training variable). This is consistent with our theoretical model, which treats different skills (general, specific) as complements and indicates that tertiary education can mediate financial training for women. For both male and female entrepreneurs, tenacity (persistence in the face of obstacles) is an important factor as evidenced by the positive and significant regression coefficients in columns 1, 2, 4 and 5. Moreover, when interacted with basic business training, tenacity has a positive and statistically significant association with sales levels of men (Table 2, column 3), but not women entrepreneurs.

For male entrepreneurs only, being motivated by the need for autonomy (e.g. opportunity motive) rather than the need to escape poverty and unemployment as well as having up-to-date license and having a higher number of employees, has a strong, positive and statistically significant association with sales level across the different specifications. Interestingly, we find evidence that the number of working hours is positively and significantly linked with sales level of women-run firms only, although the quantitative impact of adding additional hours is relatively small. Finally, and

consistent with our theoretical model, higher start-up capital has a positive and statistically significant association with sales for both male and female entrepreneurs.

Table 2. OLS regressions of determinants of sales performance, by gender, all firms. Dependent variable is the level of sales (log)

	Men			Women		
	(1)	(2)	(3)	(4)	(5)	(6)
Lack of skills perceived as a barrier (Y = 1, N = 0)	-0.280	-0.367	-0.359	-0.277	-0.263	-0.261
	(0.352)	(0.363)	(0.359)	(0.327)	(0.327GEM)	(0.328)
Motivated by autonomy (Y = 1, N = 0)	**0.635****	**0.544****	**0.637****	0.038	-0.032	-0.033
	(0.271)	**(0.279)**	**(0.279)**	(0.283)	(0.282)	(0.283)
Average weekly hours	0.004	0.004	0.004	**0.019*****	**0.019*****	**0.019*****
	(0.007)	(0.007)	(0.007)	**(0.006)**	**(0.006)**	**(0.006)**
Has tenacity (Y = 1, N = 0)	**0.771*****	**0.867*****	0.183	**0.630****	**0.629****	0.521
	(0.281)	**(0.293)**	-0.419	**(0.259)**	**(0.259)**	(0.374)
Has tertiary education (Y = 1, N = 0)	0.182	0.152	0.181	**0.503***	0.097	0.183
	(0.283)	(0.340)	(0.335)	**(0.271)**	(0.325)	(0.328)
Received training in financial literacy (Y = 1, N =0)	**0.757****	0.592	0.526	0.304	-0.238	-0.166
	(0.321)	(0.496)	(0.491)	(0.278)	(0.355)	(0.356)
Received business training (Y = 1, N = 0)	-0.188	0.017	**-0.961****	0.153	0.173	0.004
	(0.292)	(0.305)	**(0.504)**	(0.256)	(0.255)	(0.428)
Work experience (Y = 1, N = 0)	-0.176	-0.134	-0.176	-0.115	-0.073	-0.079
	(0.272)	(0.271)	(0.268)	(0.252)	(0.252)	-0.252
Start-up capital (log, E thousands)	**0.256*****	**0.233*****	**0.236*****	**0.210*****	**0.243*****	**0.250*****
	(0.073)	**(0.072)**	**(0.071)**	**(0.080)**	**(0.080)**	**(0.080)**
Own source of initial capital (Y = 1, N = 0)	0.019	0.074	0.076	0.263	0.249	0.244
	(0.294)	(0.298)	(0.295)	(0.265)	(0.264)	(0.264)
Informal source of initial capital (Y = 1, N = 0)	-0.522	-0.572	-0.552	-0.052	0.375	0.078
	(0.477)	(0.483)	(0.478)	(0.383)	(0.429)	(0.394)
Number of employees	**0.040***	**0.039***	**0.045****	0.042	0.015	0.021
	(0.021)	**(0.022)**	**(0.022)**	(0.048)	(0.049)	(0.049)
Having an up-to-date license (Y = 1, N = 0)	**0.568***	**0.570***	**0.619****	0.299	0.264	0.272
	(0.306)	**(0.319)**	**(0.316)**	(0.299)	(0.301)	(0.302)
Firm age		0.000	-0.002		**0.003***	0.003
		(0.002)	(0.002)		**(0.002)**	(0.002)
Tertiary educ.* fin. literacy training (Y = 1, N = 0)		0.116	0.111		**1.124****	**1.115****
		(0.602)	(0.596)		**(0.546)**	**-0.547**
Tenacity*business training (Y = 1, N = 0)			**1.374****			0.207
			(0.586)			(0.514)
Intercept	**5.29*****	**5.38*****	**5.88*****	**4.76*****	**4.47*****	**4.55*****
	(0.783)	**(0.812)**	**(0.832)**	**(0.710)**	**(0.728)**	**-0.756**
Observations	237	225	225	224	222	222
R^2 (adjusted)	0.19	0.18	0.20	0.18	0.20	0.19

Source: Authors' calculations based on the UN Eswatini survey of entrepreneurs. Note: Standard errors are in parenthesis.***p < 0.01. ** p < 0.05. * p < 0.1.

Table 3: Quantile regressions of determinants of sales performance, by gender, all firms (dependent variable is log of sales)

	Men			Women		
	(1)	(2)	(3)	(4)	(5)	(6)
Variable\Percentiles	25th	50th	75th	25th	50th	75th
Lack of skills perceived as a barrier (Y = 1, N = 0)	-0.547	-0.110	-0.341	-0.172	-0.181	0.049
	(0.355)	(0.276)	(0.382)	(0.339)	(0.299)	(0.317)
Motivated by autonomy (Y = 1, N = 0)	**0.541***	**0.397***	**0.497***	-0.086	-0.032	0.313
	(0.280)	**(0.218)**	**(0.302)**	(0.294)	(0.282)	(0.274)
Average weekly hours	0.005	0.001	0.003	**0.017*****	**0.012*****	**0.011****
	(0.007)	(0.005)	(0.007)	**(0.006)**	**(0.007)**	**(0.005)**
Has tenacity (Y = 1, N = 0)	**0.771*****	**0.661*****	**0.600****	0.352	**0.387***	0.175
	(0.281)	**(0.224)**	**(0.310)**	(0.268)	**(0.237)**	(0.251)
Has tertiary education (Y = 1, N = 0)	0.058	0.042	0.011	0.439	0.195	0.389
	(0.339)	(0.234)	(0.365)	(0.333)	(0.293)	(0.311)
Received training in financial literacy (Y = 1, N =0)	**1.022****	0.605	0.942	-0.344	-0.095	0.490
	(0.484)	(0.377)	(0.520)	(0.368)	(0.325)	(0.344)
Received business training (Y = 1, N = 0)	-0.777	-0.002	0.064	-0.149	0.048	0.1
	(0.299)	(0.233)	(0.321)	(0.263)	(0.232)	(0.246)
Work experience (Y = 1, N = 0)	0.287	-0.248	**-0.472**	-0.274	-0.073	0.173
	(0.267)	(0.208)	**(0.287)**	(0.259)	(0.252)	(0.243)
Start-up capital (log, E thousands)	**0.427*****	**0.461*****	**0.366*****	**0.296*****	**0.347*****	**0.338*****
	(0.068)	**(0.053)**	**(0.073)**	**(0.080)**	**(0.071)**	**(0.075)**
Informal source of initial capital (Y = 1, N = 0)	-0.369	**-0.880****	**-0.700**	-0.049	-0.418	-0.485
	(0.476)	**(0.371)**	**(0.512)**	(0.394)	(0.347)	(0.369)
Number of employees	**0.050***	**0.044*****	**0.072*****	0.027	0.037	**0.128*****
	(0.021)	**(0.017)**	**(0.024)**	(0.050)	(0.044)	**(0.047)**
Tertiary educ.* fin. literacy training (Y = 1, N = 0)	0.271	0.266	-0.227	**1.045***	**0.959***	-0.065
	(600)	(0.467)	(0.645)	**(0.566)**	**(0.499)**	(0.528)
Intercept	**3.64*****	**4.11*****	**5.81*****	**4.32*****	**4.64*****	**5.14*****
	(0.751)	**(0.585)**	**(0.807)**	**(0.734)**	**(0.647)**	**(0.685)**
Observations	237	237	237	224	224	224
Pseudo R^2	0.21	0.25	0.22	0.18	0.21	0.23

Source: Authors' calculations based on the UN Eswatini survey of entrepreneurs.
Note: Standard errors are in parenthesis.***p < 0.01. ** p < 0.05. * p < 0.1.

Building on the OLS model, quantile regressions allow testing for differences in impacts across the distribution of sales performance, conditional on controls, so we also present these in Table 3. Each line shows the variation in the coefficient of a key explanatory variable – motivation, tenacity, hours worked per week, training (general business and financial literacy), amount of start-up capital among others – over the sale distribution for both male and female entrepreneurs. Consistent with the OLS regressions analysis, results of the quantile regressions show that training in financial literacy has a positive and statistically significant impact on the sales level of only male entrepreneurs and only for the lower-end of the sales distribution (Column 1). For women, combination of such training with tertiary education is associated with higher sales levels at the

25th and 50th percentiles (columns 4 and 5). Tenacity and motivation are associated with higher sales for men (columns 1-3), while hours worked (commitment) are significant for sales performance of women (columns 4-6).

More specifically, for male entrepreneurs, the effects of non-cognitive skills such as being motivated by the need for autonomy and having tenacity remain positive and statistically significant throughout the quartile sales distribution. The size of the firm and the amount of start-up capital are also positively and significantly associated with higher sales at almost all presented ranges for both male and female entrepreneurs. In contrast, the combination of tertiary education and financial literacy training has positive and significant effect among female entrepreneurs at lower sales ranges (25th and 50th percentiles, columns 4 and 5), while the size of the firm is important at higher sales levels (column 6). Having tenacity has a positive and significant effect on sales of female entrepreneurs at middle sales ranges (50th percentile, column 5). For women entrepreneurs both the amount of start-up capital and weekly hours worked are positively and significantly associated with sales at all sales ranges (columns 4 – 6).

We further tested whether entrepreneurs' non-cognitive skills (such as tenacity, motivation) and training matter for the dynamics of sales performance (e.g., whether sales were stable/growing or declining over 2010 - 2012) for men and women entrepreneurs in a multivariate probit regression. The results are summarized in Table 4. We found female entrepreneurs who were tenacious had higher predictive probability of stable/growing sales as compared to their counterparts who lacked tenacity. We also found that female entrepreneurs who did perceive the lack of own skills to be a major barrier to opening or running a firm had lower predictive probability of stable/growing sales (columns 3 and 4). The latter finding on skills is in line with Bohlmann et al. (2017), who suggest that lower perceptions of entrepreneurial skills could lead to lower entrepreneurial activity.

While having tenacity was also positively and significantly associated with the likelihood to record a stable or growing sales among male entrepreneurs, we did not find own perceptions of skill shortages among men to have a negative association with their sales dynamics. In contrast, training in financial literacy was linked with better sales performance among female but not male entrepreneurs. Regarding the role of start-up capital for men, a higher amount was associated with better firm performance, while for women the informal nature of the source of funding was found to be a negative and statistically significant factor. This is consistent with the work of Asiedu et al. (2013), who found that female-owned firms in sub-Saharan Africa are more likely to be financially constrained than male-owned firms.

Overall, our various regression settings tend to suggest that financial literacy training have a positive association with the level of sales among male entrepreneurs, while female entrepreneurs with such training benefit only if they have tertiary education. However, regarding posting stable or growing sales there seems to be evidence that training in financial literacy is positively linked with female-run firms but not with firms run by men. Looking further in the data, we find some indication on why this may be the case. First, the sample statistics in Table 1show that male and female entrepreneurs manage firms with different characteristics, and in particular that women are more likely to run smaller firms or firms without employees. They also pursue different goals for their firms. Second, in Tables 2 and 3 we found that when combined with tertiary education, financial literacy training for women is associated with increased sales levels. Similar observations

holds for a combination of general business training for men and tenacity at middle sales ranges. This suggests that for entrepreneurial training to be effective, other components of human capital such as general education or non-cognitive skills (specific personal traits) are needed.

Table 4: Entrepreneurial performance, training and skills in start-up firms): probit estimations, by gender, all firms (dependent variable is: sales are stable/growing or decreasing)

	Men		Women	
	(1)	(2)	(3)	(4)
Lack of skills perceived as a barrier (Y = 1, N = 0)	-0.311	-0.304	**-0.682*** **	**-0.681*** **
	(0.233)	(0.234)	**(0.258)**	**(0.258)**
Motivated by autonomy (Y = 1, N = 0)	0.178	1.192	0.070	0.068
	(0.187)	(0.189)	(0.207)	(0.208)
Average weekly hours	-0.003	-0.003	0.003	0.004
	(0.005)	(0.005)	(0.004)	(0.004)
Has tenacity (Y = 1, N = 0)	**0.663*** **	**0.661*** **	**0.517** **	**0.517** **
	(0.205)	**(0.205)**	**(0.203)**	**(0.204)**
Has tertiary education (Y = 1, N = 0)	-0.170	-0.223	-0.041	-0.051
	(0.195)	(0.228)	(0.205)	(0.237)
Received training in financial literacy (Y = 1, N =0)	-0.252	-0.365	**0.355* **	**0.341* **
	(0.231)	(0.342)	**(0.214)**	**(0.272)**
Received business training (Y = 1, N = 0)	-0.161	-0.156	-0.296	-0.296
	(0.202)	(0.204)	(0.193)	(0.194)
Work experience (Y = 1, N = 0)	-0.125	-0.118	-0.094	-0.093
	(0.184)	(0.184)	(0.185)	(0.185)
Start-up capital (log, E thousands)	**0.101* **	**0.103* **	-0.024	-0.023
	(0.054)	**(0.054)**	(0.058)	(0.058)
Informal source of initial capital (Y = 1, N = 0)	0.341	0.361	**-0.505* **	**-0.504* **
	(0.293)	(0.297)	**(0.304)**	**(0.304)**
Has up-to-date license	-0.062	-0.063	-0.210	-0.210
	(0.216)	(0.216)	(0.223)	(0.223)
Firm's age	-0.001	-0.001	**-0.003** **	**-0.004** **
	(0.001)	(0.001)	**(0.001)**	**(0.001)**
Tertiary educ.* fin. literacy training (Y = 1, N = 0)		0.188		0.033
		(0.418)		(0.418)
Intercept	**-1.18** **	**-1.17** **	0.116	1.119
	(0.560)	**(0.561)**	(0.554)	(0.555)
Observations	224	224	223	223
Pseudo R^2	0.09	0.09	0.09	0.09

Source: Authors' calculations based on the UN Eswatini survey of entrepreneurs.
Note: Standard errors are in parenthesis.***p < 0.01. ** p < 0.05. * p < 0.1.

Our results also suggest that in Eswatini training programs focus on skills that are useful for male entrepreneurs with specific personality traits/non-cognitive skills and female entrepreneurs with higher education. We believe that more work needs to be done on how the government or employers could provide effective training programs for women at all levels of education.

It is also noteworthy that in the cases where the link between the female perceptions of skill shortages and performance is significant, it is negative (Table 4, columns 3 and 4). That is, the sign of the coefficient estimate is consistent with the perception. However, those coefficient estimates do not necessarily imply a negative causal relationship from perception to performance. There could be a reverse causality from performance to perception if, after experiencing poor performance, entrepreneurs ascribe it to their lack of skills, either actual or perceived.

5.4. Endogeneity of training

Owing to the fact that our sample contained only entrepreneurs who succeeded in opening and maintaining their businesses, and not those who did not, the above results are subject to a bias due to the endogeneity of entrepreneurial business participation. More concretely, entrepreneurs who operate their businesses successfully despite the lack of training can be considered as having high-ability, and thus, there is possibly negative correlation between ability and training. This may result in a downward bias on the estimates of the effect of training on performance. If those endogeneity biases were strong, the true coefficient of the effect of training could be positive for female entrepreneurs. However, that does not explain the gender gaps in the effect of training on performance, unless the endogenous ability bias would exist only for women. However, that is unlikely as it would imply that women would either be prevented to take part in training or that they would decide against participating, given their concern about the skill shortages.

We have also addressed the self-selection problem, encountered in the investigation of the causal impact of training on performance, where business training may not be randomly awarded. This is because the decisions to undergo such training are taken by entrepreneurs and may be correlated with firm characteristics that affect the outcome (firms' sales). We therefore estimate the treatment effect of business training using a matching estimator of the average treatment effect. Propensity scores-matching (developed in Rosenbaum and Rubin, 1983) allows carefully addressing the issue by pairing the "treated" firms with the "non-treated" firms that have similar observed characteristics, so that the difference between firms' productivity of a trained entrepreneur and that of a matched counterfactual is solely attributable to the training. The nearest neighbor matching technique that we use consists in matching each treated entrepreneur with N control entrepreneurs (non-treated) that have the closest propensity scores (nearest neighbors).

We used the control variables from our baseline regressions other than the treatment to derive the propensity scores of treatment and then matched the treated and no-treated entrepreneurs based on those scores. We then derive the average treatment effect on the treated by taking the difference of the business performance between the treated and non-treated in the matching. The matching estimator removes the endogeneity bias under the unconfoundedness assumption, which assumes that the unobservable determinants of business performance are orthogonal to the treatment choice. Such an assumption is often considered to be reasonable as long as we have enough controls in the propensity score equation. In Appendix 2, we present the results of the average treatment effect on the treated of the matching estimator discussed above, which measures the impact of training on firms' performance for all entrepreneurs, and separately for male and female entrepreneurs.

Supportive evidence is found that business training has a positive impact only on male entrepreneurs' performance and also when considering the whole sample. All specifications report a positive and significant average treatment effect on the treated (ATT) coefficient of business

training, although with higher magnitude and statistical significance for male entrepreneurs in particular, with ATT coefficients ranging from 0.91 to 1.09. This corroborates the previous findings from our OLS and probit regressions. We also use a similar approach to test the robustness of the impact of our tenacity variable on firm's performance as one may also suspect non-cognitive skills to suffer from endogeneity. Results that are summarized in Appendix 3 also corroborate the positive evidence found on the positive impact on firms productivity.

To confirm that our matching procedure properly balances the distribution of the main covariates across the control and the treatment groups, we conducted balancing tests as in Girma and Görg (2007). The results are in Appendix 4. For each covariate, the table presents normalized average differences between the unmatched treated and control firms as well as the differences between the matched treated and control firms. As evidenced by the t-tests, all covariates do not differ significantly after being matched, that is the balancing tests are satisfied for all variables.

6. Conclusions

This paper undertakes a detailed analysis examining the role of skills and training in gender disparities in entrepreneurial performance in developing countries and especially in Africa. While a number of studies have explored gender gaps in entrepreneurial outcomes, the role of business training combined with other skill-related components of human capital such as tertiary education or non-cognitive skills remains relatively unexplored.

Our analysis consists of two parts. First, we present a theoretical model that links productive entrepreneurship to education, skills, and training. The model shows that targeted training geared towards women entrepreneurs can raise the overall rate of productive start-ups while reducing the gender gaps in entrepreneurial outcomes, provided that entrepreneurs either already possess complementary skills or shortages of these skills are also addressed. Second, the empirical analysis demonstrates that, overall, entrepreneurial training programs alone have only a limited impact on performance. We have found some, albeit limited, evidence of a positive association between training and sales for male entrepreneurs. However, for women entrepreneurs narrow business training programs alone are not linked with stronger performance. Instead, we have found that tertiary education, which typically provides a more balanced set of cognitive and non-cognitive skills than narrow business training, has a positive link with sales performance of women entrepreneurs.

The second part of the empirical analysis studies channels that can impact the business training – entrepreneurial performance link. Consistent with our theoretical model where different skills are complements, our estimates point out that for women entrepreneurs, one such channel is tertiary education. It can mediate training for women, that is business training is associated with a better sales performance among women with tertiary education. Similarly, for male entrepreneurs tenacity can mediate training effectiveness, as basic business training is linked with better sales performance among tenacious male entrepreneurs. Tenacity also has a positive impact on the sales performance of both male and female entrepreneurs. Moreover, women entrepreneurs who were tenacious were more likely to record stable/growing sales as compared to their counterparts who lacked tenacity. However, in contrast to men, we have not found the tenacity to be linked with greater training effectiveness among women entrepreneurs.

Our findings contribute to reconciling the varying effects of entrepreneurial training on firm performance evidenced in the literature (Hogendoon et al., 2019; Cho and Honorati, 2014). The results show that entrepreneurial training programs need to be well-targeted and include non-cognitive skills to be effective in improving performance of female entrepreneurs. Another policy implication, consistent with Dutta and Mallick (2018), is the vital role of tertiary education in female entrepreneurial performance. It implies that the governments and development partners need to put a greater emphasis on tertiary education in their interventions targeting human capital formation among women, beyond their current focus on basic literacy and secondary education.[12]

The paper also leaves several important issues related to women's entrepreneurship to further research. Given the high youth unemployment in Africa's middle-income countries, further research could highlight the specific skill constraints and other impediments facing young female entrepreneurs in the region. Additionally, the research could investigate the degree of the digital skill gap between men and women in Africa and its likely impact on future labor market outcomes of these groups. Furthermore, given the aspirations of low and lower-middleincome countries in Sub-Saharan Africa to participate in global value chains with higher value-added products, future research could also examine key barriers to international entrepreneurship.

[12] Please see Cooray et al. (2016) for detailed analysis in the context of efficient utilization of remittances.

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Appendices.

Appendix 1: Descriptive statistics for key variables, all firms

Variable	No. of observations	Mean	Std. Dev.	Min	Max
Men					
Age of business (months)	253	71.29	83.28	2	693
Average weeekly hours working (hours)	259	41.30	21.20	0	99
Used informal finance for initial cap.	266	0.10	0.30	0	1
Has valid license	266	0.72	0.45	0	1
Received business training	260	0.47	0.50	0	1
Received financial training	266	0.28	0.45	0	1
Has work experience	261	0.52	0.50	0	1
Has some college education	266	0.47	0.50	0	1
Pereives lack of skills is barrier	266	0.20	0.40	0	1
Has tenacity	266	0.69	0.46	0	1
Motivated by autonomy	260	0.34	0.47	0	1
Monthly sales (thousands E)	266	71.60	374.36	0	4,500
Sales stable or growing (thousands E)	249	0.41	0.49	0	1
Start-up capital (thousands E)	266	60.21	115.61	0	1,000
Had own source of initial capital	266	0.54	0.50	0	1
Women					
Age of business (months)	255	65.11	70.94	1	429
Average weeekly hours working (hours)	259	41.29	21.52	0	99
Used informal finance for initial cap.	259	0.12	0.33	0	1
Has valid license	259	0.78	0.42	0	1
Received business training	254	0.54	0.50	0	1
Received financial training	259	0.26	0.44	0	1
Has work experience	253	0.46	0.50	0	1
Has some college education	259	0.36	0.48	0	1
Pereives lack of skills is barrier	259	0.18	0.39	0	1
Has tenacity	259	0.67	0.47	0	1
Motivated by autonomy	257	0.25	0.44	0	1
Monthly sales (thousands E)	259	53	521	0	8,333
Sales stable or growing (thousands E)	244	0.39	0.49	0	1
Start-up capital (thousands E)	259	31	67	0	500
Had own source of initial capital	259	0.61	0.49	0	1

Source: Authors based on the UN survey. Note: E stands for Emalangeni.

Appendix 2: Impact of business training of firms' performance (propensity scores matching using the (k) Nearest-neighbor method): treatment variable a dummy variable taking the value of "1" if the owner has received a formal financial training and 0 otherwise). Performance is proxied by the log of monthly sales.

	Whole sample			Male entr.			Female entr.		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	k=1	k=2	k=3	k=1	k=2	k=3	k=1	k=2	k=3
Average Treatment Effects on the Treated (ATT)	.44	.41*	.44**	1.09*	1.02*	.91*	.18	.34	.31
	(.29)	(0.23)	(.24)	(.61)	(.57)	(.53)	(.44)	(.37)	(.37)
Obs (Treated)	134	134	134	72	72	72	62	62	62
Obs (Control)	361	361	361	181	181	181	180	180	180

Note: Bootstrapped standard errors in parentheses. *,** and *** denotes significance at 10%, 5% and 1% respectively.
Source: Authors' calculations based on the UN Eswatini survey of entrepreneurs.

Appendix 3: Impact of non-cognitive skills of firms' performance (propensity scores matching using the (k) Nearest-neighbor method): treatment variable a dummy variable taking the value of "1" if the owner has "tenacity" as a skill asset[13] and 0 otherwise). Performance is proxied by the log of monthly sales.

	Whole sample			Male entr.			Female entr.		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	k=1	k=2	k=3	k=1	k=2	k=3	k=1	k=2	k=3
Average Treatment Effects on the Treated (ATT)	.68*	.9**	.91***	.89***	.91***	.85***	.88*	.65*	.58
	(.35)	(.42)	(.36)	(.31)	(.26)	(.29)	(.51)	(.37)	(.4)
Obs (Treated)	330	330	330	173	173	173	157	157	157
Obs (Control)	156	156	156	76	76	76	80	80	80

Note: Bootstrapped standard errors in parentheses. *,** and *** denotes significance at 10%, 5% and 1% respectively.
Source: Authors' calculations based on the UN Eswatini survey of entrepreneurs.

[13] Owner would start a new firm if his/her current establishment were to close.

Appendix 4: Balancing test for the propensity scores matching regressions

Covariate	Sample	Mean		%Diff	%Reduction in diff	t-test	
		Treated	Control			t	p>|t|
Motivated by autonomy	Unmatched	.67742	.75556	-17.3		-1.20	0.231
	Matched	.67742	.62903	10.7	38.1	0.56	0.575
Average weekly hours	Unmatched	36.419	42.95	-28.6		-2.06	0.041
	Matched	36.419	38.499	-9.1	68.2	-0.49	0.628
Has tenacity	Unmatched	.74194	.64444	21.1		1.41	0.161
	Matched	.74194	.72446	3.8	82.1	0.22	0.828
Has tertiary education	Unmatched	.95161	.85556	32.8		2.02	0.045
	Matched	.95161	.93548	5.5x	83.2	0.39	0.700
Own source of initial capital	Unmatched	.54839	.61667	-13.8		-0.94	0.346
	Matched	.54839	.57258	-4.9	64.6	-0.27	0.788
Informal source of initial capital	Unmatched	.19355	.08889	30.2		2.24	0.026
	Matched	.19355	.19892	-1.6	94.9	-0.07	0.941
Work experience	Unmatched	.48387	.46111	4.5		0.31	0.758
	Matched	.48387	.51344	-5.9	-29.9	-0.33	0.744
Start-up capital (log)	Unmatched	9.5922	8.9846	35.4		2.39	0.018
	Matched	9.5922	9.7875	-11.4	67.8	-0.68	0.498

Source: Authors' calculations based on the UN Eswatini survey of entrepreneurs.