# A systematic literature review of skills required in the different phases of the entrepreneurial process

Anastacia Mamabolo[a*] and Kerrin Myres[b]

[a] University of Pretoria's Gordon Institute of Business Science
26 Melville Rd, Illovo, Johannesburg, 2196, South Africa
mamaboloa@gibs.co.za; anastaciamamabolo@gmail.com

[b] University of Pretoria's Gordon Institute of Business Science
26 Melville Rd, Illovo, Johannesburg, 2196, South Africa
myresk@gibs.co.za

*Corresponding author
Corresponding author: Anastacia Mamabolo*
Mailing address: 26 Melville Rd, Illovo, Johannesburg, 2196, South Africa
Tel.: +27 11 771 4346 Fax: +27 86 637 1594
E-mail: mamaboloa@gibs.co.za; anastaciamamabolo@gmail.com

## Abstract

Skills are important in the creation and management of a business venture. However, the extant research focuses on skills required by entrepreneurs without distinguishing which skills are needed at each entrepreneurial phase. To understand the research conducted to date, this paper examined a total of 72 articles in some of the leading entrepreneurship and management journals. The reviewed literature demonstrates that entrepreneurial studies on skills tend to adopt a singular-phase rather than a multi-phase approach. Examining skills at the different entrepreneurial phases shows that the importance and complexity of skills change across the phases. Further, the context in which an entrepreneur is situated has an influence on the development and application of skills. Finally, the study puts forth a conceptual model and propositions that demonstrate an interplay between skills, entrepreneurial phases, and context. The paper identifies implications for theory, practice and future research.

**Keywords:** Entrepreneurial process, Entrepreneurial phases, Skills, Context, Systematic review

## Introduction

Does one size fit all? Do entrepreneurs at the different phases of the entrepreneurial process require different skills? A simple affirmative answer to this question is that entrepreneurs

of distinct types and at specific entrepreneurial phases require different skills. Although the answer seems obvious, most research on skills has not shown how skills differ according to the different phases. In fact, Baron (2007, p. 168) argued that competencies, including skills, "change in relative importance and scope across the various phases of the new venture creation process". Authors argued that in order to engage in venture creation activities, entrepreneurs need skills, knowledge, and experience (Becker, 1964; Unger, Rauch, Frese, & Rosenbusch, 2011). A meta-analytic study showed that skills were found to have an impact on the creation and successful management of an entrepreneurial venture (Unger et al., 2011); however, they did not specify the stage of the business venture.

Using the human capital theory, skill is the direct or observable application of knowledge as a consequence of education and practical experience (Becker, 1964; Hayton & McEvoy, 2006). Some of the skills were grouped into categories that include: Opportunity identification (Chell, 2013; Shane, 2000); business management (Hisrich, Peters, & Shepherd, 2005; Loué & Baronet, 2012); personal skills (Deakins, Bensemann, & Battisti, 2016; Narkhede, Nehete, Raut, & Mahajan, 2014) and technical skills (Chang & Rieple, 2013). Previous studies discovered that skills yield better outcomes when they are aligned to the ongoing venture creation activities or tasks (Becker, 1964; Unger et al., 2011). However, some of the existing latest studies (such as Badawi et al., 2018; Hahn, Minola, Bosio & Cassia, 2019; Prüfer & Prüfer, 2019); tend to give an inventory of skills without showing the skills required to execute entrepreneurial activities specific to each phase. Considering that there are distinct activities in each phase (Amorós & Bosma, 2014; Reynolds & Curtin, 2008), this study assumes that the skills required for each entrepreneurial phase will differ.

Although there is an increased interest in skills research (Chell, 2013), there is a paucity of empirical research that adopts a multi-phase rather than single-phase approach that regards entrepreneurs as the same, irrespective of their phase (Marvel, Davis, & Sproul, 2016; Mamabolo,

Kerrin & Kele, 2017b; Hahn et al., 2019). Instead, extant research focused on different constructs such as intentions, social capital, success and some elements of the entrepreneurial process (Davidsson & Honig, 2003; Haber & Reichel, 2007; Kodithuwakku & Rosa, 2002; van Gelderen, Kautonen, Wincent, & Biniari, 2018). An explanation to this view may be an argument that entrepreneurship research reveals variations and draws contradictory conclusions about the entrepreneurial process, which lacks empirical evidence (Moroz & Hindle, 2012; Shane, 2012). Reviewed studies reveal that the main entrepreneurial phases include: Opportunity recognition/identification; opportunity evaluation; opportunity exploitation; new business and established business phases (Amorós & Bosma, 2014; Cunneen, Mankelow, & Gibson, 2007; Singer, Herrington, & Menipoz, 2018). Additionally, entrepreneurial exit is also part of the process, whereby entrepreneurs can exit at any entrepreneurial phase (DeTienne, 2010). Understanding entrepreneurial exit is important for pedagogy and designing suitable support processes.

Noting the established significance of skills in venture creation, and its performance (Unger et al., 2011), this conceptual paper aims to address three objectives. First, a review of the skills and phases of the entrepreneurial process was undertaken. Thereafter, the paper specifies skills according to the different phases. Second, the paper reveals how the context in which entrepreneurial activities take place can be a moderator of skills required by entrepreneurs. Third, the paper suggests a conceptual model that integrates the reviewed literature on skills, entrepreneurial phases and context. The suggested conceptual model is anchored on the propositions on how skills are used in opportunity recognition, opportunity evaluation, opportunity exploitation, new business and established business phases. The paper concludes by discussing the research implications related to skills research.

The subsequent section discusses how the literature review was conducted. Thereafter, the paper is positioned in the current debates on skills, the context and the entrepreneurial phases. The paper ends by suggesting propositions, practical implications and areas for future research.

## Literature Search Methodology

The main aim of this paper is to examine the existing literature on skills used in the different entrepreneurial phases by conducting a systematic literature review (SLR). SLR design provides a reproduceable and transparent review process through exhaustive literature searches of published and unpublished studies (Tranfield, Denyer, & Smart, 2003). We adopted three steps in conducting the SLR, which included scoping the research, data collection and analysis (Siddaway, Wood, & Hedges, 2019). The purpose of this design was to conduct a conceptual review rather than statistical validation or test (e.g. meta-analysis) of the published literature on skills and the entrepreneurial process. This process resulted in propositions and a conceptual model that could be tested in future empirical research.

### Scoping

A recent review of skills and entrepreneurial process was conducted by Chell (2013); however, the focus was on opportunity recognition only, excluding the evaluation, exploitation, start-up and established businesses, and thus created a need for this study. The first step involved in the scoping process was to clarify the study's research questions by developing the conceptual boundaries according to the skills definition, skills categories, unit of analysis and the entrepreneurial phases. Skills were defined as the direct or observable application of knowledge to execute a task or solve a problem (Hayton & McEvoy, 2006; Marvel et al., 2016). The categories of skills in this case included entrepreneurial (or start-up), marketing, business management, finance, human resource, technical, social and interpersonal, leadership and personal skills. These skills were considered at an individual level, meaning these are the skills possessed by an individual entrepreneur starting or owning a business venture. These skills are

used in different entrepreneurial phases, including the opportunity identification, opportunity evaluation, opportunity exploitation, new business and the established business. A challenge encountered in this study was that skills were not always defined, and in some instances were regarded as competencies, which include knowledge, skills and abilities (Hayton & McEvoy, 2006). The definition provided in the literature review section of this paper assisted to distinguish skills from competencies and knowledge. The study was not limited to any specific country. We included studies published world-wide to gain an in-depth view of the study's research question. Empirical studies, including qualitative and quantitative research, and conceptual papers were included in the review.

**Data collection**

We created a database of articles that had been published on skills and the different entrepreneurial phases. The inclusion criteria were first, articles published in peer-reviewed journals listed in the Academic Journal Guide (AJG) list. The second selection criterion focused on articles that had been written on entrepreneurship, business management, management, human resource, education and applied psychology as they focus on skills and entrepreneurial process. Third, within the selected journals, we searched for the titles, abstracts and keywords, using the Boolen search items. These included "skills", "entrepreneurial skills", "entrepreneurial process"; "entrepreneurial phases OR stages", "skills" AND "entrepreneurial process"; "skills" AND "opportunity recognition"; "skills" AND "opportunity evaluation"; "skills" AND "opportunity exploitation"; "skills" AND "new business"; "skills" AND "start-up"; and "skills" AND "established business". We used "AND" to search for all items, and "OR" for at least one of the key terms. An additional search was conducted on Google Scholar to ensure that potentially relevant publications were not missed. Since the published review in 2013 focused on the opportunity recognition only, we did not include time limitation for the literature search, resulting in a wide spread of publications. We ensured that the steps followed were rigorous, following the

examples of Marvel et al. (2016), and Muchiri and McMurray (2015). These databases, including Science Direct, JSTOR, SAGE, Pro Quest, EBSCOhost, Emerald, Springer Link and Google Scholar, were used to search for articles. The key research articles were sourced from: The Academy of Management Journal; Small Enterprise Research; Strategic Entrepreneurship Journal; Entrepreneurship Theory and Practice; Business Venturing Journal; Journal of Small Business Management; Small Business Economics; International Journal of Entrepreneurial Behaviour & Research; Education and Training; and Journal of Applied Psychology. A full list of the journals used in this study is provided in Appendix A.

The result of the first search discovered 300 articles, of which 180 were considered as appropriate for the study. These articles included quantitative research, qualitative, systematic reviews, meta-analysis, seminal papers, practitioner materials and books. Acceptance of the articles was based on the assessment of their abstracts, introductions and conclusions (see Nolan & Garaman, 2015). We also focused on the citations using five citations per year as a starting point, except for recently published articles (Crossan & Apaydin, 2010). After the assessment, the list was reduced to 72 articles that focused on skills and entrepreneurial phases. The number comprised 34 AJG empirical research papers (including qualitative and quantitative research); 25 AJG conceptual papers; 7 articles in journals not appearing on the AJG list but were focused on skills; 3 panel studies for empirical evidence; and 3 entrepreneurship books focusing on entrepreneurial process. These articles were read in-depth, focusing on the key components of the research, comprising of the research question, literature review, research design and methods, findings, discussions, conclusions, and areas for future research.

**Data Analysis**

Data analysis commenced after having identified the articles that were used in the study. Since this is a conceptual consolidation of the literature review, the data analysis was limited to descriptive statistics, thus excluding inferential statistics that test for a significant relationship

between two or more variables in the literature. Descriptive statistics provided an understanding of the missing gaps in the skills and entrepreneurial process research. The selected literature was within the boundaries of the study and was analysed based on the research questions, theory, hypotheses or propositions, research design and methods, findings, and areas for future research. In addition, thematic analysis led to the development of the categories of skills displayed in Table 1, whereby sub-skills that had the same meaning and belonged to one group, were given a category name.

The first part of the analysis identified articles published on the categories of skills. The highly cited papers in peer-reviewed journal articles that focused mostly on skills rather than competencies were included in the analysis. Selected articles were at the individual level analysis and not at the team(s) or firm level. This resulted in Table 1, showing the nine categories of skills and their sub-skills. Second, the focus was on gaining an understanding of the entrepreneurial process and phases. We used Moroz and Hindle (2012) to understand the different approaches to the entrepreneurial process. Both empirical and conceptual papers that were highly cited and some regarded as seminal papers (e.g., Bhave, 1994; Shane & Venkataraman, 2000) were used to derive at the distinct entrepreneurial phases. Moreover, we included the articles that adopted the "stage" or "phase" approach to the entrepreneurial process (e.g., Brixy et al., 2012; Cunneen et al., 2007; Gielnik et al., 2018; Singer et al., 2018), in line with this study's conceptual argument explained in the literature review section. The examples of the entrepreneurial phases are presented in Table 2, which shows the distinct phases as opportunity identification, evaluation, exploitation, new business and established business. Once the skills and phases were studied separately, the third part of the analysis was to include both skills and the entrepreneurial process, displayed in Table 3. Most of the articles focused on the single phase rather than the entire entrepreneurial process. In some cases, the entrepreneurial phase was defined by looking at the age of the business used in the studies, aligned with the Global Entrepreneurship Monitor's

**Table 1: Skills categories and their sub-sets**

| Skills | Sub-sets of skills | Authors |
|---|---|---|
| Entrepreneurial (start-up) | Identifying opportunities, judging or assessing opportunities, exploiting opportunities, developing new products, problem solving, taking risks, creativity, proactivity, innovation and identifying changes in the environment. | Brazeal, Hayton and Kelley (2006); Deakins et al. (2016); Gruber et al., (2015); Hahn (2019); Haynie et al. (2009); Herbert (1999); Kodithuwakku and Rosa (2002); Ladzani and van Vuuren (2002); Leyden and Link (2015); Lichtenstein and Lyons (2001); Morales and Marquina (2013); Olson (1985); Oosterbeek, van Praag, Ijsselstein (2010); Pyysiäinen et al. (2006); Rosique-Blasco et al. (2016); Saks et al. (2002); Sambasivan, Abdul and Yusop (2009); Shane (2000); Ucbasaran et al. (2001) |
| Technical | Operations and machinery management, supply chain management, production, technology development, ability to analyse, and software designs | Chang and Rieple (2013); Chandler Jansen (1992); Kroeger (1974); Hahn (2019); Ladzani and van Vuuren (2002); Lichtenstein and Lyons, (2001); Mamabolo et al. (2017a); Narkhede et al. (2014); Pyysiäinen et al. (2006); Rosique-Blasco et al. (2016) |
| Financial Management | Cash flow management, setting prices, cost management, gathering financial resources, raising capital, interpreting income and balance sheet, managing invoices and using financial software. | Hahn (2019); Kroeger (1974); Ladzani and van Vuuren (2002); Lewis and Churchill (1983); Loué and Baronet (2012); Mamabolo et al. (2017a); Olson (1985); Raven and Le (2015); Scott and Bruce (1987) |
| Human Capital Management | Recruitment, staff development, performance management, assigning job positions, delegation, firing non-performing staff, and using staff management software. | Chandler and Jansen (1992); Lewis and Churchill (1983); Loué and Baronet (2012); Mamabolo et al. (2017); Peters (2005); Scott and Bruce (1987) |
| Marketing | Defining the brand, segmenting customers, monitoring competition, brand positioning, setting, brand promotion, customer experience, and digital and social media marketing. | Hahn (2019); Ladzani and van Vuuren (2002); Lewis and Churchill (1983); Loué and Baronet (2012); Mamabolo et al. (2017); Olson (1985); Oosterbeek et al. (2010); Pyysiäinen et al. (2006); Raven and Le (2015); Scott and Bruce (1987) |
| Business Management | Designing and implementing business plan or model, strategic implementation, organisation, solving problems, supervising, day-to-day management skills, and openness to learning and applying the law or regulations. | Chandler and Jansen (1992); Hisrich et al. (2005); Hahn (2019); Kodithuwakku and Rosa (2002); Kroeger (1974); Olson (1985); Ladzani and van Vuuren (2002); Lewis and Churchill (1983); Lichtenstein and Lyons (2001); Loué and Baronet (2012); Prüfer and Prüfer (2019); Pyysiäinen et al. (2006); Sambasivan et al. (2009); Raven and Le (2015); Scott and Bruce (1987) |

| | | |
|---|---|---|
| Personal | Responsibility, accountability, communication, courage, resilience, flexibility, self-emotional mastery, learning skills, cognitive & reasoning skills, self-regulation, accepting challenges, tenacity and confidence. | Bryant (2007); Chang and Ripple (2013); Deakins et al (2016); Dimov (2010); Foo (2011); Hayton and Kelley (2006); Kickkul et l. (2009); Lichtenstein and Lyons (2001); Narkhede et al. (2014); Oosterbeek, van Praag and Ijsselstein (2010); Pyysiäinen et al. (2006); Timmons and Spinelli (2004); Scott and Bruce (1987) |
| Social | Social & emotional intelligence, People skills, Communication, Collaboration, Negotiation, social adaptability, Tenacity and obstinacy, Coordinating the network members, Strengthening positive ties. | Hayton and Kelley (2006); Lamine, Mian and Fayolle (2014); Kroeger, (1974); Mamabolo et al. (2017); Prüfer and Prüfer (2019); Pyysiäinen et al. (2006) |
| Leadership | Visionary, inspiring employees, developing team orientation, empathy, ethical, fairness, leading ahead of peers and influencing, | Hayton and Kelley (2006); Ladzani and van Vuuren (2002); Mamabolo et al. (2017), McGowan, Cooper, Durkin and O'Kane (2015), Peters (2005), Prüfer and Prüfer (2019) |

Source: Authors' own

**Table 2: Examples of phases in the entrepreneurial process**

| Author | Opportunity Identification | Opportunity Evaluation | Opportunity Exploitation | New Business | Established Business |
|---|---|---|---|---|---|
| **Bhave (1994)** | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Shane and Ventkataraman (2000)** | ✓ | ✓ | ✓ | | |
| **Ucbasaran et al. (2001)** | ✓ | ✓ | ✓ | ✓ | |
| **Corbett (2005)** | ✓ | | ✓ | ✓ | |
| **Baron (2007)** | ✓ | | ✓ | | |
| **Bygrave (2007)** | ✓ | ✓ | ✓ | ✓ | |
| **Cunneen et al. (2007)** | ✓ | ✓ | ✓ | ✓ | |
| **Slotte–Kock & Coviello (2010)** | ✓ | ✓ | ✓ | ✓ | |
| **Brixy et al. (2012)** | ✓ | ✓ | ✓ | ✓ | |
| **Gielnik et al. (2018)** | ✓ | | ✓ | | |
| **Rauch et al. (2018)** | ✓ | ✓ | | | |
| **Singer et al. (2019) /GEM** | ✓ | ✓ | ✓ | ✓ | ✓ |
| **DeTienne, (2010)** | Entrepreneurial Exit | Entrepreneurial Exit | Entrepreneurial Exit | Entrepreneurial Exit | Entrepreneurial Exit |

Source: *Authors' own*

**Table 3: Examples of skills in different entrepreneurial phases**

| Opportunity Recognition | Opportunity Evaluation | Opportunity Exploitation | New Business Phase | Established Phase |
|---|---|---|---|---|
| Perceptual and conceptual skills (Kroeger, 1974) *<br>Personality, cognitive, business, social, interpersonal, learning, and motivational (Chell, 2013) *<br>Creativity, risk taking, proactivity (Rosique-Blasco et al., 2016) ^<br>Risk taking, Innovation, Problem solving, critical thinking (Badawi et al., 2018) ^<br>Environmental scanning (Gruber et al., 2015) ^<br>Political (networking) skill (McAllister et al., 2018) *<br>Invention skills, Innovation (Olson (1985) *<br>Creativity (Wright et al., 2007) ^<br>Identifying opportunities, developing new products and innovation (Brazeal, et al., 2006*; Deakins et al., 2016^; Hahn et al., 2019^; Kodithuwakku & Rosa, 2002^; Ladzani & van Vuuren, 2002^; Leyden & Link, 2015*; Lichtenstein & Lyons, 2001*; Morales & Marquina, 2013^; Olson, 1985*; Pyysiäinen et al., 2006*; Rosique-Blasco et al., 2016^; Sambasivan, Abdul & Yusop, 2009^; Shane 2000^; Ucbasaran et al., 2001*) | Emotion management skills (Foo, 2009) ^<br>Self-regulatory skills (Bryant, 2007) ^<br>Social skills and knowledge acquisition and learning skills (Keh, Der, Foo, & Lim, 2002) ^<br>Political (goal, power and risk) skill (McAllister et al., 2018) *<br>Business planning (Kodithuwakku & Rosa (2002) ^<br>Innovation skills (increased in complexity), rational, analytic, market research, preparing financial, manufacturing and marketing plans (Olson, 1985) *<br>Personal and commercial feasibility, and analytical skills (Saks et al., 2002) ^<br>Assessing opportunities (Gruber et al, 2015; Haynie et al. 2009) ^ | Analytical and external behaviour relations skill (Kroeger, 1974) *<br>Attracting customers, delivering the product, direct supervision and securing financial sources (Lewis & Churchill, 1983) *<br>Getting customers, entrepreneurial individual style, simple bookkeeping, production, sourcing funding (Scott & Bruce, 1987) *<br>Creativity, entrepreneurial skills, technical skills, communication skills, decision making and market sensitivity (Greiner, 1998) *<br>Social adaptability, tenacity, obstinacy, learning, social intelligence, networking, negotiation and strengthening positive ties (Lamine et al., 2014)^<br>Political (interpersonal) skill (McAllister et al., 2018) *<br>Self-regulation (Bryant, 2007) ^<br>Managerial, funding and marketing (Olson, 1985) *<br>Financial planning (Haber & Reichel, 2007) ^ | Budgeting, scheduling, controlling and internal intergroup relations (Kroeger, 1974) *<br>Managing revenues, cash generation and management, cash forecasting and supervision (Lewis & Churchill, 1983) *<br>Supervision, managing revenues and expenses, simple booking and personal control, managing supplies, increasing production and administrative skills (Scott & Bruce, 1987) *<br>Using accounting systems, budgeting, decision making, formalised communication and job assignments (Greiner, 1998) *<br>Managerial, funding and marketing (Olson, 1985)<br>Managerial skills including acquisition of financing, personnel management, product innovation, ongoing business operation, strategic management, marketing and selling (Haber & Reichel, 2007) ^ | Intergroup relations, coordinating, implementing strategy, innovation and efficiency (Kroeger, 1974) *<br>Managing formalised financial, marketing, human resource and production systems (Lewis & Churchill, 1983) *<br>Delegation, using formal accounting systems, managing growth, coordination, innovations, managing partners, planning business growth collaboration and securing long-term funding (Scott & Bruce, 1987) (Greiner, 1998) *<br>(Greiner, 1998) *<br>Entrepreneurial, managerial (finance, human resource and marketing, and commercial).<br>Behavioural and leadership (Loué & Baronet, 2012) ^<br>Personal, entrepreneurial, business and technical. (Narkhede et al., 2014) ^<br>Managerial, funding and marketing (Olson, 1985) *<br>Growth orientation (Pyysiäinen et al., 2006) ^ |

Source: *Author's Literature review*

*Theoretical research, ^Empirical research

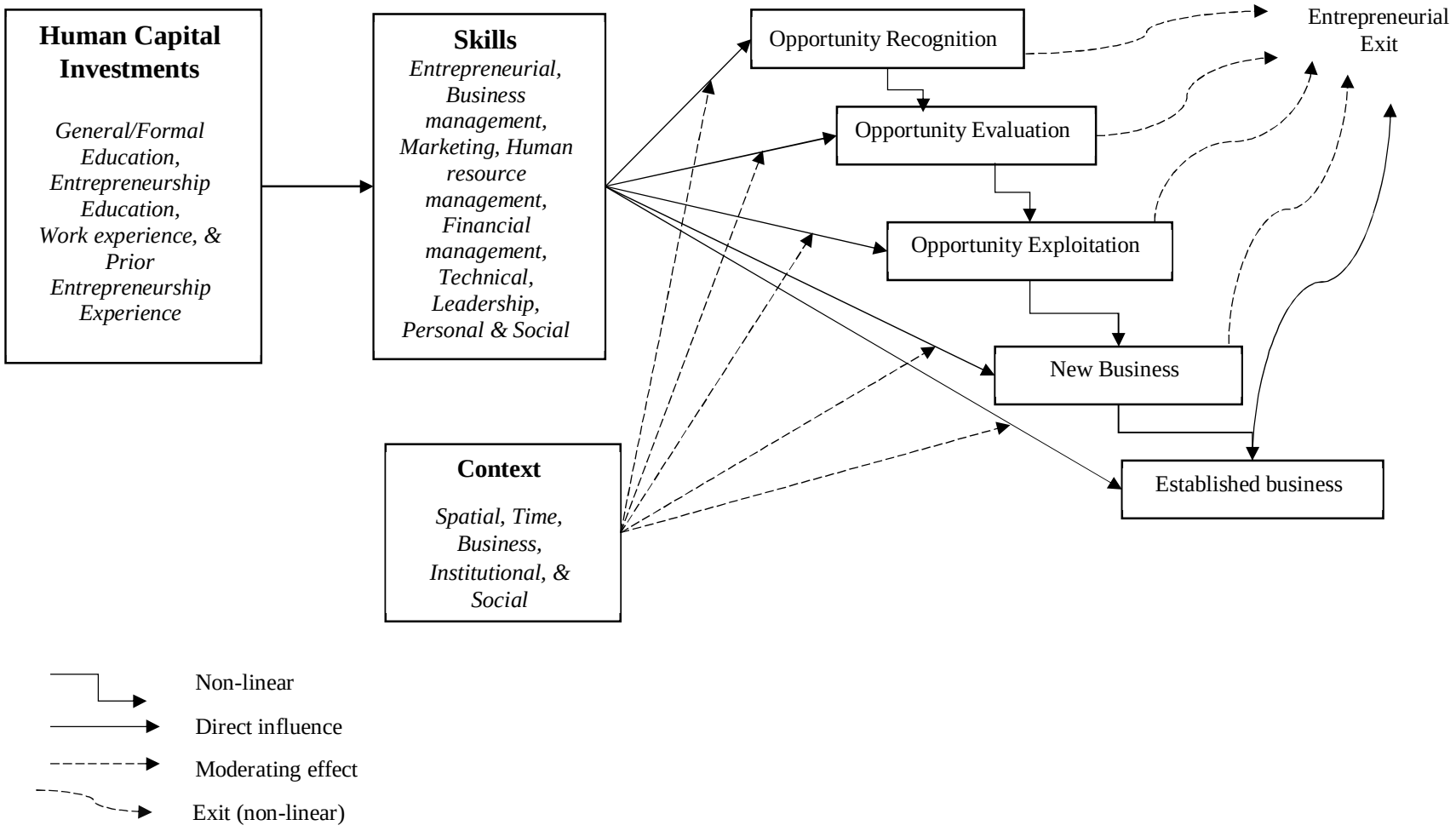


**Figure 1: Conceptual model linking human capital investments, skills, context, and entrepreneurial phases**
Source: Authors' own

(GEM) definitions of the phases (see section 2 on entrepreneurial phases). The final analysis in Table 3 shows the details of the skills per phase. Finally, the discussions of the gathered data led to the development of a conceptual model displayed as Figure 1, which includes the context. The conceptual model is supported by the propositions brought forth after each literature theme discussion. During the data analysis, multiple authors (e.g., Chell, 2013; Lamine, Mian, & Fayolle, 2014; Marvel et al., 2016; Ucbasaran, Westhead, & Wright, 2001) emphasised that skills do not happen in a vacuum, but they are influenced by the context in which the entrepreneur and business are embedded. Although there are other factors such as the type of the entrepreneur and size of the business, these were out of the scope of the study; therefore, they were suggested as an area for future research.

## Literature Review

### Theoretical underpinning of skills

This study is underpinned by the human capital theory, founded on the notion that investments such as education and practical experience result in outcomes such as skills and knowledge (Becker, 1964). In addition, Becker's (1964) assumption was that the practical application or training refines prior skills one has. In simple terms, prior experience contributes to the development of further skills. So, entrepreneurs with previous experience − either entrepreneurial or work experience − will have a better skills level and acquisition of skills compared to those without the prior exposure. A meta-analytical study shows that this theory has been used in entrepreneurship to explore how the different elements of the human capital contribute to venture formation and success (Unger et al., 2011). The findings further demonstrate that if both the investments and outcomes are related to specific activities, then there are even greater performance results (Gibbons & Waldman, 2004). Hence, this study argues that entrepreneurial skills must be studied in the context of and the consonance with each specific entrepreneurial phase.

Empirical evidence demonstrates that formal education is important for identification and not exploitation of the entrepreneurial opportunities (Davidsson & Honig, 2003). This is explained by the task-specificness of the human capital investments (Becker, 1964; Gruber, Kim, & Brinckmann, 2015; Haynie, Shepherd, & McMullen, 2009). Authors argued that entrepreneurial education will have more impact on the entrepreneurial outcomes such as nascent behaviour, start-up and venture performance (Martin, McNally, & Kay, 2013). The same notion applies to prior experience. Although the general work experience will contribute to the start-up activities, it is argued that the prior entrepreneurship experience will have more impact on the creation and performance of a business venture (Shane, 2000; Unger et al., 2011). In simple terms, generic human capital investments lead to generic skills, while entrepreneurship specific investments will result in entrepreneurial skills.

Human capital theory is closely aligned with the competence approach that requires a combination of underlying personal attributes, including knowledge, skills, and personality characteristics (Hayton & Kelley, 2006; Hayton & McEvoy, 2006). However, this review narrows the focus down on skills as outcomes of formal and informal investments; hence, the decision to select the human capital theory. Although, this theory has been criticised for the focus on skills as individual constructs that are not influenced by the social context in the social learning theory, social constructivist and psychological approaches (Bandura & Walters, 1977; Bowles & Gintis, 1975; Green, 1992), there are emerging studies that incorporate context to provide a better comprehension of skills (Marvel et al., 2016). Another opponent of the theory is Lazear's Jack of Trades (JAT) based on an assumption that since entrepreneurs are involved in different tasks, they must be competent in diverse areas (Lazear, 2004, 2005). A challenge with Lazear's theory is that it recognises skills that are innate and at times difficult to measure or control (Silva, 2007).

Skills are defined as the direct or observable application of knowledge in order to execute a task or solve a problem (Hayton & McEvoy, 2006; Marvel et al., 2016) as a result of human

capital investments in education and/or experience, and can be enhanced through training, practice and development (Becker, 1964; Mamabolo, Kerrin, & Kele, 2017a). The tasks in the entrepreneurial phases include: identifying opportunities; assessing the identified opportunities; market research; innovating new products or services; gathering the resources; setting up an office/manufacturing venue/etc.; venture launch; sales; implementing systems, and marketing the business (Amorós & Bosma, 2014; Corbett, 2005; Cunneen et al., 2007; Mueller, Volery, & Von Siemens, 2012). The suggested definition shows that skills are not only innate, but they can be developed through different training interventions (Lichtenstein & Lyons, 2001). Lichtenstein and Lyons (2001, p.7) further argued that "entrepreneurship involves a set of skills that are the result of cultivation and development rather than innate endowment". This demonstrates that unlike personality traits that presumably develops from childhood (Pyysiäinen, Anderson, McElwee, & Vesala, 2006; Saks & Gaglio, 2002), an argument of whether skills possessed by entrepreneurs are innate (JAT theory) or not (Human Capital Theory) continues to exist in the literature and it is yet to be clarified.

Research on entrepreneurship has identified various sets of skills that are important for business venturing. Table 1 shows that there are entrepreneurial (start-up) skills that are about identifying and exploiting business opportunities. Technical skills are necessary for innovation, operations management and production of the product. Financial skills deal with management of finances by ensuring that pricing, financial statements and cash flows are appropriately calculated and interpreted. Marketing skills deal with how the product is introduced to the target market. Once there are new employees in the business, then human resource skills will become necessary to design job descriptions and manage the employees according to industry standards. Business management skills ensure that the business is running smoothly on a daily basis. Personal skills are those possessed by an entrepreneur that at times are regarded as behaviours. Social skills are about interacting with different stakeholders within or outside the organisation. Finally,

leadership skills include articulating the vision and leading the employees to achieve the vision. Although there are many skills categories, the main skills can be simplified into: Entrepreneurial skills needed for recognising and taking advantage of the opportunity; management skills for planning of programmes, development of budgets, evaluation of performance and strategy execution; technical skills are associated with using tools in the field (Kodithuwakku & Rosa, 2002; Rosique-Blasco, Madrid-Guijarro, & García-Pérez-de-Lema, 2016) and soft skills including personal, social and leadership for interacting with different stakeholders. An assumption is that the combination of these skills is important for business success, and that they are interdependent and complementary (Kodithuwakku & Rosa, 2002).

**Entrepreneurial Process and Phases**

The entrepreneurship field is yet to agree on the unified entrepreneurial process (Brazeal & Herbert, 1999; Bruyat & Julien, 2001; Gartner, 1990; Shane, 2012). Brazel and Herbet (1999) argued that perhaps the entrepreneurial sector must clearly explain the entrepreneurial process and relate it to the overlapping concepts that have existed in other fields. Expanding on this argument, Moroz and Hindle (2012) observed that most of the existing models are disintegrated, and the majority of them lack empirical evidence. In an attempt to clarify this phenomenon, Shane and Venkataraman (2000) provided a definition that is largely accepted by entrepreneurship scholars. They defined the entrepreneurial process as identification, evaluation and exploitation of opportunities (Shane & Venkataraman, 2000).

There are many approaches to studying the entrepreneurial process. In their paper, Moroz and Hindle's (2012, p. 791) classification of the entrepreneurial process models includes: a) Stage models, which "divide the *priori* stages into major tasks or phases"; b) A static framework that characterises "the overall process of venture creation without examining the sequence of activities"; c) Process dynamics that employ "qualitative methods to examine how and why variations in context and process shape outcomes"; and d) Quantification sequences, which refers

to “a historical sequence-based approach of the new venture creation process”. Although each one of the models has its own weaknesses and strengths, their application in research depends on the research question or objectives explored in a study.

In this review, a stage or phase approach is used to understand skills specific to different entrepreneurial phases. The stage model originates from organisational development and social science literature, where an assumption was made that an organisation goes through the different lifecycle stages (Klyver, 2007). For example, models by Chandler and Jansen (1992); Gaibraith (1982); Greiner (1997), and Lewis and Churchill (1983) are some of the landmarks of organisational development models and have been used to understand the emergence of an entrepreneurial venture. Although most of these models lack empirical validation, they were largely used to illuminate the development of an organisation.

In this study, a stage model was selected because it shows the conceptual or empirical categories and the sub-processes that illuminates the entrepreneurial process and an appropriate construct; e.g., opportunity recognition is selected to represent each stage (Bhave, 1994; Cunneen et al., 2007). Each stage has a set of activities (Klyver, 2007; Mueller et al., 2012; Reynolds & Miller, 1992) that must be performed in order to move from one phase to the next (Gielnik, Zacher, & Wang, 2018). Failure to complete the activities in one phase might prolong the length of stay in the phase or the transition to another phase or lead to entrepreneurial exit (DeTienne, 2010; Singer et al., 2018). Therefore, a combination of conceptual or empirical categories and their activities provides an overview of the venture creation process, including the activities and their respective skills (Klyver, 2007; Mueller et al., 2012). Therefore, this conceptualisation of entrepreneurship as a process with multiple phases assists in observing entrepreneurial activities at different points (Amorós & Bosma, 2014).

Cunneen et al. (2007) observed that there are many stage models that have a number of stages, ranging from two to six. However, they discovered that four stages appeared consistently

as part of the various stages, which are: “The opportunity recognition stage; an opportunity evaluation; an opportunity development stage; and a commercialisation stage (leading to start-up, or the commencement of systematic sales)” (Cunneen et al., 2007, p. 93). Some of the international research programmes such as the Global Entrepreneurship Monitor (GEM), developed empirically-tested and validated entrepreneurial phases (Amorós & Bosma, 2014; Singer et al., 2018) used by entrepreneurship scholars (Amorós, Bosma, & Levie, 2013; Brixy, Sternberg, & Stüber, 2012; Klyver, 2007; Singer et al., 2018; Wasdani & Matthew 2014).

According to the GEM, the entrepreneurial process starts with a person who perceives themselves to have the necessary skills and motivation to start a business; it moves to a nascent or start-up business; and then to a manager of a new or established entrepreneur (Singer et al., 2018). In the nascent phase, an entrepreneur is involved in setting up a business that has not paid salaries in three months or more. The nascent phase transitions to a new-business phase, whereby the business is running and generating income for more than 3 months or 3.5 years. In the final stage, entrepreneurs are owner-managers of established firms that generate income or paid salaries for 3.5 years and longer. Table 2 summarises the key entrepreneurial phases as opportunity recognition, opportunity evaluation, opportunity exploitation, the new business, and the established business phase. As seen in Table 2, there is no guarantee that an entrepreneur will complete each stage, as some may decide to exit the entrepreneurial process at any phase (DeTienne, 2010; Singer et al., 2018).

The lack of empirical evidence on the unified entrepreneurial model does not mean that entrepreneurship scholars did not attempt to understand the uniqueness of the phases. In several instances, scholars focused on the different constructs and the specific or singular entrepreneurial phase rather than the entire entrepreneurial process. For example, they studied entrepreneurial intentions (van Gelderen et al., 2018), social capital (Davidsson & Honig, 2003), human capital (Unger et al., 2011), stress (Rauch, Fink, & Hatak, 2018), affect (Baron, 2008), and success

(Kodithuwakku & Rosa, 2002, Haber & Reichel 2007). However, there are few empirical studies that focused on how demographics and cognitive characteristics (Brixy et al., 2012), human capital investments (Haber & Reichel, 2007; Mamabolo et al., 2017b) and opportunity recognition (Wasdani & Mathew 2014) vary at each entrepreneurial phase. Their findings demonstrate that the requirements for one phase are not necessarily suitable during the subsequent phase. The contribution of this study is to focus on entrepreneurial phases rather than a single process.

**Skills and the entrepreneurial process**

So far, it is clear that the different types of skills are important in the venture creation process (Unger et al., 2011), especially across the different phases (Baron, 2007). Although scholars have emphasised that each stage of the new venture process has unique demands that call on specific skills (Kickul et al., 2009; Wright, Hmieleski, Siegel, & Ensley, 2007), there is scarce empirical evidence that examines how the skills per phase and the level of the skills relate to each other. Wright et al. (2007) argued that creativity may be needed when identifying opportunities, while management skills play an important role in leading the business venture to high growth. Further, Lichtenstein and Lyons (2001) argued that entrepreneurs possess the different levels of skills and they must be treated differently (Hahn et al., 2019). The skills level can range from low to medium to outstanding levels of skills (Lichtenstein & Lyons, 2001) or very low to very high competence (Hahn et al., 2019) or from simple to complex. Most of the entrepreneurship scholars focus on a single phase, referring either to the nascent phase or the established phases. Table 3 presents the different categories of skills applied in running a business venture through the different phases, based on existing theoretical and empirical research.

A key challenge that entrepreneurs encounter is that skills requirements for one phase may be insufficient, unimportant or too simple for the subsequent phase (Lewis & Churchill

1983; Mitchelmore & Rowley, 2010). All the phases comprise the two main activities, referring to entrepreneurial and management activities, which determine the kind of skills needed (Bird, 1995; Rosique-Blasco et al., 2016). If the correct skills are applied in the venture, the enterprise will transition to the subsequent phase; however, a lack of skills may cause it to fail (Barlett & Ghoshal, 1997; Singer et al., 2018). Therefore, it is important to understand both the entrepreneurial and managerial skills (Rosique-Blasco et al., 2016) required for and in the different phases for successful venturing.

The organisational development models were used to map out the required skills in the different phases. These models do not emphasise the early entrepreneurial activities, but they focus on later phases, which are about the management of the venture. Since there is a paucity of research on this study's topic, a combination of both organisational development and entrepreneurial phases such as depicted in Klyver's (2007) study, will assist to map out the skills required in each phase. This gap clearly supports the need for future empirical research to be conducted to map out skills in the different phases, focusing purely on the entrepreneurial process.

***Skills required in the opportunity recognition stage***

The entrepreneurial journey commences with those entrepreneurs who believe that they have the adequate human capital to create a business, have identified a business opportunity and have confidence that they will succeed (Amorós & Bosma, 2014; Singer et al., 2018). Their focus is on creating or inventing products – tangible or intangible − to meet a particular need (Kickul, Gundry, Barbosa, & Whitcanack, 2009; Olson, 1985). An assumption here is that most novice entrepreneurs without prior entrepreneurial (or relevant) experience will not possess all the skills required to be successful (Lichtenstein & Lyons, 2001). In this phase, entrepreneurs use their skills to scan the environment in an effort to identify changes in technology or customer preferences (Gruber et al., 2015). The main skills in this phase

include risk taking, innovation, problem solving, critical thinking, creativity (Badawi et al., 2018; Khamis et al., 2018; Rosique-Blasco et al., 2016). Additionally, entrepreneurs must possess the ability to learn, have intellectual skills and be able to interact with different stakeholders or possess the social skills to facilitate opportunity recognition (Chell, 2013). Unlike any established business, opportunities in the early phases of an entrepreneurial business tend to be signalled through unfamiliar and disorganized information, making it difficult to plan for such complex signals in a linear manner (Kickul et al., 2009; Olson, 1985). Since there is no unified set of skills for the opportunity identification phase, research is needed to determine the critical skills for this phase:

Proposition 1: In the opportunity recognition phase, entrepreneurs require skills that are about creativity, invention, problem solving, innovative and critical thinking to meet an existing need in the market.

***Skills required in the opportunity evaluation stage***

After identifying the opportunity, an entrepreneur can choose to evaluate and pursue the opportunity. During the evaluation phase, opportunities with potential impact will be pursued, while those with minimal to no impact will be abandoned, maybe resulting in entrepreneurial exit (Dimov, 2010). In most instances, impactful opportunities are those aligned with the entrepreneur's human capital (Haynie et al., 2009). An empirical study of 141 entrepreneurs who had 6,728 opportunity evaluations, revealed that prior experience as part of the human capital does have an impact on how entrepreneurs evaluate opportunities. As part of the opportunity evaluation, they must have skills to assess or judge the different opportunities (Gruber et al., 2015). Foo's (2011) empirical study shows that management of emotions skills are important at this stage. This is important, because emotions such as fear and anger affect how individuals evaluate opportunities. In the evaluation phase, an

entrepreneur relies on analytical or processing skills to develop detailed financial, manufacturing and marketing plans (Kickul et al., 2009; Olson, 1985). Unlike the opportunity recognition phase that is creative and intuitive, the evaluation phase requires rational thinking and analytical or processing skills (Olson, 1985; Chell, 2013; Saks & Gaglio, 2002). Therefore, the study proposes that:

Proposition 2: Entrepreneurs in the opportunity evaluation stage are involved in analytical and processing skills such as designing financial, manufacturing, and marketing plans to assess the viability of the identified opportunity.

***Skills required in the opportunity exploitation stage***

The exploitation phase can be regarded as the nascent phase. In this phase, entrepreneurs have made efforts to create an entrepreneurial venture such as finding a place or machinery, assembling a team, business planning and raising capital from family and friends (Bergmann & Stephan, 2012; Scott & Bruce, 1987). The important skills for successful exploitation include product innovation and managing technological processes (Amorós & Bosman 2014; Kroeger 1974; Singer et al., 2018). In this phase, entrepreneurs are expected to gather resources; therefore, social skills such as "tenacity and obstinacy, ability to learn, social intelligence, coordinating the network members, negotiation skills, and strengthening positive ties" are important (Lamine et al., 2014, p.527). Having prior work or industry experience in the same industry as the new venture, will reduce the obligation to learn new technical or industry-related skills (Dimov, 2010; Timmons & Spinelli, 2004). Some of the skills that were important in the beginning have changed in complexity. For instance, the political skills change from networking during the opportunity identification phase to goal or power assessment in the evaluation stage and on to becoming a goal directed influence in the exploitation phase (McAllister, Ellen III, & Ferris, 2018).

As new challenges emerge, an entrepreneur will require complex problem-solving skills. Financial analysis is another skill that starts to be important during this stage (Haber & Reichel, 2007). An entrepreneur must be able to convince financial institutions and investors to invest in the business. This requires analytical skills to develop business plans, financial forecasts, cash flows, and the definition of capital needs (Kickul et al., 2009). The employment of employees also requires organising skills to ensure that the business venture has a formalised structure. While it may seem obvious that technical skills are important in the identification phase, Ucbasaran et al. (2008) argued that they are associated more with the exploitation stage, as they can reduce the costs and risks associated with produced products and/or services. This study therefore proposes that:

Proposition 3: In the exploitation phase, entrepreneurs continue to accumulate analytical and processing skills such as product innovation, managing the technical processes, and gathering resources to launch the new business venture.

***Skills required in the new business phase***

The key issues related to this phase are acquiring customers and achieving distribution of the products that were bought (Amorós & Bosman 2014; Scott & Bruce 1987; Singer et al., 2018). As such, new business entrepreneurs dedicate their efforts to become able to identify and understand customer needs and develop creative mechanisms to fulfil those needs (Kroeger 1974). Pilot studies are some of the mechanisms used to explore customer needs and position the business for a wider market than entrepreneurs in the established phase (Lewis & Churchill, 1983). Entrepreneurs in this stage start to learn more complex skills which include attracting customers (Chang & Rieple 2013), inter-social relations (Kroeger, 1974), managing revenues, cash generation and management (Lewis & Churchill, 1983), supervision (Scott & Bruce, 1987), and job assignments (Greiner, 1998). Some of the skills from the previous

phase such as political and problem-solving skills continue to be more complex to meet the needs of a new business. There is a consensus that since this stage is about selling the product, the management of cash flow and revenues plays an important role for new business owners. As the business grows, there is a need to hire more employees; hence, the ability to assign job roles and supervise are prominent and continue to be complex during this phase. Contrary to the early entrepreneurial phases, opportunity recognition skill in this stage is considerably smaller (Brixy et al., 2012), as the entrepreneur uses analytical skills to complete the business launch, and to manage and grow the new venture (Kickul et al., 2009). Based on the discussions above, a proposition brought forth is that:

Proposition 4: The more complex skills required in the new business phase include human capital management, selling products and managing finances to ensure that the business runs effectively and efficiently on a daily basis.

***Skills required in the established phase***

Entrepreneurs in the early phases develop the product, identify the customers and sell the product; hence, there is only a small amount money to manage (Kroeger (1974). Nevertheless, as the business transitions to the late entrepreneurial phases, there is enough capital generated, thus making financial management skills far more important and complex. At this phase, the entrepreneur introduces formalised and computerised financial systems, which provide the financial status of the venture at any point in time. The ability to properly manage finances has been associated with the sustainability of the business in the long run (Diochon et al., 2008).

As the business and its products mature, new products are introduced as part of growing the business and fulfilling the customers' changing needs (Chang & Rieple, 2013). Therefore, the innovation and creativity skills that were critical in the early phases resurface

during this stage (Chell, 2013; Leyden, & Link, 2015; Ucbasaran et al., 2001). Some of the significant skills and more complex skills at this stage include strategic planning and implementation (Kroeger, 1974; Mitchelmore & Rowley, 2010); coordination, managing partners and securing long-term funding (Lewis & Churchill, 1983); delegation (Scott & Bruce, 1987), using formalised business planning tools (Greiner, 1998), and leadership skills (Loué & Baronet, 2012). It can be seen that some of the skills such as simple bookkeeping or record-keeping in the early phases have developed into complex skills of managing financial software in the established phase. Contrary to the early phases, the skills associated with writing business plans have minor importance during this phase to the success of a business venture (Haber & Reichel, 2007); entrepreneurs are focusing on implementing the strategies and the business plans. At this stage, analytical thinking and planning are complex skills and used the most to ensure the sustainability of the business (Kickul et al., 2009). In sum, the premise here is that:

Proposition 5: In the established business phase, entrepreneurs require creative skills and analytical skills such as complex financial and business management skills that will contribute towards the growth of the business. Some entrepreneurs may use their accumulated complex skills to diversify or start-new businesses.

***Skills and entrepreneurial exit***

Entrepreneurial exit is defined as the "process by which the founders of privately held firms leave the firm they helped to create; thereby removing themselves, in varying degree, from the primary ownership and decision-making structure of the firm" (DeTienne, 2010, p.203). An entrepreneur can voluntarily exit the entrepreneurial process or can exit as a result of failed venture. Inadequate entrepreneurial and management skills have been identified as one of the factors that contribute to venture failure (Koçak, Morris, Buttar, & Cifci, 2010). Any entrepreneur who decides to exit the

entrepreneurial process or diversify the existing business by starting a new venture, will require to return to the early entrepreneurial phase and use the relevant skills needed during that phase. An added advantage is that they will rely on their prior entrepreneurial experience and acquired skills to deal with the liabilities of starting a new venture (Shane, 2000).

Several studies demonstrate that individuals who experienced an entrepreneurial exit more often such as serial or portfolio entrepreneurs, may have relevant entrepreneurial skills and more often perceive and exploit good entrepreneurial opportunities than those who did not experience an exit (Hessels, Grilo, Thurik, & van der Zwan, 2011; Koçak et al., 2010; Ucbasaran, Shepherd, Lockett, & Lyon, 2013). For example, Carbonara, Tran and Santarelli (2019) argued that skilled people tend to become serial entrepreneurs when they identify new opportunities that are profitable. Those that repeatedly exit throughout their entrepreneurial career will learn more skills and improve on them. Even those that have exited as a result of failure, can still use their accumulated skills to benefit their new ventures (Hessels et al., 2011). A proposition brought forth is that:

Proposition 6: Entrepreneurs who have (repeatedly) exited the entrepreneurial process will have better skills endowments such as opportunity identification and exploitation to deal with the liabilities of starting a new venture more than those who never experienced exit.

**Context**

The review papers forming a foundation for this study, argued that context is important in human capital research (Chell, 2013, Marvel et al., 2014; Unger et al., 2011). Chell (2013) explains that the context has an impact on the acquisition and application of skills. Additionally, a recent review on human capital argues that "it is not possible to fully understand how aspects of human capital impact the process without consideration of the conditions and circumstances that are relevant to an event or situation—thus making the study context an important consideration" (Marvel et al., 2014, p. 612). The dominant study contexts referred to are factors such as industry, country, and age of the business (Unger et al., 2011; Marvel et al., 2014). There are fewer

research studies incorporating the context using Welter's (2011) framework that consists of spatial (geography), time (sequencing of events), social (networks), business (market) and institutional (culture, politics and regulations) dimensions that could help illuminate the understanding of skills.

The spatial dimension reveals that skills are well studied in developed markets and less in developing countries (Morales & Marquina, 2013). The emerging markets may have unique skills requirements, which are different from those in developed countries (Mamabolo et al., 2017a, b; Marvel et al., 2014). The time dimension focuses on the need to study skills over time, as skills required in one phase might not necessarily be suitable for the next phase (Baron, 2007) and the identified opportunity also changes (Schwartz, Teach, & Birch, 2005). Entrepreneurs who are older often have better prior experience than the younger ones, resulting in more and better skills level than those without experience (Gielnik et al., 2018). Social networks and contextual embeddedness can determine the development and the transference of skills (Chell, 2013). The business context reveals the kind of skills and the level required in specific industries or markets (Unger et al., 2011). Finally, the institutional environment explains how culture, legislation and political environments could influence the development of skills (Singer et al., 2018). For instance, a lack of regulations on entrepreneurial education can have an impact on the skills development and curriculum context on entrepreneurship.

Based on these discussions, the context can act as a moderator of how skills are used in the different entrepreneurial phases. A meta-analytical study conducted by Unger et al. (2011) discovered that context focusing on the age of the business plays a role in the relationship between the human capital investments (skills) and the performance of a business venture. Younger firms were found to have a better impact by human capital and venture performance compared to older businesses. Another study demonstrated that entrepreneurs in a resource-constrained environment had (developed) more creative skills and persistence in extracting value

and capital from their social networks and contacts (Kodithuwakku & Rosa, 2002). Therefore, future research should incorporate the different dimensions of the context in skills and venture performance research. Therefore, we propose that:

Proposition 7: The contextual factors such as geography, time, business, networks and institutions can act as a moderator that influences the application and level of skills required in the different phases of the entrepreneurial process.

**Conceptual model**

The conceptual model displayed in Figure 1 shows that as the entrepreneurial process unfolds into different phases, the skills requirements may also change and become more complex. This review focused on skills possessed or needed at an individual level rather than at the team level construct. However, the model can be expanded further and tested at the multiple level of analysis; for example, conducting a team, industry, region and country level analysis. The key constructs must be defined or operationalized to ensure that they measure what the research is intended to measure. The model suggests that human capital is an important predictor and can be measured by focusing on the level of education, years of related or relevant experience, and exposure to entrepreneurship and other industry-specific investments (Becker, 1964).

The suggested skills can be operationalized according to each phase, also noting that some skills such as financial management change in complexity as the entrepreneurial phases unfold and the tasks change. Understanding the key entrepreneurial activities in each phase will help to identify the kind of skills required. For example, if an activity to be performed involves managing the venture's finances, an entrepreneur will need to have knowledge of or experience in cash flow management, pricing, cost management, raising capital, and interpreting financial statements skills. Each activity will require its own set of skills.

Operationalized skills can be developed into instruments that could be used by training institutions to identify the skills required by entrepreneurs.

The reviewed papers demonstrated that there is no unified measurement instrument for skills. Most of the studies derives measures from the literature associated with entrepreneurial activities. In order to have a full comprehension of the diversity of skills, they must be measured as a multi-dimensional construct characterized by underlying dimensions or factors. This study identified nine underlying factors of the skills construct displayed in Table 1. Using a "total unidimensional skills" construct may not show how the application of skills changes in the different entrepreneurial phases. Although the total composite scores may be able to provide a simple comparison between participants, it will be difficult to determine what kind of skills are the most significant. Therefore, in agreement with Chell (2013), skills must be treated as a multidimensional construct that reveals the diversity of the skills.

The identified skills dimensions or factors can be measured using quantitative or survey research instruments with measurement items on a Likert scale. The sub-skills are used to develop the measurement items of the scale. Entrepreneurs can be asked to rate how their level of competence related to a skills factor ranging from "no aptitude at all" (1) to "very high aptitude" (7). Also, they can rate the level of skills from simple to complex skills, low to high competence. If a research is interested in the significance of the skills, the Likert scale can range from "not at all important" (1) to "extremely important" (7). Those that are interested in the extent to which entrepreneurs use these skills can measure them from "never" (1) to "every time" (7). To determine the entrepreneur's confidence in their skills, they can rate themselves starting from "very little" (1) to "very much" (5). The factor analysis methods can be utilized to establish the underlying categories or factors of skills. These skills can be tested both at the individual or the firm level.

Future research can elect to focus on one category of skills to measure or observe how they change over time. As for the entrepreneurial phases, they can be operationalized by focusing on the key activities occurring in each phase. Insights from panel studies of the entrepreneurial process (for example GEM and Panel Study of Entrepreneurial Dynamics) will also help to clarify the phases. The context can be operationalized by focusing on Welter's (2011) key dimensions such as the location of the business, time, networks, institutional environment and industry. Although there are no outcome variables linked to skills and phases, variables such as a venture's financial and non-financial performance could be considered as part of the model. The suggested model favours positivist approaches, but such a stance does not suggest that a social constructivist or pragmatism approaches are not important. Scholars have suggested that the interpretivism designs should be incorporated in human capital research to have a better understanding to the development of skills within a particular context (Chell, 2013; Marvel et al., 2016). Therefore, interpretivism designs in skills research are also encouraged to reveal the multidimensionality of skills and lead to new theories or insights on skills research.

Finally, other ways to measure diverse skills could include the experiential learning activities and simulations. In experimental designs entrepreneurs will get an opportunity to work on live projects as a way of assessing skills and furthermore increasing their skills endowment. Additionally, business simulations and use of gamifications can show the different levels of skills that entrepreneurs possess. These activities could reveal other diverse skills that entrepreneurs possess.

## Conclusion, Implications and Future Research

The main aim of the study was to conduct a literature review on skills required and used in the different entrepreneurial phases. Research on skills tends to focus on one

entrepreneurial phase, without showing how the skills change as the phases unfold. A contributing factor to this singular-phase approach may be an argument that there is no unified entrepreneurial process theory. This study is in line with scholars such Brixy et al. (2012), Mamabolo et al. (2017b), Marvel et al. (2016), and Wasdani and Mathew (2014) who advocate for a review of human capital across the entrepreneurial process. In addition, researchers such as Pyysiäinen et al. (2006) noted that there are many lists of entrepreneurial skills, which do not show how they are used differently across the phases. The reviewed literature led to a conceptual model, which shows the skills across the entrepreneurial phases and the moderating role of the context. Further, the study also suggested propositions, which could be explored in future studies.

Theoretically, this study shows that both the skills and the entrepreneurial process are subject to change over time, as the venture moves from one phase to the next. Also, the study has contributed to existing knowledge that entrepreneurial phases are different and may require different skills. Again, the complexity of some of the skills changes as the entrepreneurial phases unfold. For example, in the early entrepreneurial phases, entrepreneurs use simple bookkeeping or record-keeping to manage their finances; however, in the established phase, they use sophisticated financial management software. Foo (2011) also shows how political skills change in complexity. These findings suggest that skills are not static, as their importance and complexity change across the entrepreneurial phases.

Practically, the study will assist policy-makers to acknowledge that entrepreneurs have different development needs, which are in line with their entrepreneurial phases. Training institutions should teach entrepreneurs the skills that are suitable for their particular phases and essential level of skills rather than treating all entrepreneurs the same. After all, one size does not fit all, thus a cookie-cutter approach is not effective. Before training interventions are implemented, the institutions are encouraged to categorise entrepreneurs according to their

phases and survey the kind of skills they require, and thereafter find efficient ways to deliver the educational or training programmes. This will ensure that entrepreneurs are taught the skills they lack at the time or during the phase when they need them. Finally, this study will help entrepreneurs to be aware of which skills matter during each phase of their business and develop those skills as the business develops. The skilled serial and portfolio entrepreneurs could be used to transfer skills to the start-up entrepreneurs through mentorship and coaching programmes. This may be another way of encouraging early-phase entrepreneurs who would otherwise feel that they lack the skills they need to navigate the entire entrepreneurial journey.

Future studies can test the propositions and the proposed conceptual model. Some of the future studies should conduct longitudinal studies, which will indicate the significance of the changing skills needs, the complexity and applications across the entrepreneurial phases over time, and maybe include actual performance of the selected ventures. Further, there is an opportunity to investigate how skills relate to and interlink with other sub-processes or outcomes of, or activities in the entrepreneurial phases. Research should examine the significance of the contextual variables such as age of the business, size and type of entrepreneur in the development and application of skills. Finally, there is a need to have more qualitative research that will reveal the nature of skills within a social setting and how entrepreneurs learn those skills.

As one of this study's limitations, there is no differentiation between innate and learnt skills. The focus was on skills as a result of investments. But we did not show how specific investments lead to specific skills. Therefore, future research should explore the origin and nature of skills. Also, the filtering process might have missed some of the related literature; however, the rigorous SLR process helped to ensure that the study's conclusions are based on a solid foundation.

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## References

Amorós, J.E. & Bosma, N. (2014). *Global Entrepreneurship Monitor. 2013 Global Report.* Global Entrepreneurship Research Association.
Amorós, J.E., Bosma, N., & Levie, J. (2013). Ten years of global entrepreneurship monitor: Accomplishments and prospects. *International Journal of Entrepreneurial Venturing, 5*(2), 120-152.
Badawi, S., Reyad, S., Khamis, R., Hamdan, A., & Alsartawi, A.M. (2018). Business education and entrepreneurial skills: Evidence from Arab universities. *Journal of Education for Business,* 1-10.
Bandura, A. & Walters, R.H. (1977). *Social learning theory (Vol. 1).* Englewood Cliffs, NJ: Prentice Hall.
Baron, R.A. (2007). Behavioral and cognitive factors in entrepreneurship: Entrepreneurs as the active element in new venture creation. *Strategic Entrepreneurship Journal*, *1*(1-2), 167-182.
Baron, R.A. (2008). The role of affect in the entrepreneurial process. *Academy of Management Review, 33*(2), 328-340.
Bartlett, C.A. & Ghoshal, S. (1997). The myth of the generic manager: new personal competencies for new management roles. *California Management Review, 40*(1), 92-116.
Becker, G.S. (1964). *Human capital: A theoretical and empirical analysis, with special reference to education.* New York: National Bureau of Economic Research.
Bergmann, H. & Stephan, U. (2012). Moving on from nascent entrepreneurship: measuring cross-national differences in the transition to new business ownership. *Small Business Economics,* 1-15.
Bhave, M.P. (1994). A process model of entrepreneurial venture creation. *Journal of Business Venturing*, *9*(3), 223-242.
Bird, B. (1995). Towards a theory of entrepreneurial competency. *Advances in Entrepreneurship, Firm Emergence and Growth, 2*(1), 51-72.
Brazeal, D.V. & Herbert, T.T. (1999). The genesis of entrepreneurship. *Entrepreneurship Theory and Practice, 23*(3), 29-46.
Brixy, U., Sternberg, R., & Stüber, H. (2012). The selectiveness of the entrepreneurial process. *Journal of Small Business Management, 50*(1), 105-131.
Bryant, P. (2007). Self-regulation and decision heuristics in entrepreneurial opportunity evaluation and exploitation. *Management Decision, 45*(4), 732-748.
Bruyat, C. & Julien, P.A. (2001). Defining the field of research in entrepreneurship. *Journal of Business Venturing,* 16(2), 165-180.
Bygrave, W. D. (2007). The entrepreneurship paradigm (I) revisited. *Handbook of Qualitative Research Methods in Entrepreneurship, 1748*.
Carbonara, E., Tran, H. T., & Santarelli, E. (2019). Determinants of novice, portfolio, and serial entrepreneurship: an occupational choice approach. *Small Business Economics*, 1-29.
Chandler, G.N. & Jansen, E. (1992). The founder's self-assessed competence and venture performance. *Journal of Business Venturing, 7*(3), 223-236.

Chang, J. & Rieple, A. (2013). Assessing students' entrepreneurial skills development in live projects. *Journal of Small Business and Enterprise Development*, *20*(1), 225-241.
Chell, E. (2013). Review of skill and the entrepreneurial process. *International Journal of Entrepreneurial Behavior & Research*, *19*(1), 6-31.
Corbett, A.C. (2005). Experiential learning within the process of opportunity identification and exploitation. *Entrepreneurship Theory and Practice*, *29*(4), 473-491.
Crossan, M.M. & Apaydin, M. (2010). A multi-dimensional framework of organizational innovation: A systematic review of the literature. *Journal of Management Studies*, *47*(6), 1154-1191.
Cunneen, D.J., Mankelow, G.J., & Gibson, B. (2007). Towards a process model of independent growth firm creation. *Small Enterprise Research*, *15*(1), 90-105.
Davidsson, P. & Honig, B. (2003). The role of social and human capital among nascent entrepreneurs. *Journal of Business Venturing*, *18*(3), 301-331.
Deakins, D., Bensemann, J., & Battisti, M. (2016). Entrepreneurial skill and regulation: Evidence from primary sector rural entrepreneurs. *International Journal of Entrepreneurial Behavior & Research*, *22*(2), 234-259.
DeTienne, D.R. (2010). Entrepreneurial exit as a critical component of the entrepreneurial process: Theoretical development. *Journal of Business Venturing*, *25*(2), 203-215.
Dimov, D. (2010). Nascent entrepreneurs and venture emergence: Opportunity confidence, human capital, and early planning. *Journal of Management Studies*, *47*(6), 1123-1153.
Diochon, M., Menzies, T.V., & Gasse, Y. (2008). Exploring the nature and impact of gestation-specific human capital among nascent entrepreneurs. *Journal of Developmental Entrepreneurship*, *13*(02), 151-165.
Foo, M.D. (2011). Emotions and entrepreneurial opportunity evaluation. *Entrepreneurship Theory and Practice*, *35*(2), 375-393.
Gartner, W.B. (1990). What are we talking about when we talk about entrepreneurship? *Journal of Business Venturing*, *5*(1), 15-28.
Greve, A. & Salaff, J.W. (2003). Social networks and entrepreneurship. *Entrepreneurship Theory and Practice*, 28(1), 1-22.
Gibbons, R. & Waldman, M. (2004). Task-specific human capital. *American Economic Review*, *94*(2), 203-207.
Gielnik, M.M., Zacher, H., & Wang, M. (2018). Age in the entrepreneurial process: The role of future time perspective and prior entrepreneurial experience. *Journal of Applied Psychology*, *103*(10), 1067.
Greiner, L.E. (1997). Evolution and revolution as organizations grow. 1972. *Harvard business review*, 76(3), 55-60.
Gruber, M., Kim, S.M., & Brinckmann, J. (2015). What is an attractive business opportunity? An empirical study of opportunity evaluation decisions by technologists, managers, and entrepreneurs. *Strategic Entrepreneurship Journal*, *9*(3), 205-225.
Haber, S. & Reichel, A. (2007). The cumulative nature of the entrepreneurial process: The contribution of human capital, planning and environment resources to small venture performance. *Journal of Business Venturing*, *22*(1), 119-145.
Hahn, D., Minola, T., Bosio, G., & Cassia, L. (2019). The impact of entrepreneurship education on university students' entrepreneurial skills: a family embeddedness perspective. *Small Business Economics*, 1-26.
Haynie, J.M., Shepherd, D.A., & McMullen, J.S. (2009). An opportunity for me? The role of resources in opportunity evaluation decisions. *Journal of Management Studies*, 46(3), 337-361.
Hayton, J.C. & Kelley, D.J. (2006). A competency-based framework for promoting corporate entrepreneurship. *Human Resource Management: Published in Cooperation with the School of*

*Business Administration, The University of Michigan and in alliance with the Society of Human Resources Management*, *45*(3), 407-427.
Hayton, J.C. & McEvoy, G.M. (2006) Guest editors' note. *Human Resource Management* 45(3): 291-294.
Hessels, J., Grilo, I., Thurik, R., & van der Zwan, P. (2011). Entrepreneurial exit and entrepreneurial engagement. *Journal of Evolutionary Economics*, *21*(3), 447-471.
Hisrich, R.D., Peters, M.P., & Shepherd, D.A. (2005). *Entrepreneurship* (6th ed). New York: McGraw-Hill.
Kickul, J., Gundry, L.K., Barbosa, S.D., & Whitcanack, L. (2009). Intuition versus analysis? Testing differential models of cognitive style on entrepreneurial self–efficacy and the new venture creation process. *Entrepreneurship Theory and Practice*, 33(2), 439-453.
Klyver, K. (2007). Shifting family involvement during the entrepreneurial process. *International Journal of Entrepreneurial Behavior & Research*, *13*(5), 258-277.
Kodithuwakku, S.S. & Rosa, P. (2002). The entrepreneurial process and economic success in a constrained environment. *Journal of Business Venturing*, *17*(5), 431-465.
Koçak, A., Morris, M. H., Buttar, H. M., & Cifci, S. (2010). Entrepreneurial exit and reentry: An exploratory study of Turkish entrepreneurs. *Journal of Developmental Entrepreneurship*, *15*(04), 439-459.
Kroeger, C.V. (1974). Managerial Development in the Small Firm. *California Management Review*, *17*(1). 41-47
Lamine, W., Mian, S., & Fayolle, A. (2014). How do social skills enable nascent entrepreneurs to enact perseverance strategies in the face of challenges? A comparative case study of success and failure. *International Journal of Entrepreneurial Behavior & Research*, *20*(6), 517-541.
Ladzani, W.M. & Van Vuuren, J.J. (2002). Entrepreneurship training for emerging SMEs in South Africa. *Journal of Small Business Management*, 40(2), 154-161.
Leung, A. (2003). Different ties for different needs: Recruitment practices of entrepreneurial firms at different developmental phases. *Human Resource Management: Published in Cooperation with the School of Business Administration, The University of Michigan and in alliance with the Society of Human Resources Management*, *42*(4), 303-320.
Lewis, V.L. & Churchill, N.C. (1983). The five stages of small business growth. *Harvard Business Review*, *61*(3), 30-50.
Leyden, D.P. & Link, A.N. (2015). Toward a theory of the entrepreneurial process. *Small Business Economics*, *44*(3), 475-484.
Lichtenstein, G.A. & Lyons, T.S. (2001). The entrepreneurial development system: Transforming business talent and community economies. *Economic Development Quarterly*, *15*(1), 3-20.
Loué, C. & Baronet, J. (2012). Toward a new entrepreneurial skills and competencies framework: A qualitative and quantitative study. *International Journal of Entrepreneurship and Small Business*, *17*(4), 455-477.
Mamabolo, M.A., Kerrin, M., & Kele, T. (2017a). Entrepreneurship management skills requirements in an emerging economy: A South African outlook. *The Southern African Journal of Entrepreneurship and Small Business Management*, *9*(1), 1-10.
Mamabolo, M.A., Kerrin, M., & Kele, T. (2017b). Human capital investments as sources of skills: An analysis at different entrepreneurship phases. *The Southern African Journal of Entrepreneurship and Small Business Management*, 9(1), 1-12.
Martin, B. C., McNally, J. J., & Kay, M. J. (2013). Examining the formation of human capital in entrepreneurship: A meta-analysis of entrepreneurship education outcomes. *Journal of business venturing*, *28*(2), 211-224.
Marvel, M.R., Davis, J.L., & Sproul, C.R. (2016). Human capital and entrepreneurship research: A critical review and future directions. *Entrepreneurship Theory and Practice*, *40*(3), 599-626.

McGowan, P., Cooper, S., Durkin, M., & O'Kane, C. (2015). The influence of social and human capital in developing young women as entrepreneurial business leaders. *Journal of Small Business Management*, 53(3), 645-661.
Mitchelmore, S. & Rowley, J. (2010). Entrepreneurial competencies: A literature review and development agenda. *International Journal of Entrepreneurial Behavior & Research, 16*(2), 92-111.
Morales, C. & Marquina, P.S. (2013). Entrepreneurial Skills, Significant Differences between Serbian and German Entrepreneurs. *The Business and Economics Research Journal, 6(1), 129-141.*
Moroz, P.W. & Hindle, K. (2012). Entrepreneurship as a process: Toward harmonizing multiple perspectives. *Entrepreneurship Theory and Practice*, *36*(4), 781-818.
Muchiri, M. & McMurray, A. (2015). Entrepreneurial orientation within small firms: A critical review of why leadership and contextual factors matter. *Small Enterprise Research*, *22*(1), 17-31.
Mueller, S., Volery, T., & Von Siemens, B. (2012). What do entrepreneurs actually do? An observational study of entrepreneurs' everyday behavior in the start-up and growth stages. *Entrepreneurship Theory and Practice*, 36(5), 995-1017.
Narkhede, B.E., Nehete, R.S., Raut, R.D., & Mahajan, S.K. (2014). Impact of entrepreneurial skills on the firm's performance: Evidence from manufacturing SMEs in India. *International Journal of Indian Culture and Business Management*, *8*(2), 216-236.
Olson, P.D. (1985). Entrepreneurship: Process and abilities. *American Journal of Small Business (Now Entrepreneurship Theory and Practice)*, 10(1), 25-31.
Oosterbeek, H., Van Praag, M., & Ijsselstein, A. (2010). The impact of entrepreneurship education on entrepreneurship skills and motivation. *European Economic Review*, 54(3), 442-454.
Peters, M. (2005). Entrepreneurial skills in leadership and human resource management evaluated by apprentices in small tourism businesses. *Education+ Training*, 47(8/9), 575-591.
Prüfer, J., & Prüfer, P. (2019). Data science for entrepreneurship research: studying demand dynamics for entrepreneurial skills in the Netherlands. *Small Business Economics*, 1-22.
Pyysiäinen, J., Anderson, A., McElwee, G., & Vesala, K. (2006). Developing the entrepreneurial skills of farmers: some myths explored. *International Journal of Entrepreneurial Behavior & Research*, *12*(1), 21-39.
Rauch, A., Fink, M., & Hatak, I. (2018). Stress Processes: An Essential Ingredient in the Entrepreneurial Process. *Academy of Management Perspectives*, *32*(3), 340-357.
Raven, P. & Le, Q.V. (2015). Teaching business skills to women: Impact of business training on women's microenterprise owners in Vietnam. *International Journal of Entrepreneurial Behavior & Research*, 21(4), 622-641.
Reynolds, P. & Miller, B. (1992). New firm gestation: Conception, birth, and implications for research. *Journal of Business Venturing*, *7*(5), 405-417.
Reynolds, P.D. & Curtin, R.T. (2008). Business creation in the United States: Panel study of entrepreneurial dynamics II initial assessment. *Foundations and Trends® in Entrepreneurship*, *4*(3), 155-307.
Rosique-Blasco, M., Madrid-Guijarro, A., & García-Pérez-de-Lema, D. (2016). Entrepreneurial skills and socio-cultural factors: An empirical analysis in secondary education students. *Education+ Training*, *58*(7/8), 815-831.
Siddaway, A.P., Wood, A.M., & Hedges, L.V. (2019). How to do a systematic review: A best practice guide for conducting and reporting narrative reviews, meta-analyses, and meta-syntheses. *Annual Review of Psychology*, *70*, 747-770.
Saks, N. T., & Gaglio, C. M. (2002). Can opportunity identification be taught?. *Journal of Enterprising Culture*, *10*(04), 313-347.

Schwartz, R.G., Teach, R.D., & Birch, N.J. (2005). A longitudinal study of entrepreneurial firms' opportunity recognition and product development management strategies: implications by firm type. *International Journal of Entrepreneurial Behavior & Research, 11*(4), 315-329.
Scott, M. & Bruce, R. (1987). Five stages of growth in small business. *Long Range Planning, 20*(3), 45-52.
Shane, S. (2000). Prior knowledge and the discovery of entrepreneurial opportunities. *Organization Science, 11*(4), 448-469.
Shane, S. & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review, 25*(1), 217-226.
Slotte–Kock, S., & Coviello, N. (2010). Entrepreneurship research on network processes: A review and ways forward. *Entrepreneurship Theory and Practice, 34*(1), 31-57.
Singer, S., Herrington, M., & Menipoz. E. (2018). *Global Entrepreneurship Monitor 2017/2018 Global Report*. Global Entrepreneurship Research Association (GERA)
Timmons, J.A. & Spinelli, S. (2004). *New venture creation: Entrepreneurship for the 21st century (6th ed)*. Boston: Irwin
Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management, 14*(3), 207-222.
Ucbasaran, D., Shepherd, D. A., Lockett, A., & Lyon, S. J. (2013). Life after business failure: The process and consequences of business failure for entrepreneurs. *Journal of Management, 39*(1), 163-202.
Ucbasaran, D., Westhead, P., & Wright, M. (2001). The focus of entrepreneurial research: contextual and process issues. *Entrepreneurship Theory and Practice, 25*(4), 57-80.
Ucbasaran, D., Westhead, P., & Wright, M. (2008). Opportunity identification and pursuit: does an entrepreneur's human capital matter? *Small Business Economics,* 30(2), 153-173.
Unger, J.M., Rauch, A., Frese, M., & Rosenbusch, N. (2011). Human capital and entrepreneurial success: A meta-analytical review. *Journal of Business Venturing, 26*(3), 341-358.
van Gelderen, M., Kautonen, T., Wincent, J., & Biniari, M. (2018). Implementation intentions in the entrepreneurial process: concept, empirical findings, and research agenda. *Small Business Economics, 51*(4), 923-941.
Wasdani, K.P. & Mathew, M. (2014). Potential for opportunity recognition along the stages of entrepreneurship. *Journal of Global Entrepreneurship Research, 4*(1), 7.
Welter, F. (2011). Contextualizing entrepreneurship—conceptual challenges and ways forward. *Entrepreneurship Theory and Practice, 35*(1), 165-184.
Wright, M., Hmieleski, K.M., Siegel, D.S., & Ensley, M.D. (2007). The role of human capital in technological entrepreneurship. *Entrepreneurship Theory and Practice, 31*(6), 791-806.

## Appendix A

*Academy of Management Perspectives*
*Academy of management Review*
*American Economic Review*
*Annual review of psychology*
*British Journal of Management*
*California Management Review*
*Economic Development Quarterly*
*Education+ Training*
*Entrepreneurship Theory and Practice*
*European Economic Review*
*Foundations and Trends® in Entrepreneurship*
*Global Entrepreneurship Monitor*
*Handbook of Qualitative Research Methods in Entrepreneurship*
*Harvard Business Review*
*Human Resource Management*
*International Journal of Entrepreneurial Behaviour & Research*
*International Journal of Entrepreneurial Venturing*
*International Journal of Entrepreneurship and Small Business*
*International Journal of Indian Culture and Business Management*
*Journal of Applied Psychology*
*Journal of Business Venturing*
*Journal of Evolutionary Economics*
*Journal of Management Studies*
*Journal of Small Business and Enterprise Development*
*Journal of Small Business Management*
*Long range planning*
*Management Decision*
*New venture creation: Entrepreneurship for the 21st century (6th ed)*
*Organization Science*
*Small Business Economics*
*Small Enterprise Research*
*Strategic Entrepreneurship Journal*
*The Business and Economics Research Journal*
*The Southern African Journal of Entrepreneurship and Small Business Management*