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Published in *International Entrepreneurship and Management Journal*

DOI: <https://doi.org/10.1007/s11365-022-00803-8>

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Unveiling the role of entrepreneurial knowledge and cognition as antecedents of entrepreneurial intention: a meta-analytic study

Abstract

Although entrepreneurial intention has been regarded as one of the most important drivers of creativity, innovation, and performance in firms, a comprehensive framework that integrates the relevant influential factors has yet to be developed. Drawing on the theory of planned behavior and the social cognitive career theory, this study investigates the critical antecedents, mediators, and moderators of entrepreneurial intention. A meta-analytic approach is employed to validate the proposed hypotheses, and 89 primary studies with a total sample size of 51,919 are analyzed. The results indicate the existence of differences in the manner in which entrepreneurial knowledge influences cognitive antecedents in the individuals who participate in new ventures. Furthermore, personal attitude and self-efficacy play a vital role in predicting entrepreneurial intention. Demographic characteristics (such as age, gender, and education background) significantly moderate the relationship between cognitive antecedents and entrepreneurial intention, indicating that men tend to adopt more entrepreneurial behaviors than women, that older individuals with more positive attitudes have a higher propensity to start ventures than younger ones, and that those with higher education attainment tend to have lower self-employment. These findings offer several recommendations. They could provide valuable references for further academic work, which should aim to extend and validate them. The findings are also very beneficial for professional experts tasked with the design of effective programs for enhancing entrepreneurial behavior.

Keywords: Entrepreneurial knowledge, Self-efficacy, Social norms, Risk-taking, Entrepreneurial intention

1. INTRODUCTION

In recent decades, entrepreneurs have become especially vital contributors to the economy because of their commitment to new employment, creativity, and versatility (Caputo and Pellegrini, 2020). Entrepreneurs have the ability to develop new markets and to create new wealth through the development of products, services, and technologies. They play a critical role in the economic development of nations. Research has emphasized the role of entrepreneurship education since it is important to developing the attitude, knowledge, and skills associated with the practice of entrepreneurship (Gangi, 2017). Equipped with an entrepreneurial attitude, knowledge, and skills, individuals can recognize business opportunities and create business plans that exploit them. Continuous entrepreneurial intention (EI) is one of the most important issues. EI is regarded as “the conscious state of mind that precedes action and directs attention toward entrepreneurial behaviors” (Moriano et al., 2012). A growing body of literature shows that

intentions play a very critical role in entrepreneurial processes and behaviors (Fayolle and Liñán, 2014).

While scholars agree about the importance of EI, its antecedents, mediators, and moderators rarely are discussed. First, those who possess entrepreneurial knowledge (EK) not only recognize entrepreneurial opportunities but also create practical business plans and act accordingly (Jack and Anderson, 1999). Second, EK may have a direct, positive, and significant impact on EI (Tshikovhi and Shambare, 2015). However, other scholars have contended that several variables may need to be considered as mediators between EK and EI. For example, Buana et al. (2017) stated that individuals who acquire more EK exhibit more positive entrepreneurial attitudes. Roxas et al. (2008) stated that EK and entrepreneurial learning practices promote the positive identification of social norms (SNs) that are related to entrepreneurial behavior (Gilaninia et al., 2013). Puni et al. (2018) argued that EK should have a significant impact on the self-efficacy (SE) of employees. Similarly, it has a positive influence of these mediators and risk-taking on EI (Shah et al., 2020; Phong et al., 2020; Hossain et al., 2019; Boakye et al., 2020). It seems that EK promotes entrepreneurial attitudes, SNs, SE, but previous studies do not discuss these issues in detail, and the mediating role of these variables on EI is not established well. Furthermore, in addition to the antecedents and mediators of EI, the literature also discusses some of its moderators. For example, Liñán and Chen (2009) indicated that younger individuals exhibit more entrepreneurial behavior. However, Ozaralli et al. (2016) argued that as entrepreneurs become older, their intention to start their own business becomes more pronounced. Additionally, men seem to be more open to entrepreneurial training (Harris and Gibson, 2008), and individuals with higher education attainment seem to have lower EI (Khan et al., 2019).

Previous studies of these issues tend to adopt a piecemeal approach that does not account for the variables that are relevant to EI within the same framework. For example, Bae et al. (2014) conducted a well-designed meta-analysis. However, they focused exclusively on EI, ignoring other antecedents, such as social norms (SNs) and self-efficacy (SE), which can mediate the relationship between entrepreneurship education and EI. In filling the gap, this study responds to the call for more research in Martin et al. (2013) by exploring several significant constructs and systematizing scientific knowledge about the investigation of relationships among them. Moreover, it evaluates the contribution of behavioral and psychological variables in entrepreneurship as well as the potential moderating role of demographic variables.

The study adopts a meta-analytical approach, which is a study about studies. It is particularly useful for finding general trends in previous studies that share hypotheses. It can help overcome the issue of small sample size and establish statistically significant results with larger populations (Mikolajewicz and Komarova, 2019). Primary studies that were published in 2020 or earlier are examined to check effect sizes for each hypothesis and to verify the generalizability of the results in the formation of EI through meta-analysis. Specifically, this study has three objectives: (1) to explore the influence of entrepreneurial knowledge (EK) on mediating variables, including

personal attitude (PA), social norms (SNs), and self-efficacy (SE); (2) to verify the influence of these mediating variables and risk-taking on entrepreneurial intention (EI); (3) to investigate the moderating effect of gender, age, and education background on the influence of the mediators on EI.

Achieving these objectives in the context of the Theory of Planned Behavior (Ajzen 1991, 2011; Liñán et al., 2002) and adopting a meta-analytic approach, this study offers several contributions to the literature in three ways. First, it focuses on the effect of cognitive antecedents and personality characteristics on EI through the lens of the social cognitive career theory (SCCT). Second, it offers a novel contribution in the field of EI by being among the few studies that use a meta-analytic approach to test EI-related hypotheses. Third, it is among the first studies to explore the moderating role of demographics in the relationship between cognitive mediators and EI through the adoption of meta-analytic techniques.

The structure of our article is as follows. It begins with a discussion of the theoretical foundations of the analysis and the development of a model and hypotheses for empirical testing. Then, the description of the methodological approach is presented, followed by the results of the statistical analysis. Finally, it concludes with a discussion of its implications, limitations, avenues for future research, and conclusions.

2. LITERATURE REVIEW

2.1 Theory of planned behavior

The Theory of Planned Behavior (Ajzen, 1991) can be a valid framework for analyzing and measuring the impact of the behavioral attitudes of a subject, of subjective norms such as the recognition of the conclusions that others draw about a proposed behavior, and of behavioral control. The Theory of Planned Behavior argues that intention is affected by three components or antecedents (Ajzen, 1991; Krueger et al., 2000). The first is the perceived attitude (PA) toward the behavior, which in the case of entrepreneurs concerns the perceived desirability and perceived feasibility. Perceived desirability refers to an individual's attitude toward entrepreneurship, that is, the degree to which they evaluate the performance of the target behavior (e.g., being an entrepreneur) positively or negatively. Perceived feasibility, which is an individual's self-reported capacity to start a business. The second is perceived behavioral control, that is, the perceived difficulty or ease of performance (Liñán and Chen, 2009). It represents the extent to which an individual feels capable of executing given behavior (Ajzen, 1991). Perceived behavioral control is conceptually similar to perceived SE as proposed by Bandura (1997). Social norms (SNs) are the third component. They pertain to the perceived level of normative social pressure and beliefs about engaging in a behavior, such as becoming an entrepreneur (Ajzen, 2005; Ajzen and Cote, 2008). According to this conceptual ordering, entrepreneurial behavior can be forecast based on the effect of these influences on intentions, which can be inferred from antecedents such as demographic characteristics or personality traits, as well as from purely

situational factors (Ajzen, 2011). This approach has been at the core of several empirical investigations (Sun et al., 2020; Agolla et al., 2019; Naushad, 2018; Ahmad and Zafar, 2017; Ana et al., 2017; Dinc et al., 2016; Tshikovhi and Shambare, 2015; Carr and Sequeira, 2007; Liñán and Chen, 2006; Liñán, 2004). This study adopts the Theory of Planned Behavior to explain the influence of PA, SNs, SE, and risk-taking on EI.

2.2 Social cognitive career theory (SCCT)

Bandura's (1986) Social Cognitive Career Theory is a vocational psychology theory that has been widely used to describe career-related decision-making behavior. The theory emphasizes that individual influences on cognition (on dimensions such as SE, outcome expectations, and goals or intent) affect career growth. Furthermore, according to the Social Cognitive Career Theory, the decision to pursue a career is influenced by a variety of social factors, including exposure to education experiences (Dyer, 1994). Ajzen (2001) further defined attitude toward a behavior as the sum of the estimations of each of its possible outcomes of the target behavior and the perceived probability of their occurrence. In the Social Cognitive Career Theory, it is expected that the definitions of result expectations contain both anticipated and actual outcomes. Shapero and Sokol (1982) defined perceived desirability as the directly perceived attractiveness of a target activity, which is analogous to the more recent definition of an attitude toward action as the individually perceived attractiveness of a target behavior (Autio et al., 2010). Segal et al. (2002), in their empirical research, validated the efficacy of the Social Cognitive Career Theory model for predicting individuals' desire to become entrepreneurs, and show it as a crucial model predictor of the level of achievement (mastery) that individuals eventually achieve in that model, similar to the EI model (Bandura, 1986). Specifically, there is a conceptual overlap between outcome expectations in Social Cognitive Career Theory, attitudes toward the development of new ventures, and SNs in the Theory of Planned Behavior entrepreneurial model (Krueger and Carsrud, 1993). This study adopts the Social Cognitive Career Theory as an organizing framework to reduce the theoretical overlap in the entrepreneurial purposes literature, and it identifies the routes for the influence of EK on EI.

2.3 Entrepreneurial intention model

The entrepreneurial intention model posits that EI is based on a combination of individual and other relevant factors (Shapero and Sokol, 1982). Boyd and Vozikis (1994) further improved the bird paradigm to incorporate the concept of SE by using the theory of social learning. The Shapero-Krueger model of EI was developed on the basis of the Theory of Planned Behavior and the entrepreneurial event model (Shapero and Sokol, 1982; Krueger, Reilly and Carsrud, 2000) to define the relationship between the cultural and social factors that can contribute to business development by shaping an individual's perceptions. Centered on the latter approach, many entrepreneurial research models have been developed, and they have suggested cognitive premises for describing phenomena.

EI portrays the degree of commitment to the exertion of entrepreneurial effort that is necessary to establish a business that involves self-employment (Krueger and Carsrud, 1993; Kennedy and Renfrow, 2005; Souitaris et al., 2007). The entrepreneurship literature has long recognized that intentions are key precursors to the creation of new companies (Bird, 1988). The psychological literature has studied intentions through process models (intention models), including models based on the Theory of Planned Behavior. Ajzen (1991) suggested that intentions are expected to capture the motivational variables that affect conduct because they indicate how much difficulty individuals are willing to accept and how much effort they are prepared to exert in the performance of a behavior (Al-Mamun and Fazal, 2018). This study intends to adopt the entrepreneurial intention model to explain the antecedents of EI.

3. DEVELOPMENT OF HYPOTHESES

3.1 Entrepreneurial knowledge and the antecedents of entrepreneurial intention

Jack and Anderson (1999) characterized entrepreneurial knowledge (EK) as an individual's appreciation of the concepts, abilities, and attitudes that are expected of entrepreneurs. Direct behavioral involvement would influence the reasoning of the individual and cause differences in the relationship between EK and antecedents of entrepreneurial intention (EI). Coordinated encounters with EK are assumed to contribute to an experiential EK; as a result, individuals can fully understand the less alluring components of an entrepreneurial career (Giones et al., 2017).

Personal attitude (PA) can also be impacted by the individual's perception of the natural and social incentives that make entrepreneurship enticing. Politis (2008) indicated that individuals who had gained EK to exploit new opportunities in different contexts had a more favorable attitude toward entrepreneurship than those who had not. The literature supports the argument that individuals who have achieved EK through job experience or schooling also exhibit stronger entrepreneurial attitudes (Zulfiqar et al., 2017). Conversely, little is understood about the relationship between the knowledge that an individual possesses and their perception of the social valuation of a behavior (Roxas et al., 2008). A connection exists between positive experiences with entrepreneurial learning practices in one setting and the subsequent positive identification of a social setting that is conducive to entrepreneurial behavior (Buana et al., 2017; Gilaninia et al., 2013).

The self-appraisal of existing EK and capacities is more adaptable than regular SE (Krekar and Coric, 2013). According to Roxas (2014), acquiring knowledge is the best method for fostering students' self-confidence and their attitudinal proclivity to engage in entrepreneurship. A theoretical study by Puni et al. (2018) underlined that the identification of opportunities and the acquisition of EK are aspects of business learning that could have a meaningful and important impact on entrepreneurship and SE. Thus, the intention to perform an entrepreneurial behavior depends on an individual's understanding of their own desires (PA and SNs) and the SE of the venture as well as on their level of EK (Liñán and Rodríguez, 2004). Researchers have

empirically applied the Theory of Planned Behavior to studies of EK and confirmed that PA, SNs, and SE all play significant roles (Giones et al., 2017; Gilaninia et al., 2013; Liñán, 2004). We derive the following hypothesis for investigation of such favorable relationships:

Hypothesis 1: EK is positively related to PA.

Hypothesis 2: EK is positively related to SNs.

Hypothesis 3: EK is positively related to SE.

3.2 Social norms and personal attitude and self-efficacy

Social norms (SNs) control the state of mind of individuals (Paicheler, 1976) and contribute to socially appropriate actions. Individuals, when faced with strong social pressures from family members, acquaintances, and others, are forced to develop a positive attitude toward entrepreneurship. Sociologists believe that SNs are linked to economic perspectives (Meek et al., 2010) at both the individual level and the group level (Sherif, 1936; Lipset, 2000). According to Wibowo (2016), individuals who are more strongly driven by SNs acquire more positive attitudes toward the corresponding activities. Similarly, Angulo et al. (2019) observed that subjective norms have a positive impact on employee attitudes toward knowledge-sharing behavior. Therefore, we posit that when peers recommend that an individual create a business, a cognitive mechanism operates to change their attitude toward entrepreneurship gradually. Thus, we propose the following hypothesis:

Hypothesis 4: SNs are positively related to PA.

Self-efficacy (SE) refers to the challenge or convenience of acting experienced by oneself; in this sense, to becoming an entrepreneur. In other words, it is an individual's confidence in their own capacity to carry out an action, in this case, to set up a business. In comparison, individuals with high SE for a mission perform more diligently and are more likely to attempt to realize it, as well as continue to do so, than those with low SE (Asimakopoulos et al., 2019). A norm that defines the actions of a popular social group encourages people to recognize a behavior more frequently, to have more favorable attitudes about that behavior, and to feel more self-effective toward it (Stok et al., 2014). The perception of ability is more important than the actual abilities required to engage in a certain activity. Individuals who receive positive support from friends, family, and colleagues can enhance their perception of their ability; and as a result, their desire to act on an intention. Therefore, we propose the following hypothesis:

Hypothesis 5: SNs are positively related to SE.

3.3 Personal attitude and entrepreneurial intention

Fini et al. (2010) argued that attitudes are the way we feel about an object, which can be a person, a brand, an ideology, or any entity we might perceive. The term "entrepreneurial

attitude” refers to the degree to which one is attracted to becoming an entrepreneur and believes that doing so will lead to a favorable outcome (Shah et al., 2020; Phong et al., 2020; Henley et al., 2017). Personal attitude (PA) is the primary motivator behind a person’s victory or disappointment in overcoming obstacles when confronted with unpredictable life events (Darren Lee-Ross, 2017; Sullivan and Meek, 2012). The more positivity the individual has about a particular situation (including EI), the more likely the individual is to succeed (Agolla et al., 2019). Previous research has established that one’s attitude toward entrepreneurship is the most influential factor. It includes the desire to begin an entrepreneurial career (Kautonen et al., 2013; Munir et al., 2019). Thus, amid a period of job crisis, entrepreneurs with a positive PA toward EI would be expected to be more likely to pursue entrepreneurial projects than individuals with negative attitudes. Therefore, we present the following hypothesis:

Hypothesis 6: PA is positively related to EI.

3.4 Social norms and entrepreneurial intention

Social norms (SNs), beliefs, and values affect entrepreneurial activities, and these components shape the tests that are used in entrepreneurial research to assess the scope of entrepreneurial action (Zhang et al., 2015; Becker and Woessmann, 2009). SNs capture the social impact of performing or failing to perform an entrepreneurial activity. They are a critical determinant of cognitive antecedents for individuals without a background in entrepreneurship. Entrepreneurs without an entrepreneurship background are affected by their social environment. The opinions of family members and friends may support or hinder a potential entrepreneurial behavior (Phong et al., 2020; Hussain, 2018). SNs are intimately related to entrepreneurship since they are the source of the variance in entrepreneurial activity between societies and because they can explain the genesis of non-monetary rewards for entrepreneurship. More individuals in a community may decide to become entrepreneurs because they have characteristics that make them more likely to engage in entrepreneurial activities (Al-Jubari et al., 2018). Thus, SNs can effectively predict EI. Accordingly, we propose the following hypothesis:

Hypothesis 7: SNs are positively related to EI.

3.5 Self-efficacy and entrepreneurial intention

The concept of self-efficacy (SE) depicts the self-motivated influence of actions, behaviors, perceptions, cognition, and the environment. In the context of entrepreneurship, it has been considered as an individual’s confidence in their ability to start a business venture successfully (McGee et al., 2009). Individuals with high SE are able to mobilize motivations, cognitive resources, and the specific plans of action that are necessary to succeed (Dissanayake, 2013). SE has been demonstrated to be an exceptional indicator of EI (Chen et al., 1998; Krueger et al., 2000). When individuals believe in successful entrepreneurship, the probability of investing in entrepreneurial ventures is higher (Shah et al., 2020; Hou et al., 2019). Thus, SE is a critical

cognitive antecedent of EI and behavior (Laviolette et al., 2012), and previous studies have found that it plays an important role in the decision to become an entrepreneur (Utami, 2017; Darmanto and Yuliar, 2018). Hence, the following hypothesis is proposed in this study:

Hypothesis 8: SE is positively related to EI.

3.6 Personality characteristics and entrepreneurial intention

The risk-taking (RT) inclination is accepted to be a particular entrepreneurial characteristic, with those who launch a company of one sort or another tending to exhibit a tolerance for risk (MacCrimmon and Wehrung, 1986). RT propensity is another crucial personality trait identified by Farrukh et al. (2018), defined as an individual's willingness to participate in a risky event; entrepreneurship is one of those risky activities. Empirical studies have demonstrated that individuals with a stronger RT inclination have a greater urge to participate in entrepreneurship (Sun et al., 2020; Ndofirepi, 2020) and have considered that propensity as an antecedent to the dimensions of the Theory of Planned Behavior (Rosique-Blasco et al., 2018). According to Alam et al. (2020), the tendency to take risks predisposes individuals to grow more confident in their talents, to confront obstacles, and to complete tasks effectively. Furthermore, Adu et al. (2020) stated that entrepreneurship, by definition, entails risk and uncertainty, which must be managed in a complex and unpredictable environment. Most tactics, strategies, and judgments are structured through planning. Therefore, those with a high sense of taking risks are more likely to envision themselves as successful and realize their entrepreneurial aspirations. Thus, based on the premise of the given contentions, we postulated the following hypothesis:

Hypothesis 9: RT is positively related to EI.

3.7 Entrepreneurial knowledge and entrepreneurial intention

EK resources are essential to the development and survival of knowledge-based start-up companies. Pihie et al. (2013) highlighted the importance of sharpening students' cognition skills to improve their entrepreneurial learning and, consequently, their intention to become entrepreneurs. As a result, the knowledge acquired by entrepreneurs attending an entrepreneurship program would have a positive effect on their desires to establish a business (Rialti et al., 2017). Analysis of the impact of EK on EI helped achieve a deeper understanding of the lack of a link between past experience and their desire to engage in an entrepreneurial enterprise (Karyaningsih, et al., 2020; Miralles et al., 2016). EK increases the capacity of entrepreneurs to run a business, and it can be improved through entrepreneurship education (Essel et al., 2020; Hutasuhut, 2018). According to Westhead and Solesvik (2016), students who participate in entrepreneurship education are more enthusiastic about establishing a firm than those who do not. Therefore, the acquired knowledge from entrepreneurial education systems

demonstrates an eagerness to launch a venture, and it boosts the corresponding intention (Mehtap et al., 2017). Thus, on the basis of the given arguments, we postulate the following hypotheses:

Hypothesis 10: EK is positively related to EI.

3.8 The moderating effect of demographics

According to Liñán and Chen (2009), research on personality traits and demographic variables has made it possible to identify important associations between the demographic characteristics that are linked to entrepreneurial behavior. The line of research allows the recognition of significant associations between demographics and entrepreneurial behavior. However, their predictive capacity has been highly limited (Reynolds, 1997).

Gender differences manifest primarily in the understanding of the environment and in the level of self-motivation. Harris and Gibson (2008) found that women are less interested in starting businesses, whereas men are twice as likely as women to engage in entrepreneurial activities. Entrepreneurship training in firms tends to have a more positive impact on male learners than on their female counterparts, and those who consider the obstacles to be too difficult to navigate may restrict their participation in entrepreneurial activities (Mao, 2015). Previous studies indicated that women's lower proclivity to the enterprise is associated with social network traits, a lower degree of confidence in their entrepreneurial abilities, and a stronger fear of failure (Caputo et al., 2016; Mehtap et al., 2017; Welsh et al., 2021). These differences might be explained by the gender stereotypes that attach to the role of entrepreneurs (Koellinger et al., 2011; Gupta et al., 2008). There is evidence that there are more male entrepreneurs than female entrepreneurs, which further corroborates the foregoing proposition (Turker and Selcuk, 2009; Austin and Nauta, 2015).

Age is significantly associated with entrepreneurial development. Traditionally, entrepreneurship has been thought of as an endeavor for the young (Mao, 2015). In contrast, Schøtt et al. (2017) showed that, in many aspects, older individuals are a significant force in entrepreneurship. In confirming that evidence, Botham and Graves (2009) stated that older individuals who venture into start-up businesses tend to have different personal values and attitudes toward self-employment than the young.

According to Khan et al (2019), the higher one's level of education the lower their intention to participate in an entrepreneurial start-up. Drawing on Morris et al. (2006), we include education attainment as a categorical variable, differentiating between undergraduates (who have not yet received a bachelor's degree) and postgraduates (who continue studying by pursuing a master's degree or a doctorate). Since intention models appear to provide a suitable starting point for the investigation of EI, we propose the following hypotheses:

Hypothesis 11a: Gender moderates the influences of cognitive factors and EK on EI.

Hypothesis 11b: Age moderates the influences of cognitive factors and EK on EI.

Hypothesis 11c: Education background moderates the influences of cognitive factors and EK on EI.

An integrated framework is shown in Figure 1.

4. METHOD

Meta-analytic approaches allow more than one independent or moderator variable to be evaluated through regressions (Lipsey and Wilson, 2004). In this study, meta-analysis offers new proof and thus enables the hypotheses to be tested by using moderators that were not examined in the original studies (Rauch and Frese, 2007).

4.1 Literature search and inclusion criteria

We followed best practices in meta-analytic entrepreneurship research (Martin et al., 2013) and used a set of catchphrases as well as a variety of combinations thereof for our searches, including EK, PA, SNs, SE, EI, RT, gender, age, and education background. We searched several scholarly databases for relevant articles, including ProQuest, JSTOR, ScienceDirect, Emerald, SAGE, Frontiers, ResearchGate, and Springer. We also searched management and entrepreneurship journals, such as *Business and Economic Research*, *Journal of Business Research*, *Entrepreneurship Theory and Practice*, *Journal of Small Business Management*, *Journal of Applied Psychology*, and *The Journal of Entrepreneurship Education*. Furthermore, to discover any relevant unpublished work and to minimize the file drawer problem, we searched Google, Google Scholar, and relevant conferences related to entrepreneurship and management from 2004 to 2020.

The data started with the conglomeration of effect sizes across studies, and the study had to report a correlation matrix or other information that could be converted into a correlation coefficient. We relied on two criteria to determine the number of papers possible for inclusion. First, primary studies had to be empirical and quantitative. Second, studies had to report a correlation coefficient between antecedents and EI or report sufficient statistics that would allow for an effect size conversion. After that, all variations that resulted from the coding were addressed before a 100 percent consensus was reached between the coders. We found 89 qualifying studies for inclusion in this meta-analytic (Table 1).

4.2 Variable coding

We coded two independent variables, EK and RT, and the aggregate “published.” The antecedents of EK (PA, SNs, and SE) were coded as positive work outcomes.

In line with previous meta-analytic investigations (Miao et al., 2018), if a study provided multi-faceted level effect sizes for a construct, it was deemed to have a reported single effect size. Due to variations in the presentation of demographic information about participants in each

of the chosen articles, three general features of each sample were coded as possible moderators: gender (male/female), age (younger than 25 years and older), and education background (undergraduate/postgraduate).

According to Coleman (2007), the age of the members of the target group also should be considered as a means of controlling for access to experiential knowledge over time. Based on that argument, our study considered it as a measurement of the size of the effect on the decision to start a business through the lens of cognitive antecedents. Following the works of Manolova et al. (2007), we included “education background” as a categorical variable. The first category is “undergraduate,” which includes those who hold high school diplomas and bachelor’s degrees. The second category is “postgraduate,” which includes those who pursuing master’s degrees and doctorates.

4.3 Analytical techniques

The correlation coefficients (r) were used as the primary effect size in the sample, and experiments that provided standardized regression coefficients (β) were converted to r for further research. After gathering and combining all of the necessary correlation coefficients (r), the analysis calculated the 95 percent confidence interval (CI) to assess the statistical significance of each effect size. When the 95 percent CI did not include zero, the effect size was found to be statistically important. Q-statistics, introduced by Lipsey and Wilson (2001), were used and applied to analyze homogeneity of the effect size distribution. The criterion was that the Q-value had to be higher than χ^2 (χ^2 with degree of freedom equals $(n-1)$, where n = number of studies). It gives sense to the null hypothesis of homogeneity. If the null hypothesis of homogeneity were rejected, heterogeneity between the variances would exist. In other words, differences in effect size might be attributed to factors other than sampling. A Q-test was used to test for moderators. Hedges and Olkin (1985) performed homogeneity experiments using the Q significance test statistic to determine the possible effects of moderators. A significant Q-statistic means the observed effect is heterogeneous and that moderators are required to clarify the additional variation in the findings. The z-test, introduced by Hunter and Schmidt (1990), then was used to assess the statistical importance of between-group differences.

5. RESULTS

Table 2 presents the results for the main effects. We found that EK is strongly and positively linked to the antecedents of EI. Specifically, EK has a significantly positive effect on PA ($r = 0.520$) and the adjusted 95 percent confidence interval (CI) varies from 0.491 to 0.549, which does not contain zero, revealing that H1 is supported. Furthermore, EK has a critical positive impact on SNs and SE ($r = 0.441$ and $r = 0.359$, respectively), in that the rectified 95 percent CI ranges from 0.406 to 0.474 for SNs, and CI varies from 0.317 to 0.400 for SE, CIs do not contain zero. Hence, H2 and H3 are supported. We also found that SNs are positively related to PA ($r = 0.396$), and, thus, H4 is supported. The 95 percent CI fluctuates from 0.351 to 0.440 with a non-zero value endorsed by the findings. Similarly, SNs have a positive impact on SE ($r = 0.239$), and the adjusted 95 percent CI varies from 0.195 to 0.282, which does not contain zero. Therefore, H5 is supported.

As far as the influences of the three cognitive antecedents from the Theory of Planned Behavior on EI are concerned, our results indicate that PA has the strongest positive effect on EI ($r = 0.499$), and that the adjusted 95 percent CI varies from 0.488 to 0.509, which does not contain zero. Thus, H6 is supported. Additionally, SNs ($r = 0.212$) have the lowest positive effect on EI, and the corrected 95 percent CI ranges from 0.179 to 0.244, which does not contain zero. Therefore, H7 is supported. SE is positively related to EI ($r = 0.330$), and the corrected 95 percent CI varies from 0.313 to 0.346 and does not contain zero. Accordingly, H8 is supported. In terms of personality characteristics and EK influence on EI, RT is positively related to EI ($r = 0.308$), and 95 percent CIs do not contain zero. Therefore, H9 is supported. Finally, the findings revealed that 95 percent CIs for EK ($r = 0.391$) do not contain 0, indicating that H10 is supported.

Additionally, it was confirmed that all Q-value is significantly higher than χ^2 for the effects of PA, SNs, SE, and EK on EI. This finding indicates the likely presence of moderators (Hedges and Olkin, 1985). Hunter and Schmidt's (1990) A-test was performed to evaluate the moderating effects by measuring the statistical significance of the discrepancies between the groups. Table 3 displays the results of the impact of the moderators on the effect of PA, SNs, SE, and EK on EI. First of all, gender was a significant moderator of all four relationships (PA–EI, SNs–EI, SE–EI, and EK–EI). Accordingly, the results indicate a significant gap exists between male and female business entrepreneurs in their need for entrepreneurial business creation, with the male group ($r = 0.632$) having higher correlation scores on the PA scale than the female group ($r = 0.454$) in the PA–EI relationship. Moreover, similar results were obtained for the SNs–EI relationship, with higher correlations for the male group ($r = 0.280$) than for the female group ($r = 0.153$). For the SE–EI relationship, the female group ($r = 0.275$) is less self-efficacious than the male group ($r = 0.387$). Additionally, the male group ($r = 0.467$) has more EK than the female group ($r = 0.235$) in the case of the EK–EI relationship. Hence, H11a is totally supported.

Furthermore, with respect to age as shown in Table 3, those older than 25 ($r = 0.578$) have a stronger attitude decision toward being self-employed than those younger than 25 ($r = 0.461$). However, no significant difference exists in the links of SE–EI and EK–EI. Thus, H11b is partially supported.

In terms of education background, postgraduates ($r = 0.239$) face greater social prejudices toward self-employment than undergraduates in the link of SNs–EI ($r = 0.153$). On the other hand, no significant differences exist in any of the following three links: PA–EI, SE–EI, and EK–EI. Therefore, H11c is partially supported (Table 3).

6. DISCUSSION

Several conclusions can be drawn from the results of this study. First, EK has a strong and positive effect on an individual's attitude toward entrepreneurship, which is in line with Miralles et al. (2015). Knowledge acquisition is a significant contributor to one's ability to confront any

hurdles faced during the entrepreneurship process (Buana et al., 2017). Additionally, EK contributes positively to the SNs of entrepreneurship (Zulfiqar et al., 2017). The integrated results also confirmed that EK has a positive impact on SE, leading to strong self-confidence when initiating entrepreneurship (Setiawan et al., 2020).

Second, this study confirmed a statistically positive association between PA and EI, suggesting that PA is the most important factor that affects EI. This result is also in line with previous literature (Vamvaka et al., 2020; Shi et al., 2020). SNs are applied in the same manner as attitudes. Undergraduate students who enjoy steady support from their family, colleagues, and noteworthy others are more likely to start a business (Zhang et al., 2014). Moreover, this study reinforced the positive connection of SE with EI and investigated the positive effect of SE on self-employment intentions (Zicheng et al., 2017). This study discovered that SNs are positively related to PA and SE. These findings are consistent with the results of previous research on the impact of SNs on PA and SE (Liñán 2004; Liñán and Chen, 2006; Pfeifer et al., 2014; Gorgievski et al., 2017; Angulo et al., 2018).

Third, EK has a strong and positive effect on EI. The findings underscore the value of growth in awareness in promoting an entrepreneur's self-confidence and attitudinal inclination toward participating in entrepreneurship (Roxas and Banjo, 2014). The expertise acquired from an entrepreneurship program helps entrepreneurs understand how to maximize their chances of successfully starting a business (Fiet, 2000). Furthermore, it can be seen that a person with a high RT propensity will have higher EI (Asmara et al., 2016).

Fourth, besides the main impacts of this study, the characteristics of respondents indicate that age and education background are a partial moderator of the relationship among EK, cognitive antecedents and EI, while gender is a full moderator. These study results indicate that diploma and baccalaureate graduates are full of enthusiasm for starting a new business, while postgraduate graduates consider the high opportunity costs and the lengthy period of time required to achieve a stable income. Regarding gender, it is discouraging and worth analyzing that the EI of female entrepreneurs is significantly lower than that of male entrepreneurs (Yıldırım et al., 2016). Gender-based perceptions may lead both men and women to follow gender-stereotypic roles, which often are compatible with the perception that "women are more likely to limit their career aspirations due to perceived lack of the necessary skills" (Weber, 2011, p. 67). Age is the only significant moderator of two relationships (PA–EI, and SNs–EI). For the relationship between SNs and EI, those individuals older than 25 ($r = 0.378$) have a stronger attitude decision toward being self-employed than do those younger than 25 ($r = 0.168$). Education background is the only major moderator in the relationship between SNs and EI. Those who were more postgraduates ($r = 0.239$) tended to be affected by social norms for self-employment more than undergraduates ($r = 0.153$).

6.1 Practical and theoretical implications

This research has some practical implications. First, the results of this study present the critical role of EK in entrepreneurship. The opening of regular training courses (short- and long-term) on entrepreneurship, not only in higher education but also in vocational colleges, will help individuals take their EK from basic to advanced. For example, these courses could focus on the basics of business planning, finance, manufacturing, and marketing, as well as the basics of the law, with a particular emphasis on small- and medium-sized categories. In this way, entrepreneurship training is not only about formality but also nurtures the pioneering spirit of entrepreneurship.

Second, the discoveries in this study have led to the recommendation that education programs aimed at inspiring individuals to create their own business ought to comprise complementary hypothetical and dynamic components, supporting prior calls for such content (Kautonen, 2010; Luoto and Tornikoski, 2010; Zapkau et al., 2015). The research findings contribute to the literature regarding the influences of cognitive antecedents and risk-taking on EI, providing empirical evidence supporting the establishment of strategies to promote students' entrepreneurship activities and further increase the efficacy of entrepreneurship education (Hou et al., 2019).

Moreover, the readiness and capacity to take risks are among the principal aspects of entrepreneurship. Entrepreneurs who do not like danger would find it difficult to create a business. They realize that significant accomplishment occurs when they are willing to take risks to accomplish their goals (Sun et al., 2020; Herdjiono et al., 2017). Gender plays a major role in the startup process, and this difference may be due to personality characteristics: Men dare to take risks more often than women do, and confidence in men is higher than in women. Additionally, in many contexts and cultures, it has been reported that the majority of women receive social and economic support from their families (Caputo et al., 2017). For this reason, they may not be in a position to make decisions on their own to start a business without obtaining prior support from their families (Mehtap et al., 2019). Moreover, age has a partial effect on entrepreneurship. By examining start-up success rates, one will find more proof that young people are less effective. Entrepreneurs are mostly older and exhibit slightly higher levels of performance. Furthermore, some young entrepreneurs can launch a business and be successful, but it is likely that they will achieve greater success only at an older age.

This paper has several theoretical implications. First, the meta-analytic study explored the relationship between EK, cognitive antecedents, and EI. It proved that the Theory of Planned Behavior and the Social Cognitive Career Theory are two of the major theories that explain the antecedents, mediators, and moderators of EI. Based on the research framework that we developed, the results illustrate that the EK one obtains from on- and off-campus education and training becomes the fundamental source for individuals striving toward EI. This study also contributed to the literature that seeks to identify the moderating effects of demographic variables on the influence of cognitive mediators on EI. Based on calls from prior research (e.g., Martin et al., 2013; Bae et al., 2014), we examined the effect of demographic moderators on the

relationship between EK and EI through the lens of cognitive antecedents. We discovered that gender has a totally positive effect on the link between EK and EI, with cognitive factors functioning as mediators. Age and education background are partial influences. Second, we agree with both of Bae et al. (2014)'s studies. After correcting for sample error and statistical aberrations, we discovered that a residual variance remains. This finding suggests that there is a significant variation in effect sizes, which might be related to the moderators. This study adopted a meta-analytic approach to identify the general trend across previous studies using the same research hypothesis. It can help overcome the issues of small sample size by testing hypotheses against aggregated data to increase the statistical significance of the findings (Mikolajewicz and Komarova, 2019). The findings of this research can be a critical reference for further academic extension.

Finally, our results may be used as evidence to indicate whether entrepreneurship education is positively connected to entrepreneurship and under what circumstances the focal partnership would be more or less successful. EK remains a key component of an individual's identity and performance regarding entrepreneurship.

6.2 Limitations and future directions

We note the following limitations that may provide suggestions for future research directions. First, EK is a new topic in meta-analysis. Therefore, only a relatively limited number of studies were tested on each of the theories. Second, due to the limitation of sample size, readers have to be vigilant when analyzing the findings of our moderator analyses because the meta-analytical distributions through moderator subgroups were not very large and were vulnerable to second-order sampling errors (Miao et al., 2018). However, we believe that our preliminary meta-analysis is still relevant to the EK–EI relationship since it offers a timely interim appraisal of current literature and highlights areas that require further study. Third, our meta-analysis corrects only for sampling error. Although we employed demographic variables (gender, age, and education background) to increase explained variance, the exact magnitude of the relationships could be confirmed further once a larger sample of methodologically rigorous studies becomes available. Finally, our meta-analysis is dominated by cross-sectional research and we cannot rule out the possibility of reverse causality or reciprocal causation. We recommend that future studies employ longitudinal designs in order to derive robust causal findings.

In general, meta-analysis often is restricted by variables that provide adequate data and should therefore be viewed as a summary of the most frequently studied impact factors. Future research may examine alternative theoretical frameworks that account for other determinants, such as the role of external factors (e.g., entrepreneurial mindset, role models, and entrepreneurial passion) in the genesis and development of EI. Future research also could identify new types of moderators that prior research has not addressed. For example, future research could draw on cognitive antecedents to inquire whether an instructor's attributes – such as teaching styles, work experience, family background, and ethnicity-moderate the relationship

between EK and EI. Finally, scholars recently have become interested in the role of peers (e.g., peer entrepreneurs) in the process of forming EI, and they especially emphasized the effect of support on entrepreneurial career development (Bellò et al., 2017). Hence, future research can adopt these factors as potential moderators in the relationship between EK and EI.

7. CONCLUSIONS

The results of this meta-analysis endorse the role of EK in entrepreneurship on the basis of evidence. This discovery has potential significance for entrepreneurship education, in that it may focus consideration on other angles of the Theory of Planned Behavior, such as raising acknowledgments of social desirability and the acceptability of entrepreneurship as a career choice, as well as focusing on increasing perceived feasibility (Cooper and Lucas, 2006; Otuya et al., 2013; Piperopoulos and Dimov, 2015). If individuals who are passionate about entrepreneurship know that it is possible to create a successful business, their commitment increases and their intention to become entrepreneurs is strengthened. Moreover, PA and EK are the crucial factors for inspiring one to act in an entrepreneurial manner (Tshikovhi and Shambare, 2015).

In terms of moderating effect, women are less self-efficacious than men, which is in line with some previous literature on gender (Chen et al., 1998; Kickul et al., 2008; Marlino and Wilson, 2002). This study found that men focus on the instrumental outcomes of entrepreneurship, while women are more sensitive to social factors, and they suffer from stereotypes and ingrained notions of familial inhibit their ability to become entrepreneurs. Furthermore, women rarely received three types of support that are commonly available to men: emotional support (cohesiveness), instrumental support (financial capital), and affirmative support (business advice) (Fielden and Hunt, 2011). In consequence, they may struggle to establish formal business networks. Age has a positive correlation with the cognitive antecedents and EI, but not with EK. Older individuals who have accumulated savings over a long career have higher positive attitudes toward starting businesses than younger individuals who are still dependents financially on their parents. Our findings indicate that older entrepreneurs can navigate social stereotypes to overcome barriers in business better than young entrepreneurs. In addition, older individuals who have working experience in management can avoid the pitfalls that thwart those who are young and have less business experience. The empirical evidence suggested that founders are especially successful when starting businesses in middle age and beyond, not when they are young (Azoulay et al., 2020). More educated individuals seem to show less interest in entrepreneurship. This tendency could be explained by the fact that they hold more favorable perceptions of their prospects in the job market than those who are less educated. These results are similar to those reported by Pérez et al. (2021).

These meta-analytic findings can be used to direct teaching and education. Entrepreneurship curricula should be built on the basis of the scientific evidence presented by meta-analysis. For example, the common use of structured business planning courses in entrepreneurship curricula may represent an overestimation of their efficacy for success. In summary, this study provided insights into potential entrepreneurs and their role as future managers and executives.

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Table 1: The studies included in the meta-analysis

Studies Alphabetically by Source and	Codes for Hypotheses Tests ^{a,b}
Angulo et al., 12, (SNs-PA), 2018	Miralles et al., 24, (EK-PA, EK-SNs, PA-EI, EK-EI), 2015
Arshad et al., 9, (PA-EI, SE-EI), 2016	Mamman et al., 2, (EK-SE), 2018
Ana et al., 65, (PA-EI, SE-EI), 2017	Miranda et al., 16, (PA-EI), 2017
Agolla et al., 6, (PA-EI), 2019	Mohammed et al., 4, (PA-EI), 2017
Afroz et al., 67, (PA-EI), 2020	Marques et al., 12, (PA-EI), 2012
Ahmad and Zafar, 29, (PA-EI), 2017	Mothibi and Malebana, 1, (PA-EI), 2019
Ayodele, 18, (SE-EI), 2013	Moraes et al., 42, (SE-EI), 2017
Akanbi, 63, (SE-EI), 2013	Nieuwenhuizen, 61, (PA-EI), 2016
Asimakopoulos et al., 62, (SE-EI), 2019	Naushad, 15, (PA-EI), 2018
Abun et al., 33, (RT-EI), 2017	Ndofirepi, 50, (RT-EI), (2020)
Abun et al., 35, (EK-EI), 2018	Nwankwo et al., 18, (SE-EI), 2012
Abbas et al., 19, (SNs-EI), 2020	Oyugi, 46, (SE-EI), 2015
Asmara et al., 38, (RT-EI), 2016	Pfeifer et al., 52, (SNs-SE, SE-EI), 2014
Buana et al., 38, (EK-PA, EK-SNs, EK-EI), 2017	Papzan et al., 46, (PA-EI, SE-EI), 2014
Baidi and Suyatno, 43, (SE-EI), 2018	Phuong and Hieu, 34, (RT-EI), 2015
Carr and Sequeira, 39, (PA-EI, SE-EI), 2007	Phong et al., 10, (PA-EI, SNs-EI), 2020
Darmanto and Yuliani, 1, (EK-SE), 2018	Riverola et al., 56, (PA-EI), 2012
Doanh and Trang, 54, (PA-EI, SE-EI), 2019	Rodríguez et al., 24, (PA-EI), 2013
Dinc et al., 13, (PA-EI), 2016	Ranga et al., 64, (PA-EI), 2019
Darmanto and Yuliani, 1, (SE-EI), 2018	Sahinidis et al., 36, (SNs-EI)2012
Ebewo et al., 7, (PA-EI), 2017	Soomro and Shah, 12, (EK-SE), 2019
Entrialgo and Iglesias, 14, (PA-EI), 2016	Shah et al., 45, (PA-EI, SE-EI), 2020
Essel et al., 59, (EK-EI), 2020	Singh et al., 3, (PA-EI), 2014
Fitzsimmons and Douglas, 40, (SE-EI), 2011	Shiri et al., 28, (PA-EI), 2017
Farrukh et al., 6, (RT-EI), 2018	Shi et al., 22, (PA-EI), 2020
Giones et al., 24, (EK-PA, EK-SNs, PA-EI), 2017	Samo and Hashim, 49, (PA-EI), 2016
Gilaninia et al., 23, (EK-PA, EK-SNs, PA-EI, SNs-EI, EK-EI), 2013	Shahab et al, 30, (SE-EI), 2017
Gorgievski et al., 41, (SNs-SE, PA-EI, SNs-EI), 2017	Santoso and Oetomo, 21, (SE-EI), 2018
Gredig et al., 51, (PA-EI), 2007	Sukavejworakit et al., 43, (SE-EI), 2018
Garaika et al., 43, (SE-EI), 2019	Solesvik et al., 63, (SE-EI), 2014
Hassan et al., 12, (SNs-EI), 2020	Sun et al., 19, (RT-EI), 2020
Herdjiono et al., 31, (RT-EI), 2017	Suleman and Bingab, 6, (RT-EI), 2020
Hutasuhut, 12, (EK-EI), 2018	Tshikovhi and Shambare, 55, (EK-PA, PA-EI, EK-EI), 2015
Henley et al., 30, (PA-EI), 2017	Tammubua et al., 47, (SE-EI, RT-EI), 2015
Hossai et al., 52, (RT-EI), 2019	Torres et al., 34, (RT-EI), 2017
Izquierdo and Buelens, 26, (PA-EI, SE-EI), 2011	Utami, 17, (PA-EI), 2017
Jubari, 59, (PA-EI), 2019	Usman and Yennita, 48, (PA-EI), 2019
Karimi et al., 57, (PA-EI), 2013	Wibowo, 5, (SN-PA, PA-EI), 2016
Karyaningsih et al., 20, (EK-EI), 2020	Wathanakom et al., 50, (PA-EI), 2020
Karimi et al., 27, (PA-EI), 2015	Yamina and Mohammed, 4, (SE-EI), 2019
Khodabakhshi and Talebi, 44, (SE-EI), 2012	Zhang et al., 14, (SNs-EI), 2015
Liñán, 60, (EK-SE, SNs-PA, PA-EI, SE-EI, EK-EI), 2004	Zulfiqar et al., 8, (EK-PA, EK-SNs, PA-EI, SNs-EI), 2017
Liñán and Rodríguez, 66, (EK-SE, SNs-EI, EK-EI), 2004	Zarefard et al., 25, (EK-SE), 2018
Liñán and Chen, 37, (SNs-PA, SNs-SE, PA-EI, SE-EI), 2006	Zicheng et al., 62, (SE-EI), 2017
Laviolette et al., 30, (SE-EI), 2012	

Notes: ^aCodes in parentheses: EK: Entrepreneurial Knowledge, EI: Entrepreneurial Intention, PA: Personal Attitude, RT: Risk-Taking, SE: Self-Efficacy, SNs: Social Norms.

^bJournals are footnoted in alphabetical order: (1) *Academy of Entrepreneurship Journal*; (2) *Acta Universitatis Sapientiae, Economics and Business*; (3) *American Journal of Educational Research*; (4) *American Journal of Economics*; (5) *Asia-Pacific Management and Business Application*; (6) *Asia Pacific Journal of Innovation and Entrepreneurship*; (7) *African Journal of Business Management*; (8) *Business and Economic Research*; (9) *Career Development International*; (10) *Cogent Business & Management*; (11) *Dinamika Pendidikan*; (12) *Education and Training*; (13) *Eurasian Journal of Business and Economics*; (14) *Entrepreneurship Research Journal*; (15) *Entrepreneurship and Sustainability Issues*; (16) *European Research on Management and Business Economics*; (17) *European Research Studies Journal*; (18) *European Journal of Business and Social Sciences*; (19) *European Journal of Business and Management Research*; (20) *Entrepreneurial Business and Economics Review*; (21) *Expert Journal of Marketing*; (22) *Frontiers in Psychology*; (23) *Interdisciplinary Journal of Contemporary Research in Business*; (24) *International Entrepreneurship and Management Journal*; (25) *International Journal of Entrepreneurship*; (26) *International Journal of Entrepreneurship and Small Business*; (27) *International Journal of Psychology*; (28) *International Journal of Agricultural Management and Development*; (29) *International Journal of Business, Economics and Law*; (30) *International Journal of Entrepreneurial Behaviour & Research*; (31) *International Journal of*

Entrepreneurial Knowledge; (32) *International Journal of Psychological Research*; (33) *International Journal of Applied Research*; (34) *International Journal of Academic Research in Business and Social Sciences*; (35) *International Journal of Educational Research*; (36) *International Journal on Integrated Information Management*; (37) *Journal of Applied Social Psychology*; (38) *Journal of Business and Management*; (39) *Journal of Business Research*; (40) *Journal of Business Venturing*; (41) *Journal of Career Assessment*; (42) *Journal of Contemporary Administration*; (43) *Journal of Entrepreneurship Education*; (44) *Journal of Education and Vocational Research*; (45) *Journal of Economic Structures*; (46) *Journal of Entrepreneurship, Management and Innovation*; (47) *Journal of Entrepreneurship: Research & Practice*; (48) *Journal of Global Entrepreneurship Research*; (49) *Journal of International Business Research and Marketing*; (50) *Journal of Innovation and Entrepreneurship*; (51) *Journal of Public Health*; (52) *Journal of Small Business Management*; (53) *Journal of Small Business and Enterprise Development*; (54) *Management Science Letters*; (55) *Problems and Perspectives in Management*; (56) *Proceedings of The 7th European Conference On Innovation and Entrepreneurship*; (57) *Procedia - Social and Behavioral Sciences*; (58) *Problems and Perspectives in Management*; (59) *SAGE Open*; (60) *Studies in Higher Education*; (61) *Southern African Business Review*; (62) *Sustainability*; (63) *The African Symposium: An online journal of the African Educational Research Network*; (64) *Theoretical Economics Letters*; (65) *The Online Journal for Technical and Vocational Education and Training in Asia*; (66) *The Journal of Entrepreneurship Education*; (67) *The Jahangirnagar Journal of Marketing*

Table 2: Meta-analysis results of main effects

Hyp.	Variables		N	k	Effect Size & 95% Confidence Interval			Heterogeneity			
	Independent	Dependent			r	LCI	UCI	p-value	Chi-square	Q	I-squared
H1	EK	PA	2,496	6	.520	.491	.549	0.000	11.07	128.729	96.116
H2	EK	SNs	2,141	5	.441	.406	.474	0.000	9.483	53.899	92.579
H3	EK	SE	1,730	6	.359	.317	.400	0.000	11.07	175.419	97.150
H4	SNs	PA	1,380	4	.396	.351	.440	0.000	7.814	8.893	66.265
H5	SNs	SE	1,823	3	.239	.195	.282	0.000	5.991	5.369	62.751
H6	PA	EI	19,011	45	.499	.488	.509	0.000	60.48	893.198	95.074
H7	SNs	EI	3,349	9	.212	.179	.244	0.000	15.50	56.209	85.767
H8	SE	EI	11,972	32	.330	.313	.346	0.000	44.98	249.013	87.551
H9	RT	EI	5,126	12	.308	.283	.332	0.000	19.67	41.353	73.399
H10	EK	EI	2,891	10	.391	.359	.421	0.000	16.91	94.983	90.525

Notes: EK: Entrepreneurial Knowledge, EI: Entrepreneurial Intention, PA: Personal Attitude, SNs: Social Norms, SE: Self-Efficacy, RT: Risk-Taking.

Table 3: Meta-analysis results of moderator effects

Variables		N	k	Effect Size & 95% Confidence Interval			Heterogeneity				Significant difference
Independent	Dependent			r	LCI	UCI	p-value	Chi-square	Q	I-squared	
PA	EI	19,011	45	.499	.488	.509	.000	60.48	893.198	95.074	
Gender											
Male		12,440	22	.632	.621	.642	.000	32.67	2927.40	99.283	Y
Female		4,940	15	.454	.432	.476	.000	23.68	77.724	81.988	
Age											
Less than 25		10,574	27	.461	.445	.475	.000	38.88	432.983	93.995	Y
Higher than 25		5,452	12	.578	.560	.595	.000	19.67	199.81	94.495	

Education Background											
Undergraduate		10,573	23	.523	.509	.537	.000	33.92	558.815	96.264	N
Postgraduate		5,874	17	.526	.507	.544	.000	26.29	144.796	88.950	
SNs	EI	3,349	9	.212	.179	.244	.000	15.50	56.209	85.767	
Gender											
Male		1,776	6	.280	.237	.323	.000	11.07	38.479	87.006	Y
Female		681	2	.153	.079	.226	.000	3.841	.275	0.000	
Age											
Less than 25		1,135	4	.168	.111	.224	.000	7.814	4.085	26.737	Y
Higher than 25		658	2	.378	.310	.441	.000	3.841	33.455	97.011	
Education Background											
Undergraduate		1,042	3	.153	.093	.212	.000	5.991	1.158	0.000	Y
Postgraduate		473	2	.239	.152	.323	.000	3.841	3.144	0.076	
SE	EI	11,468	30	.332	.316	.348	.000	42.55	244.79	88.162	
Gender											
Male		5,709	12	.387	.364	.408	.000	19.67	33.357	67.023	Y
Female		2,566	8	.275	.238	.310	.000	14.06	45.091	84.476	
Age											
Less than 25		6,651	21	.310	.289	.331	.000	31.41	104.667	80.892	N
Higher than 25		876	3	.407	.350	.461	.000	5.991	53.485	96.261	
Education Background											
Undergraduate		8,212	19	.343	.323	.362	.000	28.86	105.300	82.906	N
Postgraduate		1,334	6	.427	.381	.470	.000	11.07	56.931	91.217	
EK	EI	1,731	8	.434	.401	.467	.000	14.06	59.077	88.151	
Gender											
Male		1,872	6	.467	.431	.502	.000	11.07	37.459	86.652	Y
Female		1,019	4	.235	.175	.292	.000	7.814	10.781	72.173	
Age											
Less than 25		2,182	8	.378	.341	.413	.000	11.07	74.198	90.566	N
Higher than 25		709	2	.429	.367	.487	.000	3.84	18.819	94.686	
Education Background											
Undergraduate		1,641	5	.357	.314	.399	.000	14.06	58.807	93.198	N
Postgraduate		1,250	5	.433	.386	.477	.000	14.96	30.537	86.90	

Notes: Y, yes; N, no; EK: Entrepreneurial Knowledge, EI: Entrepreneurial Intention, PA: Personal Attitude, SNs: Social Norms, SE: Self-Efficacy.

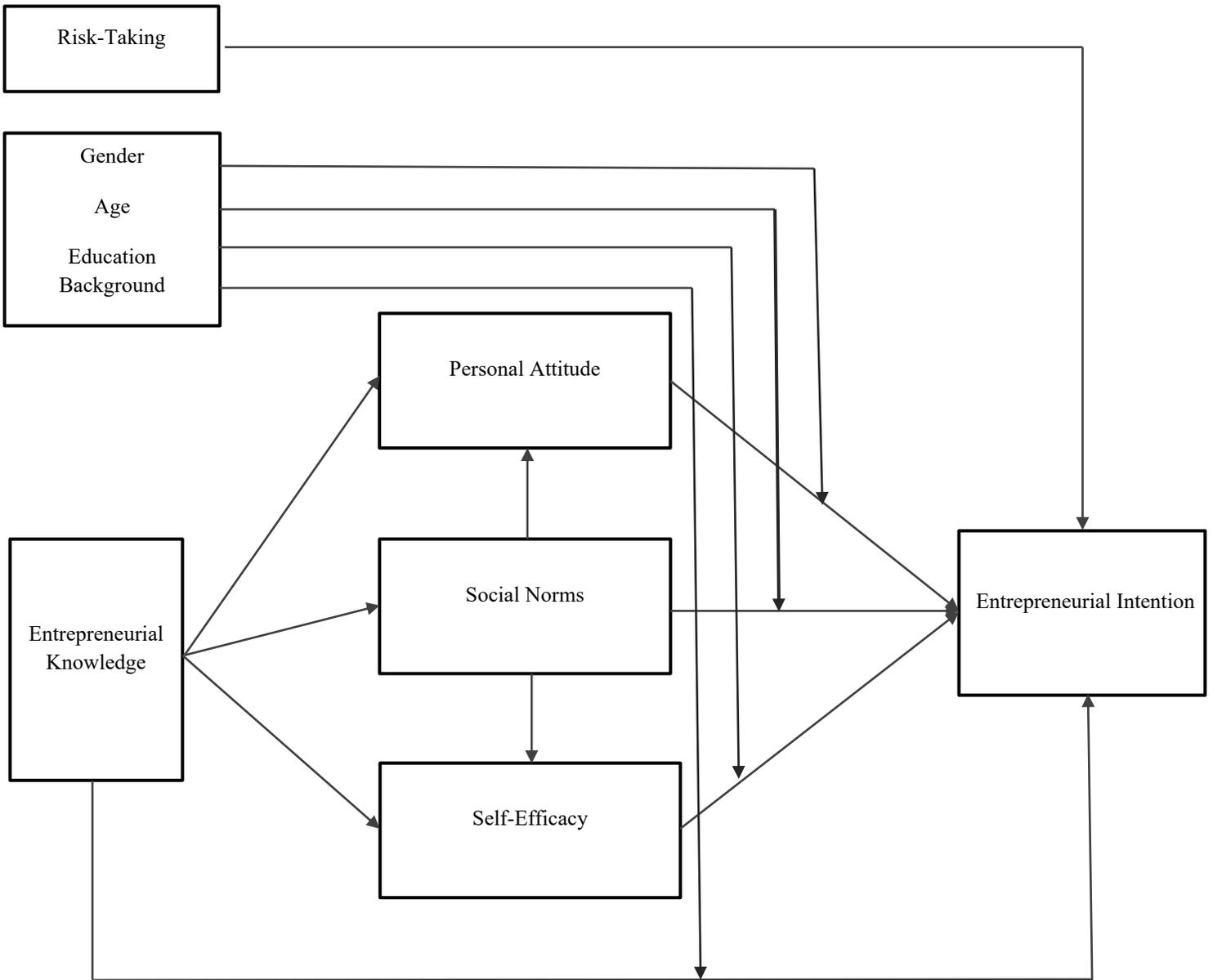


Figure 1. The conceptual framework